

The Rules of Reading

**I Will Read or Listen Like AudioBook On Phone or Other Technology
The Rules of Reading All Parts, On Daily Basis And Apply The Steps of
The Rules of Reading To Tasks, Deep Work, Deep Studies, Learning and
Studies, Values, Personal Life, Professional Life, Reflect and Review Of
Day, Journaling and Visualisation.**

- 1. Stop Doing Less Than Absolutely Your Best**
- 2. Skim Book Before Make Decision if I Want To Proceed or Quit Bad Books:**
- 3. If You Want To Quit Bad Books. Great rule is 100 pages minus your Age.**
- 4. Take Notes After 2nd Inspectional Reading.**
- 5. Read Or Listen A Book Daily.**
- 6. Never Speed Read The Book For Comprehension.**
- 7. Spend lots of time reading or listening the book.**
- 8. Read OR Listen Classical Book.**
- 9. Study Foundation of The Topic in Order to Proceed To Advance Level.**
- 10. Try To Apply The Book To Your Life. Point of Book not to look Smarter but do better in Life**

Brain Like Muscle, The Harder You Use, The Stronger it Becomes.

- 1. When Studying Any Topic, Start To Learn Foundation of The Topic.
Once You Know the Foundation of the Topic, then It is Easy To
Understand Advanced Level of The Topic. Without Learning
Foundation, You Cannot Progress Further.**
- 2. Focus And Act On What You Can Control And Influence Instead Of
What You Can't. Control What You Can And Do Not Worry About
Things I Cannot Control.**

"If You Don't Read Newspaper You are uninformed. If You Do Read It You Are Misinformed. What are the Responsibilities The Reporter Has? The Responsibility Of Reporter Is To Tell The Truth, Not Just To Be First, But To Tell The Truth. We Living In The Society, Where Just First Is Priority, who Cares, Just Get It Out There, Do Not Care Who Would It Hurts, Do Not Care Who Would Destroy, Do Not Care If It Is True, Just Say It And Sell It." **Denzel Washington**

If you want your name to be remembered after your death, either do things worth writing, or write things worth reading."
- Benjamin Franklin.

If You Don't Produce You Won't Thrive – No Matter How Skilled Or Talented You Are. Human beings, it seems, are at their best when immersed deeply in something challenging. If you service low-impact activities, therefore, you're taking away time you could be spending on higher-impact activities.

Two Core Abilities for Thriving in the New Economy

- 1. The ability to quickly master hard things.*
- 2. The ability to produce at an elite level, in terms of both quality and speed.*

Cal Newport.

IF You Not Study Or Learning History. History Tend To Repeat Itself. Always Try To Understand Historical Past Facts From Both Sides And Build On That Understanding Further. This Helps To Look AT The History Holistically And Understand The Future and Where Civilization Is Moving Toward.

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Review Generally The News And
Newspaper On Daily Basis.*

1. Reasons Do Read and Review News or Newspaper.

- I. Every Morning and At Any Time Temptation Arises To Read or Review News or Newspaper, Always Read and Listen Rules of Reading Pages 18-19, And Ask Yourself, If I am Going To Read and Review News and Newspaper For The Following GOOD Reasons: Deep Work, Academic Work, Employment, Self Employment, Investigation, Investigative Journalism, Analysis, Reading, Syntopicon, Research and For Various Writings, Thinking, Facts, Data, Mental Model, Critical Thinking, Performance, Make Better Life Decisions. If The Answer is I am NOT Reading or Review News and Newspaper For those GOOD reasons above, Then Do not Read and Review News and Newspaper at All. Any Other Reasons to Read and Review News and Newspaper Leads For Dopamine Increase and Entertainment. I MUST Not Read and Review News and Newspaper For Dopamine and Entertainment, As These Are Bad Reasons.**

2. Reasons Do Not Read Generally The Newspaper On Daily Basis.

- I. The problem is news doesn't make us informed. In fact, the more news we consume the more misinformed we become.**
- II. The speed of news delivery has increased. We used to have to wait to get a newspaper or gossip with people in our town to get news, but not anymore. Thanks to alerts, texts, and other interruptions, the news finds us almost the minute it's published.**
- III. The cost of producing news has dropped significantly. Some people write 12 blog posts a day for major newspapers. It's nearly impossible to write something thoughtful on one topic, let alone 12. The fluency of the person you're getting news from in the subject they're covering is near zero. As a result, you're filling your head with surface-level insights. "When information is cheap, attention becomes expensive." Information is something we are all curious about but how accurately can we predict the future if we fail to understand the past?**
- IV. News doesn't make you more informed; it just makes you more confident the information you have is all there is. News reinforces what we already believe. Rarely do we read things we disagree with, walking away saying, "well that was a good point, I was wrong."**

- V. As news has become easier to distribute and cheaper to produce, the quality has decreased and the quantity has increased.
- VI. The incentives are misaligned. When the news is free, you still need to pay people. If people aren't paying, advertisers are. And if advertisers are in charge, the incentives change. Page views become the name of the game. More page views mean more revenue. When it comes to page views, the more controversy, the more enraged you become, the better.
- VII. We do not to ask ourselves questions about the media we consume: Is this good for me? Is this dense with detailed information? Is this important? Is this going to stand the test of time? Is the person writing someone who is well informed on the issue? Asking those questions makes it clear the news isn't good for you.
- VIII. News producers perpetuate a culture of "tune in, don't miss out, someone knows something you don't, follow this or you'll be misinformed.
- IX. Most of what you read online today is pointless. It's not important to living a good life. It's not going to help you make better decisions. It's not going to help you understand the world. It's not dense with information. It's not going to help you develop deep and meaningful connections with the people around you.
- X. Like a drug, the news is addictive. Not only does it alter your mood, but it keeps you wanting more.
- XI. While platforms like Facebook play a role in our excessive media consumption, we are not innocent. Far from it. We want to be well informed. (More accurately, we want to appear to be well informed.) And this is the very weakness that gets manipulated. "To be completely cured of newspapers, spend a year reading the previous week's newspapers."
- XII. When you stop reading the news the first thing you notice about people who read the news is how misinformed they are. Often, they cherry-pick one piece of information and give it enormous weight in their opinions. Like the dog that didn't bark you realise that they have a tiny lens into a big and messy issue.
- XIII. Another thing you notice is that you weren't as well informed as you thought. The news didn't make your opinions more rational, it just made you more confident you were right. Rarely do we read things we disagree

with. It's much easier to just put our walls up and tune out. Filtering our own news like this self-reinforces what we already believe.

XIV. Another thing you notice is how people who are in the news a lot worry about what the news says about them. Not only does this increase their anxiety but it changes how they think and act. Instead of getting feedback from reality, they crave validation in the printed opinion of others.

XV. Not reading news shows you how often what you thought was your thinking belonged to someone else. **Thinking is hard**. It's much easier to let someone else think for you. Without news in my life, I find that I say "I don't know" more often.

XVI. Instead of the news, we should read good books. More than just read them, we should re-read them.

Step 2 - Reasons Do and Do Not Use Internet.

1. Book For NOT Using Internet and digital media.

- I. Cal Newport Digital Minimisation.

2. Reason Do Use Internet.

- I. **Every Morning and At Any Time Temptation Arises To Use Internet, Always Read and Listen Rules of Reading Pages 20, And Ask Yourself, If I am Going To Use Internet For The Following GOOD Reasons: What is Written in Digital Minimisation By Cal Newport, Deep Work, Academic Work, Employment, Self Employment, Investigation, Investigative Journalism, Analysis, Reading, Syntopicon, Research, For Various Writings, Searching For Books, Articles, Talks, Discussion, Debate, Speeches, Newspaper, Journal, Facts, Data ETC.**
- II. **For Personal: Sport and Sport Analysis, Before or While Driving To Find The Road, Restaurant, Place, Or Any Other Area and Use Google or Google Maps. If The Answer is I am NOT Going To Use Internet For those GOOD reasons above, Then Do not Use Internet at All. Any Other Reasons to To Use Internet Leads For Dopamine Increase and Entertainment. I MUST Not Use Internet For Dopamine and Entertainment, As These Are Bad Reasons.**

3. Reasons Do Not Use Internet.

- I. **Mental Health Issues**-Depression, anxiety and other mental health disorders have risen because the diagnosis methods have improved yes, but also because of isolation and the triggers and stresses. We know that Instagram harms the mental health of young girls.
- II. **The Addictive Internet**-Internet outlets are designed to be addictive. Notifications from Facebook give dopamine rewards for those red numbers, sites are made blue so you trust them more, and yellow so that you are more likely to be generous with your donations.

Step 3-Reasons Do And Do Not Use TV and Youtube, Email And Whatsapp.

1. Reason Do Watch Youtube And TV

- I. **Every Morning and At Any Time Temptation Arises To Use TV and Youtube, Always Read and Listen Rules of Reading Pages 20-21, And Always Ask Yourself, If I am Going To Watch Youtube or TV For Following GOOD Reasons: Deep Work, Employment, Self Employment, Academic Work, Investigation, Investigative Journalism, Improve Skills, Learning, Analysis, Syntopicon, Research, Data, Facts, Academic, Communication, Finance, Professional, Teaching, Sermon, For Various Writing,**
- II. **FOR Personal: Listen Music, Watch With Family Cartoon or Movie and Relax, Strategy, Tactic, Sport, Sport Analysis. If The Answer is I am NOT Going To Use TV and Youtube For those GOOD reasons above, Then Do not Use TV and YOUTUBE at All. Any Other Reasons to To Use TV and Youtube Leads For Dopamine Increase and Entertainment. I MUST Not Use TV And Youtube For Dopamine and Entertainment, As These Are Bad Reasons.**

2. Reasons Do Not Use TV and Youtube.

- I. **It feeds your mind with lies.** A great reason to stop watching television is that it's feeding your mind with lies. Mainstream television is controlled by the corporate elite, which, due to its vested interests, brainwashes TV viewers with false information.
- II. **It makes you feel bad about yourself.** For advertisements to work, they first need to convince you that you are not good enough as you are. For example, in order to persuade you to buy beauty and fashion products, they first need to make you believe that you are ugly and unattractive.
- III. **It's harming your health.** Another obvious yet often unrecognised reason why you'd better stop watching TV is that it's having a negative impact on your health. Indeed, over the last years research has shown that watching TV for even just a

couple of hours every day can significantly increase the chances of obesity, heart disease, and diabetes.

IV. It disconnects you from people. People are social beings with a deep desire to connect and communicate with others. However, being used to spending hours upon hours watching TV, the majority of them sooner or later end up feeling lonely.

3. Check SMS, Email and WhatsApp Twice A day.

I. At Lunch Time and In the Evening.

4. Times To Answer A Call

I. Family (At All Time).

II. Urgent Call (At Any Time).

III. Job (At Any Time During My Working Hours).

IV. Job Interview (Specified Time).

V. For Others Be Very Hard To Reach. They Can Reach Either Call or Email.

5. Every Morning and At Any Time Temptation Arises To Use PC, Ask Yourself What are the reasons to use PC. Below are Good Reasons to Use PC.

I. For Employment, Self Employment, Profesional, Academic, Investigation, Investigative Journalism, Studying, Learning, Deep Study, Deep Work.

II. For Reading, Analysis, Syntopicon, Research, Bible Study, For Various Writing, Journaling, Setting Up Goals, Sport Analysis, Analysis, Teaching, Strategy and Tactics

III. For Check Emails, Letters, Finance and Investment.

IV. For Inserting Sport Techniques and What do I do.

IF I am Not using for Good Reasons, then Do not USE PC at All.

Step 4-NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Myth of Multitasking_ How Doing it All Gets Nothing Done

*Part 2: Steps In Choosing Topic,
Skimming The Books, Articles
Debate, Discussion For Deep Work
Or Deep Study Or Bible Study.*

Step 5 - How To Become Polymath.

1. What Are The Lesson, How To Become Polymath.

A. Lesson 1- Diversify

- I. The winning strategy of polymath is diversification.
- II. Polymath always has several projects on the go.
- III. The successful polymath trying to get range of skills in the areas between fields that they will be able to explore and capitalise on.
- IV. Many polymaths has peers who worked on the same projects and even have rivals.

B. Lesson 2-Be fearless

- I. Polymath are working by themselves despite sometimes extreme resistance and interference from the rest of world.
- II. Many of polymaths have had to push back against ignorance, fear, politics and more.
- III. Polymath is driven by deep inner drive for knowledge, the misunderstanding and disapproval of others is just small impediment.

C. Lesson 3-Seek Authenticity

- I. Polymaths strive for new and unique achievement: fresh visions, novel horizons and totally original combination of ideas.
- II. Polymaths resist easy definition and focus simply on being what they are, following what inspires them and exploring their unique endowment of gifts to the fullest.
- III. Polymath acknowledge mistakes, because the faster they admit they are wrong, the sooner they can find a way to be right.
- IV. Polymath is motivated by curiosity and the will for mastery.

2. Listen, and Apply The Following Books on Polymaths

A. Learn Like like a polymath how to teach yourself anything By Peter Hollins

**B. THE POLYMATH UNLOCKING THE POWER OF HUMAN VERSATILITY By
WAQĀS AHMED**

Step 6-Choose The Topic.

- 1. Read About The Past: If You do not know the Past, then we will tend to Repeat The Same Mistakes.**
- 2. Decide the reason of wanting to read:**
 - A. Reading to Entertain — The level of reading taught in our elementary schools.**
 - B. Reading to Inform — A superficial read. You skim, dive in and out, get a feel for the book, and get the gist of things.**
 - C. Reading to Understand— The real workhorse of reading. This is a thorough reading where you chew on things and digest them.**
 - D. Reading to Master — If you just read one book on a topic, odds are you have a lot of blind spots in your knowledge. Synoptical reading is reading various books and articles on the same topic, finding and evaluating the contradictions, and forming an opinion.**
- 3. List of Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics.**
 - A. Academic Fields.**
 - I. Humanities.**
 - Performance Arts.
 - Visual Arts.
 - History.
 - Languages and Literature.
 - Law.
 - Philosophy.
 - Religious Studies.
 - Theology.
 - II. Social Science.**
 - Anthropology.
 - Archeology.
 - Economics.
 - Geography.

- **Political Science.**
- **Psychology.**
- **Sociology.**
- **Social Work.**

III. Natural Science.

- **Biology.**
- **Chemistry.**
- **Earth Science.**
- **Astronomy.**
- **Physics.**

IV. Formal Science.

- **Computer Science.**
- **Mathematics.**

V. Applied Science.

- **Agriculture.**
- **Architecture and Design.**
- **Business.**
- **Divinity.**
- **Education.**
- **Engineering and Technology.**
- **Environmental studies and forestry.**
- **Family and Consumer Science.**
- **Human Physical performance and recreation.**
- **Journalism, media studies and communication.**
- **Law.**
- **Library and Museum Studies.**
- **Medicine and Health.**
- **Military Science.**
- **Public Administration.**
- **Social Work.**
- **Transportation.**

- B. Syntopicon Part 1 and Part 2**
- C. Great Conversation**
- D. Great Problems and how to solve them in my Working Industry.**
- E. Great Inventions.**
- F. Character Quality.**
- G. Thematic**
- H. Topics**
- I. Words**
- J. Great Inventors.**
- K. Great Thinkers**
- L. Great Philosophers**
- M. Great Problems in History.**
- N. Great Events in History.**
- O. Great People in History.**
- P. Great Ideas.**
 - I. Truth.**
 - II. Goodness.**
 - III. Beauty.**
 - IV. Liberty.**
 - V. Equality.**
 - VI. Justice.**
 - VII. ANGEL.**
 - VIII. ANIMAL.**
 - IX. ARISTOCRACY.**
 - X. ART.**
 - XI. ASTRONOMY AND COSMOLOGY.**
 - XII. BEING.**
 - XIII. CAUSE.**
 - XIV. CHANCE.**
 - XV. CITIZEN.**
 - XVI. CONSTITUTION.**
 - XVII. COURAGE.**
 - XVIII. CUSTOM AND CONVENTION.**
 - XIX. DEFINITION.**
 - XX. DEMOCRACY.**

XXI.DESIRE.
XXII.DIALECTIC.
XXIII.DUTY.
XXIV.EDUCATION.
XXV.ELEMENT.
XXVI.EMOTION.
XXVII.EQUALITY.
XXVIII.ETERNITY.
XXIX.EVOLUTION.
XXX.EXPERIENCE.
XXXI.FAMILY.
XXXII.FATE.
XXXIII.FORM.
XXXIV.GOD.
XXXV.GOOD AND EVIL.
XXXVI.GOVERNMENT.
XXXVII.HABIT.
XXXVIII.HAPPINESS.
XXXIX.HISTORY.
XL.HONOR.
XLI.HYPOTHESIS.
XLII.IDEA.
XLIII.IMMORTALITY.
XLIV.INDUCTION.
XLV.INFINITY.
XLVI.JUDGMENT.
XLVII.JUSTICE.
XLVIII.KNOWLEDGE.
XLIX.LABOR.
L. LANGUAGE.
LI. LAW.
LII. LIBERTY.
LIII.LIFE AND DEATH.
LIV.LOGIC.
LV. LOVE.

LVI.MAN.
LVII.MATHEMATICS.
LVIII.MATTER.
LIX.MECHANICS.
LX.MEDICINE.
LXI.MEMORY AND IMAGINATION.
LXII.METAPHYSICS.
LXIII.MIND.
LXIV.MONARCHY.
LXV.NATURE.
LXVI.NECESSITY AND CONTINGENCY.
LXVII.OLIGARCHY.
LXVIII.ONE AND MANY.
LXIX.OPINION.
LXX.OPPOSITION.
LXXI.PHILOSOPHY.
LXXII.PHYSICS.
LXXIII.PLEASURE AND PAIN.
LXXIV.POETRY.
LXXV.PRINCIPLE.
LXXVI.PROGRESS.
LXXVII.PROPHECY.
LXXVIII.PRUDENCE.
LXXIX.PUNISHMENT.
LXXX.QUALITY.
LXXXI.QUANTITY.
LXXXII.REASONING.
LXXXIII.RELATION.
LXXXIV.RELIGION.
LXXXV.REVOLUTION.
LXXXVI.RHETORIC.
LXXXVII.SAME AND OTHER.
LXXXVIII.SCIENCE.
LXXXIX.SENSE.
XC.SIGN AND SYMBOL.

XCI.SIN.

XCII.SLAVERY.

XCIII.SOUL.

XCIV.SPACE.

XCV.STATE.

XCVI.TEMPERANCE.

XCVII.THEOLOGY.

XCVIII.TIME.

XCIX.TRUTH.

C. TYRANNY AND DESPOTISM.

CI. UNIVERSAL AND PARTICULAR.

CII.VIRTUE AND VICE.

CIII.WAR AND PEACE.

CIV.WEALTH.

CV.WILL.

CVI.WISDOM.

4. Books on the Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics.

- I. The Great Ideas: A Syntopicon of Great Books of Western World part 1
By Mortimer Adler.**
- II. The Great Ideas: A Syntopicon of Great Books of Western World part 2
By Mortimer Adler.**
- III. Great Thinkers, Great Ideas By Vincent J Falcone.**
- IV. The Oxford Companion to English Literature.**
- V. Treasury Scripture Knowledge.**

5. Pick Different Areas To Achieve.

- I. Pick a minimum of Three Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics, or skills that are sufficiently distinct from each other. Do not choose subset of the same subject.**
- II. Instead choose combination which are different and distinct and even better if these have some relevance to your work.**

6. Decide Any Topics, Problem or Courses I Will Study Academically, Self Learning and Autodidactic or Deep Work.

I. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.

II. Brainstorm Idea, Topics and Problems.

A. What Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics Do I want To Study?

B. Do I want to study the topic related to my Job, Hobby and Interest?

C. Do I want To Study Newest Topic, Problem or The topic which stood the test of time?

D. Make A list of Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics that I am Interested.

III. Select A Topic or Course.

A. Pick Ideas, Problems, Historical Events, Inventions, Inventors, Historical People, Great Problems and Topics. I am interested in at the moment.

B. Choose a problem or topic above yourself which are challenging.

- Choose your topics carefully: Not everything that you study suits this technique. Usually abstract complex ideas are best understood by Feynman technique but ideas that are evidence-based or observational might not really be suited for this.

C. Why should I solve this problem? (give positives).

D. Why should I solve this problem? (give negatives, what would happen if I would not solve this problem?).

E. Define the topic or problem?

F. Read Great Books of Western World, and Reflect on the current world and Move Forward.

G. Read About The Past: If You do not know the Past, then we will tend to Repeat The Same Mistakes.

7. Write What I Do Know About the Topic or Problem and What I Do Not Know.

- I. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.
- II. Selecting a concept to study compels you to be intentional about. what you know, what you don't know and what You think You know. It also forces you to choose a topic that's small enough that it could reasonably fit onto one or several pages.
 - A. Before you start reading a new book, take out a blank sheet of paper. Write down what you know about the book/subject you're about to read — a mind map.



B. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle but never fool yourself about where it stands today, and never be afraid to say "I don't know."

- C. **You face what you don't know.** By writing a topic down on a blank page, you acknowledge you're starting from scratch or at least filling in some blanks. In doing so, take the initial step in the process.
- D. **You need to be specific.** Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.

III. Write Down General Facts About The Topic That I Know.

IV. Identify and define the current assumptions on topic or problem.

- V. Write Down What Would I like To Learn About The Subject.**
- VI. Identify where you are reasoning from analogy.**
- VII. Break Down the problem into its fundamental principles.**
- VIII. How am I going to conduct research?**
- IX. Who else has same problem, and solved the problem.**
- X. Have they written a book about this topic?**
- XI. Have they recommended any books related to this topic?**
- XII. Have they recommended a of book related to this topic?**
- XIII. Build your foundation. The key here is brutal honesty with yourself about
What we really know about the Topic.**
- XIV. Understanding the basics allows us to predict what matters. Put simply,
people who understand the basics are better at understanding the
Consequences.**
- XV. This helps to find out what exactly we do know and do not know about
the topic.**
- XVI. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time
and Do Not Rush Process.**

8. Analyse Current Skills and Experience.

- I. Analyse current skills, experiences and interests to spot gaps in
knowledge.**
- II. Where are you lacking compared to your future self?**
- III. What do you already know and do well?**
- IV. What do you still need to learn?**
- V. Can other people fill in these gaps of knowledge?**
- VI. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and
Do Not Rush Process.**

Step 7-Questions to Ask Yourself Before Saying YES to a New Commitment AND What Type of Mindset To Have.

1. Everyone wants a part of your time. The problem is we don't really understand the nature of time. And so we waste it. We can learn to better harmonise our time across the things that we want. One of the ways to do that is to avoid things that are unproductive.
2. We need to learn that the most powerful productivity tool ever invented is simply the word "no." And you can say no with grace. But how do we know when we should say yes and when we should say no?
3. Ask yourself three simple questions before you accept any new commitment.
 - I. Am I the right person?
 - II. Is this the right time?
 - III. Do I have enough information?
 - IV. If the answer to any of those questions is no, then don't do it.
4. What Type of Mindset To Have, When Starting To Read, Analyse, Syntopicon, Research, Listen, Communication, Performance, DEEP WORK, Bible Study, Investigative Journalism, Investigation And Mixed Method.
 - I. Be attentive to Detailed Focus, and review information few times to ensure the information I providing are correct and True.
 - II. Be analytical mindset, and analyse information and Situation to smallest details.
 - III. Be curious mindset
 - IV. Be working at natural pace, this helps to ensure that information provided are correct and well analysed.
 - V. Have learning mindset, and enjoy learning new things, this helps me to grow.
 - VI. Be Problem Solving Mindset
 - VII.Be growing mindset.

Step 8-What Tools I Will Use For Learning?

1. The Broad Overview.

- I. Look at the ***What to use in different situation***, and find out what tools will I use for learning.
- II. Find Overall Broad Overview of the Topic.
- III. What are the essential details we need to know before attempting to master it?
- IV. What does this topic or skill truly entail?
- V. How extensive is the subject?
- VI. Taken big topic cut it down to pieces and decided which piece we like best
 - Coding as broad subject, we divided into specific languages and agreed upon one or a few languages to learn.
 - Focus on one or two offers us much bigger and higher chance of success.
- VII. Our goal is to infer the appropriate scope for our topic such that it takes from few weeks to a month to grasp.
- VIII. Determine appropriate scope that can be learned within a practical timeframe.
This time period must also be carefully chosen to maximise focus on task.
- IX. Follow your own method of breaking down subjects into small parts. You are organise information for your own specific goals, not based on how others have done it.
- X. Condemnation before investigation. Set Aside Whatever you been taught and believe about topic and look with fresh eyes and try to hear what text is saying.
- XI. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

Step 9 - Narrow Down Subject or Topic.

1. Narrow Down.

- I. Narrow down your subject, but this one is restricted to understand enough about the topic to discuss intelligibly and found out for yourself what the true scope is.
 - What is it about?
 - Is the topic something basic that a layperson could grasp in few hours or is it too complex like physics for an untrained individual to pursue?
 - How much literature has been devoted to this subject?
 - How much do you need to learn to understand the topic adequately?
- II. What are Basics, Foundation and Fundamental of the Craft or Topic.
 - Without Basics, Foundation and Fundamentals, You cannot Progress.
- III. What Do I need For Fundamental, Foundation and Basic?
- IV. You don't need to understand the latest study in biology, but you sure as heck better understand the concept of evolution because it applies to so much more than animals.
- V. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

2. Define Success.

- I. Look at the ***What to use in different situation***, and find out what tools will I use for learning.
- II. We need to design an objective, measurable criteria for success so that we can know whether we have fulfilled it to a mathematical certainty.
- III. The best way to effectively complete this step is to consider why you intended to learn your chosen subject at all.
- IV. Is there a particular task or function that you would like to be able to perform through learning your chosen subject?
 - E.g Digital photography-the goal of learning digital photography and criteria of using manual modes along with manipulating lighting are both sound.
 - To master digital photography completely, you would have to learn about all of its various subtopics and depending on your motivation for studying, it might be gratifying to achieve that outcome through learning experience.

- V. Ideally the goal should be to learn something that is practically beneficial since using your new skills will reinforce your entire learning process, making easier for you to retain the knowledge.

Step 10 - Information overload: Why we're facing it and how to handle it.

1. It's learning how to search out, consume, and filter it in the best way possible.

- I. There's nothing wrong with having a healthy thirst for current events. The problem is that our news sources have turned from a water fountain to a firehose and propaganda.
- II. Instead of making a choice and feeling good about it, we end up in a constant state of FOMO, stressing that we've made the wrong decision and searching for something better.
- III. "You have to choose what you consume consciously... The information you allow yourself to process affects you greatly. You can become confused quickly with all of the conflicting voices, opinions, and options in the world today."

2. How not to be overloaded with Information

- I. Choose "Just in time" over "Just in case" information. There's a difference between searching out information because you need it now versus just storing it for later.
- II. "Think about the last technical topic you learned from either a class or a book. How much of the details do you remember? The answer probably depends a lot on whether you knew that you needed to be able to do that particular thing you were learning. And that's huge. "Because if even at a high level you know you need to learn PHP, if the parts your studying don't seem directly related to what you know you want to do, the learning will be weak." Think about how you can apply this technique to your information consumption. Rather than read every news story just in case it comes up in conversation, seek out only what you need now. This doesn't mean that you should forgo any information that doesn't have an immediate purpose. But simply to use this as a filter when you're feeling the effects of information overload.

- III. Slow the news cycle by choosing a trusted source and signing up for their newsletter.**
- IV. Rather than get caught up in the “breaking” part of news where facts are more uncertain, slow news is the idea of a longer news cycle that focuses more on fact-checking and careful reporting than being first to report on a story. Gillmor’s gone so far as to cut down on news-based RSS feeds, stop checking Twitter, and even deleted his browser bookmarks to news sites. As he explains: “The more current the news is, the more skeptical I am of what I’m seeing.” Instead, he gets his “slow news” from mailing lists where experts send out links to information they believe is useful and important.**
- V. If you’re feeling the effects of information overload, you can always take a break. Wikipedia never prompts you to go take a break. While YouTube and Netflix purposefully push you to consume more and more. Instead, it’s up to us to become better content and information consumers. We should all schedule breaks into our day, set hard limits on when and how much information we consume, and keep our digital and physical spaces clutter free and well organised.**

Step 11-Compile Resources And Create Curriculum.

1. Compiling Resources.

- I. Look at the ***What to use in different situation***, and find out what tools will I use for learning.
- II. We need to do is compile every recourse we can find on our topic without filtering them. Given the plurality and different mediums used for sharing information. It is advisable to give your method of compilation some lengthy consideration to help you think out of the box.
- III. Find the appropriate books, but consider other mediums like blogs, courses, through friends, find expert, podcasts, magazines, journals, articles, newspapers.
- IV. Read Great Books Of Western World or Classical Books.
- V. Maximise the Number of good resources at your disposal on the topic.
- VI. Create a folder for bookmarks on the topic with relevant resources.
- VII. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

2. Create A Curriculum.

- I. Look at the ***What to use in different situation***, and find out what tools will I use for learning.
- II. Create a learning plan for the subject. This is creating an outline what you want to learn.
- III. The Subtopic you have chosen, break down into smaller parts.
 - Review and Analyse table of contents in the books, videos, blogs that you chosen.
 - This can help you to see the structure and even see how everything begins to coverage and overlap. Observe different authors have break down the topic. If all the authors break down similar way the topic, then you should follow same learning plan.
 - Based on the different authors, you can also get the sense of which perspective on the topic are less frequently included.

Step 12-Filter Resources.

1. Filter Resources.

- I. Look at the ***What to use in different situation***, and find out what tools will I use for learning.
- II. **As Learner, if I am going to search for the resources online, does Search Engines put me in the Filter Bubble?**
 - A. **We're increasingly trapped inside an algorithm that filters our news based on what it thinks is best for us.**
 - B. **Computers and the algorithms they run are increasingly aware of the things we seem to like. They learn from what we click on and tailor results so we get more of what we like and less of what we don't like.**
 - C. If Google knows that I'm a democrat or republican they *could* now add a filter to my news to show me only the stories I'm predisposed to agree with. Based on their guess as to my education level, they may then tailor the article's words and language to maximise its impact on me. In this world, I only see things I agree with and writing that I easily comprehend and that's a problem
- III. As Learner, there are number of resources available on any given topic, but we simply don't have the time to pursue them all.
- IV. Attempt to read every book, blogpost or article on single topic bound to result in failure.
- V. Filter resources. The primary goal at this point is to prune (cut) our collection of resources to preserve only the best and avoid overwhelmed by all the material we have collected.
- VI. This helps financially, since you won't need to purchase ten different books to learn about topic.
- VII. The most important part of this step is to carefully and efficiently scan through your resources to select the best ones among them.
- VIII. The entire purpose of selecting these particular resources is for you to learn a specific topic that you choose earlier, not to take all information you have gathered.
- IX. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

*Step 13-Choose A Book, Article, Talk,
Discussion, Debate, Speeches, Research,
Newspaper, Journal And Give The Reason
of The Choice*

1. **Study Foundation and Start the Beginning Of The Topic.** Get back to basics. Understanding the basics, as boring as it sounds, is one of the key elements of effective thinking. A lot of people assume the basics are not important and never really take the time to learn them, preferring the sexiness of complexity. Understanding a simple idea deeply, however, creates more lasting knowledge and builds a solid foundation for complex ideas later. The more basic knowledge you have ... the less new knowledge you have to get. Build your foundation. The key here is brutal honesty with yourself about what you really know. Take the time to do a Feynman One Pager on an idea you think you know really well. While easy, this process will reveal any gaps you have in your knowledge. The multidisciplinary mind understands the basic ideas. Acquiring the basic mental models from multiple disciplines allows you to see things that other people can't. You don't need to understand the latest study in biology, but you sure as heck better understand the concept of evolution because it applies to so much more than animals. Understanding the basics allows us to predict what matters. Put simply, people who understand the basics are better at understanding second and subsequent order consequences. Plus, how are we to have a chance of understanding complex ideas without a firm understanding of the basics. Remember, the slightest wind blows over a house without a foundation.
2. **Find Who is Leading Figure On That Topic.**
3. **Let Time Filter Books.** What has been will continue to be. The second idea is the Lindy Effect, which is just a fancy way of saying what's been around will continue to be around. The nonperishable is anything that does not have organic or avoidable expiration dates. Time can predict value. While produce and humans have a mathematical life expectancy that decreases with each day, some things, like books, increase in life expectancy with each passing day.

4. This is where the art of not reading comes in. We have a choice, even if we refuse to exercise it. Schopenhauer offers us guidance on what to read. Remember rather that the man who writes for fools always finds a large public: and only read for a limited and definite time exclusively the words of great minds, those who surpass other men of all time and countries, and whom the voice of fame points to as such. These alone really educate and instruct.
5. Furthering this notion, he adds: One can never read too little of bad or too much of good books: bad books are intellectual poison; they destroy the mind. Which can equally apply to the websites and articles that consume us. Before we know it, we develop a Pot-Belly of Ignorance.
6. Inverting the problem, Schopenhauer suggests, “in order to read what is good, one must make it a condition never to read what is bad; for life is short, and both time and strength limited.” It is because people will only read what is the newest instead of what is the best of all ages, that writers remain in the narrow circle of prevailing ideas, and that the age sinks deeper and deeper in its own mire.
7. Understanding Time-Tested Ideas. So let’s combine these ideas and focus on reading basic ideas that have stood the test of time as a means to understanding them better. Knowledge has a half-life. The most useful knowledge is a broad-based multidisciplinary education of the basics. These ideas are ones that have lasted, and thus will last, for a long time. And by last, I mean mathematical expectation; I know what will happen in general but not each individual case.

8. To Find Book, Article, Talk, Discussion, Debate, Speeches, Research, Newspaper and Journal, Use the Following Books

- I. Great Books of the Western World Part 1: By Mortimer Adler.
- II. Great Books of the Western World Part 1: By Mortimer Adler.
- III. The CBPC Reference Library Catalogue.
- IV. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 1.
- V. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 2.
- VI. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 3.
- VII. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 4.
- VIII. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 5.
- IX. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 6.
- X. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 7.
- XI. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 8.
- XII. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 9.
- XIII. An Index to English Periodical Literature on the Old Testament and Ancient Near Vol 10.
- XIV. Google.
- XV. Library.
- XVI. Google Scholar.
- XVII. internet.

9. Choose A Book, Article, Talk, Discussion, Debate, Speeches, Research, Newspaper, Journal And Give The Reason of The Choice.

- I. It turns out that most of the time the best way to improve your Reading Return on Invested Time (RROIT) is to carefully filter the books you read.
- II. Create a tentative bibliography of your subject by recourse to library catalogues, advisors, and bibliographies in books.
- III. Inspect *all* of the Books, Articles, Talk, Discussion, Debates, Speeches, Research, Newspaper on the tentative bibliography to ascertain which are germane to your subject, and also to acquire a clearer idea of the subject.
- IV. Do not choose the Books, Articles, Talk, Discussion, Debates, Speeches, Research, Newspaper which has idea have not stood the test of time.
- V. Choose Books, Articles, Talk, Discussion, Debates, Speeches, Research, Newspaper on Topic that Time was Tested and withstand the scrutiny.
- VI. Return on Investment on reading and understanding a concept from 500 years ago is highly likely to be exponentially greater in the long run than one presented only 5 years ago.
- VII. Read Great Books of Western World, and Reflect on the current world and Move Forward.
- VIII. If you must read the news, read it for the facts and the data, not the opinions.

10. Ask Questions, Why I Will Use This Book, Articles, Talk, Discussion, Debates, Speeches, Research, Newspaper.

- I. What is the reason I'm choosing this Book, Article, Talk, Discussion, Debate, Speeches, Researches, Newspaper and Journal on the topic?
- II. Why do I think this book will be helpful or good on this topic?
- III. Decide the reason I will Listen, read, research this Book, Article, Talk Discussion, Debate, Speeches, Researches, Newspaper and Journal on the topic?
- IV. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

11. There are few type of reading:

- Read for Entertainment
- Read for Information
- Read for Understanding and Learning

Step 14 - My Philosophy

1. When it comes to reading, you don't need to finish what you start. You can quit. Once you realize that you can quit without guilt, everything changes.
2. Reading a great book twice is better than reading ten average ones. All the time you spend reading something bad comes at the expense of reading something good.
3. My philosophy with reading is simple:
 - I. Skim a lot of books.
 - II. Read a few that deserve undivided attention.
 - III. Immediately re-read the best ones twice.

Step 15-Intelligently Skimming Through The Book. VERY VERY FAST READING AND SKIMMING.

1. Intelligently Skimming Through The Book.

- I. Doing the Intelligently Skimming: Book, Text, Discussion, Talk, Speech, Communication, Research, Writing, Preach, Debate, Public Speaking.
- II. Should take approximately 1-3 hours.
- III. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.
- IV. Intelligently Skimming.
- V. Decide, if this is worth to Pursue Further, Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method.

VERY VERY FAST READING AND Systematic Skimming or Pre-Reading.

Inspectional Reading I: Systematic Skimming or Pre-reading

1. **LOOK AT THE TITLE PAGE AND, IF THE Source HAS ONE, AT ITS PREFACE.**
Read each quickly. Note especially the subtitles or other indications of the scope or aim of the book or of the author's special angle on his subject. Before completing this step you should have a good idea of the subject, and, if you wish, you may pause for a moment to place the book in the appropriate category in your mind. What pigeonhole that already contains other books does this one belong in?
2. **STUDY THE TABLE OF CONTENTS** to obtain a general sense of the book's structure; use it as you would a road map before taking a trip. It is astonishing how many people never even glance at a book's table of contents unless they wish to look something up in it. In fact, many authors spend a considerable amount of time in creating the table of

contents, and it is sad to think their efforts are often wasted. It used to be a common practice, especially in expository works, but sometimes even in novels and poems, to write very full tables of contents, with the chapters or parts broken down into many subtitles indicative of the topics covered. Milton, for example, wrote more or less lengthy headings, or “Arguments,” as he called them, for each book of *Paradise Lost*. Gibbon published his *Decline and Fall of the Roman Empire* with an extensive analytical table of contents for each chapter. Such summaries are no longer common, although occasionally you do still come across an analytical table of contents. One reason for the decline of the practice may be that people are not so likely to read tables of contents as they once were. Also, publishers have come to feel that a less revealing table of contents is more seductive than a completely frank and open one. Readers, they feel, will be attracted to a book with more or less mysterious chapter titles—they will want to read the book to find out what the chapters are about. Even so, a table of contents can be valuable, and you should read it carefully before going on to the rest of the book. At this point, you might turn back to the table of contents of this book, if you have not already read it. We tried to make it as full and informative as we could. Examining it should give you a good idea of what we are trying to do.

3. **Understand the language of the Resource.** This means skimming the index. Not only will this give you an idea for the range of topics covered but it will also tell you the other people the book connects to and the jargon used in the book.
4. **CHECK THE INDEX** if the book has one—most expository works do. Make a quick estimate of the range of topics covered and of the kinds of books and authors referred to. When you see terms listed that seem crucial, look up at least some of the passages cited. (We will have much more to say about crucial terms in Part Two. Here you must make your judgment of their importance on the basis of your general sense of the book, as obtained from steps 1 and 2.) The passages you read may contain the crux—the point on which the book hinges —or the new departure which is the key to the author’s approach and attitude. As in the case of the table of contents, you might at this point check the index of this book. You will recognise as crucial some terms that have already been discussed. Can you identify, for example, by the number of references under them, any others that also seem important?

5. **If the Source is a new one with a dust jacket, READ THE PUBLISHER'S BLURB.**

Some people have the impression that the blurb is never anything but sheer puffery. But this is quite often not true, especially in the case of expository works. The blurbs of many of these books are written by the authors themselves, admittedly with the help of the publisher's public relations department. It is not uncommon for authors to try to summarise as accurately as they can the main points in their book. These efforts should not go unnoticed. Of course, if the blurb is nothing but a puff for the book, you will ordinarily be able to discover this at a glance. But that in itself can tell you something about the work. Perhaps the book does not say anything of importance—and that is why the blurb does not say anything, either. Upon completing these first four steps you may already have enough information about the book to know that you want to read it more carefully, or that you do not want or need to read it at all. In either case, you may put it aside for the moment. If you do not do so, you are now ready to skim the book, properly speaking.

6. **One reason why titles and prefaces are ignored by many readers is that they do not think it important to classify the Source they are reading.**

They do not follow this first rule of analytical reading. If they tried to follow it, they would be grateful to the author for helping them. Obviously, the author thinks it is important for the reader to know the kind of book he is being given. That is why he goes to the trouble of making it plain in the preface, and usually tries to make his title—or at least his subtitle—descriptive. Thus, Einstein and Infeld, in their preface to *The Evolution of Physics*, tell the reader that they expect him to know “that a scientific book, even though popular, must not be read in the same way as a novel.” They also construct an analytical table of contents to advise the reader in advance of the details of their treatment. In any event, the chapter headings listed in the front serve the purpose of amplifying the significance of the main title.

7. **From your general and still rather vague knowledge of the Source's contents, LOOK NOW AT THE CHAPTERS THAT SEEM TO BE PIVOTAL TO ITS ARGUMENT.**

If these chapters have summary statements in their opening or closing pages, as they often do, read these statements carefully. At this point, you have an overview of the jargon and the journey the author is taking you on. It should be relatively easy to identify the pivotal chapter to the argument. Dive into these reading bits and pieces. How are they structured? How connected is it to the rest of the book?

Is this a place you want to end up? Turn the pages and dive in here and there with a few paragraphs or even pages.

8. **Finally, TURN THE PAGES, DIPPING IN HERE AND THERE, READING A PARAGRAPH OR TWO, SOMETIMES SEVERAL PAGES IN SEQUENCE, NEVER MORE THAN THAT.** Thumb through the book in this way, always looking for signs of the main contention, listening for the basic pulse beat of the matter. Above all, do not fail to read the last two or three pages, or, if these are an epilogue, the last few pages of the main part of the book. Few authors are able to resist the temptation to sum up what they think is new and important about their work in these pages. You do not want to miss this, even though, as sometimes happens, the author himself may be wrong in his judgment.
9. **Read the end.** Authors generally do a good job summarizing their work in the last few pages. This where they sum up what they think is most important about their work.
10. **Listen to an interview.** While this has nothing to do with the actual book, interviews can be a great way to get the gist of a book in 30m or so. Authors do so much promotion now that it's relatively easy to find interviews. And of course, they use the best examples from the book in these interviews.
11. If the book is over your head this is reason to read it, as this helps to improve yourself and forces you to work on the book to understand.
12. There are Books that can be:
 - I. Tasted.
 - II. Swallowed.
 - III. Chew and Digested.
13. **Deciding to Read a Book.**
14. That's how you intelligently skim a book. Once you get some practice, it should take at most, an hour.
15. Skimming helps you reach a decision point: Does this book deserve more of my time and attention? Why?

16. Unless you're reading for entertainment, if you can't answer that question, you can toss the book.
17. Mastering intelligent skimming will:
- Save you a lot of time because most books are not worth reading.
 - Offer knowledge of the book's blueprint and contents so you know where to find stuff if you need it in the future.
 - Improve retention, if you decide to read the book in its entirety because you've primed your brain with the contents.
18. Do I need prerequisite for this book or not? Do I need Some Tools Necessary for Understanding this Book? Or Am I intellectually Lazy for this Book?
19. Do I need to put Enough of Thought and time to this book?
20. Never Read A book Just to Win an Argument, but be open minded for Author's Persuasion and convince.
21. It is not about how many books do you read, it is whether you digest of master thinkers. It is not about quantity, but about quality, like great books of western world or Stoics.
22. Great Writers are very specific about the words they use and how they use them. Great Writers, wrote a sentence that can be commented in a Book. While modern writers write a book that can be sum up in a sentence.
23. Do Not Try to put your thoughts, or what I feel the text could mean or mean to me into, but let the author say what does he mean and says in the text.
24. Some Books You need a Teacher, who Studied The Text to help you through the text.
25. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.
26. Do not read the newest books, but the great books of western world, stoic and classics, as these books stood the test of time.

Step 16- Find Out What Kind of Resource is this?

1. Find Out What Kind of Book, Article, Debate, Discussion, Monologue, Dialogue, Discourse, Video, Newspaper, Newsletter, Letter is this.

- I. Bible Study.**
- II. Theology.**
- III. Poetry.**
- IV. History.**
- V. Theoretical.**
- VI. Practical.**
- VII. Biography.**
- VIII. Autobiography.**
- IX. Current Event.**
- X. Science.**
- XI. Popular Science.**
- XII. Mathematics.**
- XIII. Philosophy.**
- XIV. Canonical.**
- XV. Philosophy.**
- XVI. Social Science.**
- XVII. Stories.**
- XVIII. Plays.**
- XIX. Epic.**
- XX. Tragedy.**
- XXI. Poems.**
- XXII. Lyrics.**
- XXIII. Non-Fiction.**
- XXIV. Syntopicon.**
- XXV. Research.**
- XXVI. Speech.**

XXVII.Video.
XXVIII.Podcast.
XXIX.Dialogue.
XXX.Conversation.
XXXI.Communication.
XXXII.Films.
XXXIII.Debate.
XXXIV.Academic Journals
XXXV.Academic Articles
XXXVI.Documentary.
XXXVII.Conference.

*PART 3: Rules of Reading for
Entertainment and Basic
Understanding For Deep Work, Or
Deep Study, Or Bible Study*

Step 17- Decide The Rules for Entertainment and Basic Understanding.

1. There are few type of reading:

- Read for Entertainment.
- Read for Information.
- Read for Understanding and Learning.

2. Decide The Rules for Basic Understanding.

A. VERY FAST READING- Entertainment.

- I. Method 1-Speed Reading. VERY FAST Reading. Pages 59-64.**

B. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

- I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
- II. Method 2-Use 80/20 Principle For Reading. Pages 68.**
- III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
- IV. Method 4-Flip Through Pages and Analyse. Page 70.**
- V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
- VI. Method 6-Devotional Bible Read. Pages 73-74.**

Step 18-Dive In.

1. Dive In.

- I. In this step, you would need to learn enough about the topic or module to then grasp it more extensively. This means you need to find basic information before attempting to learn it in further depth.
- II. In this step it is simply to gain a basic familiarity with a particular module so that you can explore it independently.
- III. Spend minimal amount of time on this step.
- IV. Familiarise with concept of the topic.
- V. Make notes of the concept that seems to be most relevant to my module.
- VI. My goal is to only understand the basics, so that I am prepared for the next step.
- VII. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

Step 19 - The Best Way to Find More Time to Read

How do you find the time to read so much?" or "how can I find more time to read?"

Let me share with you how I find time to read, learn, and give myself an advantage.

Everyone looks at my reading list and assumes that I either have no life or speed-read.

When I tell people that I do have a life and I don't speed-read, the question becomes:

what's your secret? How do you find more time to read than the average person?

Well, first, there is no secret. As simple as it sounds, finding time to read boils down to choices about how you allocate your time. And allocating your time is how successful people increase productivity.

In a good week, I can read three to five books. Sometimes fewer. I'm an average reader, likely within one standard deviation in terms of speed and retention. In short, I'm no different from you when it comes to how fast I read.

For example, while remarkably enjoyable, *Blood and Beauty* consumed almost a week. I was incredibly slow reading *Seneca's Epistles 1-65*, and even slower with *Antifragile*.

These are books I don't want to rush. On the other hand, I can cruise through something like *Fate of the States* in an afternoon.

When reading, I generally take notes. I'm underlining, synthesizing, asking questions, and relating concepts from other things I've read.

After I finish a book, I let it age for a week or two and then pick it up again. I look at my notes and the sections I've marked as important. I write them down. Or I let the book age for another week or two.

Finding More Time to Read

Let's look at this another way. Rather than say what I do, I'll tell you what I don't do.

What gets in the way of reading?

I don't spend a lot of time watching TV. (The lone exception to this is during football season, when I watch one game a week.)

I watch very few movies.

I don't spend a lot of time commuting.

I don't spend a lot of time shopping.

These choices are deliberate. I don't even have cable TV. I watch NFL through Game Pass, which also saves time (if you don't watch games live, you can watch the full game in under 30 minutes).

I live downtown; I can walk to the grocery store, purchase a bagful of groceries, and return home all within 15 minutes.

If you assume that the average person spends 3–4 hours a day watching TV, an hour or more commuting, and another 2–3 hours a week shopping, that's 28 hours a week on the low end.

Twenty-eight hours. That's 1,680 minutes. That's huge. If you read a page a minute, that's more than 1,600 pages a week.

Books Are Important

Few things are as rewarding as making friends with the eminent dead. Reading isn't something to be done once a week to check a box; it's something to do every day.

If you're a knowledge worker, you're paid to use your brain, so it's in your best interest to make that brain as big as possible.

Wherever I go, a book is not far behind. It might be on my phone or physical, but there is always a book close by.

Finding time to read is easier than you might think. Waiting for a bus? Stop staring down the street and read. Waiting for a taxi? Read. On the train? Read. On the plane? Read. Waiting for your flight? Read.

What I read depends on the situation.

If I know I have only a few minutes, I'm not going to read something that requires a lot of mental context switching to get back into. I'll keep it simple, with something like Phil Jackson's *Eleven Rings: The Soul of Success* or *Grow Regardless*. Waiting around is also a great time to read magazines and printed copies of articles from the web. These tend to be short, rather disposable, and easily digested.

Early in the evening, say around 8 or 9, I'll grab a glass of wine and sink into something serious. Something I want to read without interruption. Some nights I'll read well past midnight; other nights I'll stop reading around 10 or 11.

I'll then do a little bit of blogging and plop myself into bed and read till I fall asleep.

Sometimes I'll read something light before going to bed, and sometimes I'll read something requiring more thought so I can ponder an idea while I'm falling asleep.

When I'm not reading, I'm trying to think about what I've just read. I don't pull out a book while I'm in the checkout line at the grocery store. While everyone else is playing the "which line is longer game," I'm toying with something I've read recently.

[quote]Ignorance is more expensive than a book.[/quote]

Investments

The biggest problem with reading so much is money.

Books are expensive. I often joke that the only group I'm in the 1% of is Amazon customers.

After I graduated from university, I made a choice that I've rarely deviated from: I don't worry about any money spent on books. I'm not alone. I know other people do this, too. The first thing I did when I started making money was to call my younger brothers and tell them that until they graduated high school, I'd buy them whatever books they wanted as long as they promised to read them. As many as they wanted; whatever they wanted.

Why Do You Read?

Some people read for entertainment. Some people read to acquire knowledge. Some read for both.

To me, reading is more than a raw input. I read to increase knowledge. I read to find meaning. I read for better understanding of others and myself. I read to discover. I read to make my life better. I read to make fewer mistakes.

To borrow words from David Ogilvy, reading can be "a priceless opportunity to furnish your mind and enrich the quality of your life."

Remember the tagline of this website: *Mastering the best that other people have already figured out*. That'd be nearly impossible without reading. In fact, it is largely through reading that we walk this path.

We've been recording knowledge in books for a long time. That means there's not a lot that's new; it's just recycled old knowledge. Even Nassim Taleb, author of *Antifragile*, points out that several ancient philosophers grasped the concept of antifragility. Odds are that no matter what you're working on, someone somewhere, who is smarter than you, has probably thought about your problem and put it into a book.

In *The Prince*, Machiavelli writes, "A wise man ought always to follow the paths beaten by great men, and to imitate those who have been supreme, so that if his ability does not equal theirs, at least it will savor of it." That's not to say that this is the only way, but why not start with the best thinking that has come before you? Seneca, on the same subject, wrote, "Men who have made these discoveries before us are not our masters, but our guides."

The Library

When I get into detailed discussions on my book buying habits, people often ask why I never use the library. "Think of all the money you'd save," they say.

The truth is, I keep most of the books I read and I go back to them. “If you are OK giving the books back after two weeks,” writes Ryan Holiday, “you might want to examine what you are reading.” I take that one step further: If you’re not keeping what you read, you probably want to think about what you’re reading and how.

While not impossible, it’s harder to have conversations with library books. You can’t pull out a pen and write in the margin. You can’t highlight something. Having conversations with books is one of the ways that I learn.

“The rich invest in time, the poor invest in money.”

— Warren Buffett

If you wanted to look something up again in a library book, you’d have to get in your car and drive back to the library. But how much time have you spent now driving back and forth?

How do you value your time? We can make more money; we can’t make more time.

Charlie Munger, voracious reader, billionaire, and vice chairman of Berkshire Hathaway, once commented: “In my whole life, I have known no wise people (over a broad subject matter area) who didn’t read all the time – none, zero.”

It’s pretty simple: Either you read or you don’t. If you read, you probably want to do it more. If you don’t read, I’m not going to convince you to put down the remote.

Reading more isn’t a secret. It comes down to choices.

Warning: Side effects of reading more may include (1) increased intelligence; (2) an uncomfortable silence when someone asks you what happened on *Game of Thrones* last night and you say “Game of what?”; (3) better ideas; and (4) increased understanding of yourself and others.

So what are you waiting for? Cancel your cable and buy some books. Looking for a place to start?

Step 20 - Just Twenty- Five Pages a Day

- Reading doesn't need to take up all of your time.
- The most effective way to read more is to start with 25 pages a day.
- Twenty-five pages a day is almost 10,000 pages a year.
- The number of pages you read is not as important as the fact that you enjoy it.

I love bookshelves. I love the physical act of having the books on the shelves to be looked at, admired, and remembered.

When I was younger, I really enjoyed the library, and I still do. But I learned over time that for me to *own* a book — intellectually — I needed to *own* the damn book. I needed to have it close by for reference. I needed to be able to write in it and take it down off the shelf and put it back on the shelf and take it down off the shelf and put it back on the — you get it. So I built my Anti-library, and today, even after giving away hundreds of books, my shelves are stocked. I've probably read 1/4 of them. But I keep adding.

It's a classic on power politics in New York in the early to middle 20th century, seen through the eyes of the brilliant and wicked Robert Moses. The glory and curse of the book, though, is that it's a doorstopper. It runs at about 1,110 pages — dense ones. I think Caro said it came to about 700,000 words. (Which was down from his original finished draft of over a *million*.) It's well written, not a slog in any sense of the word, but even great books take time due to sheer volume.

When you think about reading a book like that, even taking it off the shelf seems to generate anxiety. Let's do the math: I'm a pretty good reader, I think I read in the neighborhood of 300 words per minute. It might be plus or minus 50 words, but my guess is that's a close estimate for a text written in modern English prose.

At 300 words per minute, a 700,000-word text will take me 2,333 minutes, or about 39 hours to read. And there's the issue: the brain doesn't seem to like to get started on 39-hour projects it isn't being paid to complete. The gap between where you are and completion is too large. Instead, we pick something shorter and easier. Still counts, right? I thought about all of the *other* great works I wanted to get to in my lifetime. Caro has four (eventually five) books about LBJ that are masterpieces on 20th-century American politics. I want to read Gibbon's Decline and Fall of the Roman Empire. I want to read Tolstoy's Anna Karenina and War and Peace. I want to read Boswell's Johnson.

Shirer's Rise and Fall of the Third Reich. Adam Smith's The Wealth of Nations. More of Ron Chernow's biographies. (Titan is one of my favorites of all time, and I hear great things about Alexander Hamilton.) All doorstoppers.

That got me thinking. How the heck does anyone get these books read? How do I become a person that's *read* all these books rather than talked about them?

We do a lot of reading for Farnam Street, but it's hard to take a week off from our standard fare to sit and read War and Peace. It's the same for any busy person with a profession that takes up their days.

The solution I devised for myself is a simple one: 25 pages a day. That's it. Just commit to that, and then do it. What will 25 pages a day get you?

Let's say that two days out of each month, you probably won't have time to read. Plus Christmas. That gives you 340 days a year of solid reading time. 25 pages a day for 340 days is 8,500 pages. 8,500. What I have also found is that when I commit to a minimum of 25 pages, I almost always read more. So let's call the 8,500 pages 10,000. (I only need to extend that 25 pages into 30 to get there.)

With 10,000 pages a year, at a general pace of 25/day, what can we get done?

Well, The Power Broker is 1,100 pages. The four LBJ books are collectively 3,552 pages. Tolstoy's two masterpieces come in at a combined 2,160. Gibbons is six volumes and runs to about 3,660 pages. That's 10,472 pages.

That means, in about one year, at a modest pace of 25 pages a day, I've knocked out 13 masterful works and learned an enormous amount about the history of the world. In one year!

That leaves 2017 to read Shirer's Rise and Fall (1,280), Carl Sandburg's Six Volumes on Lincoln (2,000?), Adam Smith's Wealth of Nations unabridged (1,200), and Boswell's Johnson (1,300) with plenty of pages left to read something else.

This is how great works get read. Day by day. 25 pages at a time. No excuses.

Before anyone takes this too literally, the point isn't the number. (Although 25 pages is my literal rule.) It could be 20 pages, 10 pages, thirty minutes, an hour, or 2,000 words. Regardless of what unit of reading you choose, the math will still work out: In six months, a year, or five years, you'll have digested a large swath of human wisdom.

Did you ever want to read Moby Dick? Or Ulysses? Or some of Jane Austen's books? Or David Foster Wallace's Infinite Jest? Done! Start today. 25 pages. Then do it tomorrow. Read in the morning, read at lunch, read before bed, read at the dentist's

office...it doesn't matter. Just get your pages in, day in and day out. And then you'll be a person who reads the books everyone else simply talks about.

What you choose to read is up to you. I love history. I love biography. I love science.

Tolstoy aside, I don't read many novels. But the task no longer seems daunting, does it?

All it takes is commitment and a little assiduity. So let's go get smart.

*Step 21-Use The Chosen Rules of
Reading Method For Entertainment Or
Basic Understanding and Follow Each Steps
Of The Method Until Finish All Steps,
And Follow Each Steps As many Times As
I Want, While Re-listen Lectures, Read
Books or Lecture Notes 1-1000 Times For
Each Step. VERY FAST READING.*

VERY Fast Reading For Entertainment-Basic

Level

Method 1-VERY Fast Reading Speed Reading

Inspectional Reading I: Systematic Skimming or Pre-reading.

1 LOOK AT THE TITLE PAGE AND, IF THE BOOK HAS ONE, AT ITS PREFACE. Read each quickly. Note especially the subtitles or other indications of the scope or aim of the book or of the author's special angle on his subject. Before completing this step you should have a good idea of the subject, and, if you wish, you may pause for a moment to place the book in the appropriate category in your mind. What pigeonhole that already contains other books does this one belong in?

2. STUDY THE TABLE OF CONTENTS to obtain a general sense of the book's structure; use it as you would a road map before taking a trip. It is astonishing how many people never even glance at a book's table of contents unless they wish to look something up in it. In fact, many authors spend a considerable amount of time in creating the table of contents, and it is sad to think their efforts are often wasted. It used to be a common practice, especially in expository works, but sometimes even in novels and poems, to write very full tables of contents, with the chapters or parts broken down into many subtitles indicative of the topics covered. Milton, for example, wrote more or less lengthy headings, or "Arguments," as he called them, for each book of *Paradise Lost*. Gibbon published his *Decline and Fall of the Roman Empire* with an extensive analytical table of contents for each chapter. Such summaries are no longer common, although occasionally you do still come across an analytical table of contents. One reason for the decline of the practice may be that people are not so likely to read tables of contents as they once were. Also, publishers have come to feel that a less revealing table of contents is more seductive than a completely frank and open one. Readers, they feel, will be attracted to a book with more or less mysterious chapter titles—they will want to read the book to find out what the chapters are about. Even so, a table of contents can be valuable, and you should read it carefully before going on to the rest of the book. At this point, you might turn back to the table of contents of this book, if you have not already read it. We tried to make it as full and informative as we could. Examining it should give you a good idea of what we are trying to do.

3. CHECK THE INDEX if the book has one—most expository works do. Make a quick estimate of the range of topics covered and of the kinds of books and authors referred to. When you see terms listed that seem crucial, look up at least some of the passages cited. (We will have much more to say about crucial terms in Part Two. Here you must make your judgment of their importance on the basis of your general sense of the book, as obtained from steps 1 and 2.) The passages you read may contain the crux—the point on which the book hinges—or the new departure which is the key to the author's approach and attitude. As in the case of the table of contents, you might at this point check the index of this book. You will recognise as crucial some terms that have already been discussed. Can you identify, for example, by the number of references under them, any others that also seem important?

4. If the book is a new one with a dust jacket, READ THE PUBLISHER'S BLURB. Some people have the impression that the blurb is never anything but sheer puffery. But this is quite often not true, especially in the case of expository works. The blurbs of many of these books are written by the authors themselves, admittedly with the help of the publisher's public relations department. It is not uncommon for authors to try to summarise as accurately as they can the main points in their book. These efforts should not go unnoticed. Of course, if the blurb is nothing but a puff for the book, you will ordinarily be able to discover this at a glance. But that in itself can tell you something about the work. Perhaps the book does not say anything of importance—and that is why the blurb does not say anything, either. Upon completing these first four steps you may already have enough information about the book to know that you want to read it more carefully, or that you do not want or need to read it at all. In either case, you may put it aside for the moment. If you do not do so, you are now ready to skim the book, properly speaking.

5. One reason why titles and prefaces are ignored by many readers is that they do not think it important to classify the book they are reading. They do not follow this first rule of analytical reading. If they tried to follow it, they would be grateful to the author for helping them. Obviously, the author thinks it is important for the reader to know the kind of book he is being given. That is why he goes to the trouble of making it plain in the preface, and usually tries to make his title—or at least his subtitle—descriptive. Thus, Einstein and Infeld, in their preface to *The Evolution of Physics*, tell the reader that they expect him to know "that a scientific book, even though popular, must not be read in the same way as a novel." They also construct an analytical table of contents to advise the reader in advance

of the details of their treatment. In any event, the chapter headings listed in the front serve the purpose of amplifying the significance of the main title.

6. From your general and still rather vague knowledge of the book's contents, LOOK NOW AT THE CHAPTERS THAT SEEM TO BE PIVOTAL TO ITS ARGUMENT. If these chapters have summary statements in their opening or closing pages, as they often do, read these statements carefully.

7. Finally, TURN THE PAGES, DIPPING IN HERE AND THERE, READING A PARAGRAPH OR TWO, SOMETIMES SEVERAL PAGES IN SEQUENCE, NEVER MORE THAN THAT. Thumb through the book in this way, always looking for signs of the main contention, listening for the basic pulse beat of the matter. Above all, do not fail to read the last two or three pages, or, if these are an epilogue, the last few pages of the main part of the book. Few authors are able to resist the temptation to sum up what they think is new and important about their work in these pages. You do not want to miss this, even though, as sometimes happens, the author himself may be wrong in his judgment.

Inspectional Reading II: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed.
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed.
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed.
4. Read or Listen The Full Book Without Stopping.
5. Read or listen 25min and 5min break.
 - Read or Listen 20 pages an Hour according Mortimer Adler.
6. Read or Listen between 1-50 times the book.
7. Speed of Audiobook.
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed.
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Inspectional Reading III: Superficial Reading

1. Read or Listen The Full Book Without Stopping.
2. That rule is simply this: In tackling a difficult book for the first time, read it through without ever stopping to look up or ponder the things you do not understand right away.
3. Pay attention to what you can understand and do not be stopped by what you cannot immediately grasp. Go right on reading past the point where you have difficulties in understanding, and you will soon come to things you do understand. Concentrate on these.

Basic Questions a Reader Asks

1 Understand the language of the book. This means skimming the index. Not only will this give you an idea for the range of topics covered but it will also tell you the other people the book connects to and the jargon used in the book.

2. Identify the pivotal points. At this point, you have an overview of the jargon and the journey the author is taking you on. It should be relatively easy to identify the pivotal chapter to the argument. Dive into these reading bits and pieces. How are they structured? How connected is it to the rest of the book? Is this a place you want to end up? Turn the pages and dive in here and there with a few paragraphs or even pages.

3. WHAT IS THE BOOK ABOUT AS A WHOLE? You must try to discover the leading theme of the book, and how the author develops this theme in an orderly way by subdividing it into its essential subordinate themes or topics.

4. WHAT IS BEING SAID IN DETAIL, AND HOW? You must try to discover the main ideas, assertions, and arguments that constitute the author's particular message.

5. IS THE BOOK TRUE, IN WHOLE OR PART? You cannot answer this question until you have answered the first two. You have to know what is being said before you can decide whether it is true or not. When you understand a book, however, you are obligated, if you are reading seriously, to make up your own mind. Knowing the author's mind is not enough.

6. **WHAT OF IT?** If the book has given you information, you must ask about its significance. Why does the author think it is important to know these things? Is it important to you to know them? And if the book has not only informed you, but also enlightened you, it is necessary to seek further enlightenment by asking what else follows, what is further implied or suggested.

7. What is the structure, or blueprint, of the book “whereby the author develops his conception or understanding of that general subject matter?”

8. Always Have doubt about everything, and always. Do not be afraid to ask questions About Everything. Ask Questions:

- Who?
- What?
- When?
- Where?
- Why?
- How?

8. **Listen to an interview.** While this has nothing to do with the actual book, interviews can be a great way to get the gist of a book in 30m or so. Authors do so much promotion now that it's relatively easy to find interviews. And of course, they use the best examples from the book in these interviews.

*FAST READING Methods for Basic
Knowledge*

Method 1-Survey, Question, Read, Recite, Record,

Reflect (SQR4)

SQR4

- I. Condemnation before investigation. Set Aside Whatever you been taught and believe about topic and look with fresh eyes and try to hear what text is saying.
- II. Survey - Review the chapter before read or listen. The first step, survey or **skim**, advises that one should resist the temptation to read the book and instead first go through a chapter and note the headings, sub-headings and other outstanding features, such as figures, tables, marginal information, and summary paragraphs. This survey step typically only takes 3–5 minutes, but it provides an outline or framework for what will be presented. The reader should identify ideas and formulate questions about the content of the chapter.
- III. Questions-**Generate questions** about the content of the reading. For example, convert headings and sub-headings into questions, and then look for answers in the content of the text. Other more general questions may also be formulated:
 - What is this chapter about?
 - What question is this chapter trying to answer?
 - How does this information help me?
- IV. Always Have doubt about everything, and always. Do not be afraid to ask questions About Everything. Ask Questions:
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?
- V. Read or Listen-Use the background work done with "S" and "Q" in order to begin reading actively. This means reading in order to answer the questions

raised under "Q". Passive reading, in contrast, results in merely reading without engaging with the study material.

VI. Recite-The second "R" refers to the part known as "Retrieve." The reader should try to retrieve from memory what was learned in the same manner as telling someone else about the information. It is important that the reader use his/her own words in order to formulate and conceptualise the material. Try recalling and identifying major points (heading/subheadings) and answers to questions from the "Q" step. This recital step may be done either in an oral or written format and is related to the benefits of retrieval ([testing effect](#)) in boosting long-term memory for the material.

VII. Record.

VIII. Reflect-The final "R" is "Review." Once you reach the end of the passage, review the material by repeating back to yourself what the point of the passage is using your own words. You may then repeat the process on the second set of questions.

Method 2 - Use 80/20 Principle For Reading

- I. Never read a book from cover to cover, except for pleasure. When you are working, find out what the book is saying much faster than you would by reading it through.
- II. Read Conclusion
- III. Read Introduction
- IV. Then Dip Lightly Into Any Interesting Bits.
- V. Apply 80/20 Principle to find out, What are 20% of Pages, which provides 80% of Information.
 - **Once you Find Out, what is 20% input that gives 80% Output. Then You need to Put 100% effort into those 20% inputs, to achieve the best results. Additionally Remove Trivial Many.**
- VI. Once You Identified 20%, then you need to put 100% effort into those 20%.
The You need to do the following:
 - Read.
 - Ask Questions.
 - Review.
 - Read.
 - Ask Questions Again.
 - Review.
- VII. **Summary:** The student summarises the topic, bringing his or her own understanding of the process. This may include written notes, spider diagrams, flow diagrams, labeled diagrams, [mnemonics](#), or even voice recordings.
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?
- VIII. **Test:** The student answers the questions drafted earlier, avoiding adding any questions that might distract or change the subject.

Method 3-Preview, Question, Read,

Summary, Test(PQRST)

PQRSTF

- I. **Preview:** The student looks at the topic to be learned by glancing over the major headings or the points in the syllabus.
- II. **Question:** The student formulates questions to be answered following a thorough examination of the topic(s).
- III. **Read or Listen:** The student reads through the related material, focusing on the information that best relates to the questions formulated earlier.
- IV. **Summary:** The student summarises the topic, bringing his or her own understanding of the process. This may include written notes, spider diagrams, flow diagrams, labeled diagrams, [mnemonics](#), or even voice recordings.
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?
- V. **Test:** The student answers the questions drafted earlier, avoiding adding any questions that might distract or change the subject.
- VI. Always Have doubt about everything, and always. Do not be afraid to ask questions About Everything. Ask Questions:
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?

Method 4-Flip Through Pages and Analyse

Flipping through the pages and analyse

- I. Flip through pages or listen through few pages.
 - Find out what is on page.
 - Check Pictures, tables, how long is chapter.
- II. Go to the end of chapter and see if there is any quiz or questions.
 - Check quiz or questions is to know what look for.
 - What the author think is important.
 - Use 80/20 rules.
- III. Read or Listen Bold printed text.
 - Title.
 - Subtitle.
 - Headings.
 - Broke down information.
- IV. Read or Listen first and last sentence of each paragraph.
 - First sentence is introduction and gives indication of what the paragraph looks like.
 - Last sentence summoned up the paragraph.
- V. 80/20 Rules apply.
 - Review and decide the most important information 20% of material to give 80% of result or most important information.
- VI. Repetition as many times as possible.
- VII. Always Have doubt about everything, and always. Do not be afraid to ask questions About Everything. Ask Questions:
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?

Method 5-Devotional Bible Study by Using

Devotional Books

Step 1-Open Part 4-6 For Deep Work, Deep Study Bible. Then Open Bible. Choose A devotional Book.

1. Morning and Evening by Charles Spurgeon.
2. The MacArthur Daily Bible by John MacArthur.
3. The NKJV Daily Bible_ Read the Entire Bible in One Year.
4. Amplified Cross-Reference Bible.
5. New Spirit-Filled Life Bible_ Kingdom Equipping Through the Power of the Word.
6. The MacArthur Study Bible, English Standard Version.
7. Through the Bible Through the Year_ Daily Reflections From Genesis to Revelation.
8. Learn the Bible in 24 hrs. (complete).
9. How to Read the Bible through the Jesus Lens_ A Guide to Christ-Focused Reading of Scripture.

Step 2-Record Passage Information.

1. Record the name of the book in which passage you are studying is found.
2. Record chapter and verse number you have selected to study.

Step 3 Identify The Subject

1. Read the portion of Scripture which you have selected to study.
2. Select a title that summarises the subject and record it on your chart.

Step 4-identify the Key verse

1. Which verse provides the best summary of the scripture portion you are studying?
2. Write the verse and reference on your chart.

Step 5-Summarise

1. In your own words, summarise what the portion of Scriptures Teaches.
2. Outline the main points covered.
3. Use Chart to summarise the passage.
4. Make a brief summary statement.
5. Paraphrase the passage. Paraphrasing is when you take a verse and summarise it In your own word. Follow the text, but put it in the language today.
6. Ask Questions
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?

Step 6-Pray For Insight on How to Apply the Passage

1. Ask God to help you apply the Scripture you are studying and show you specifically what he wants you to do. You already know that God wants you to do two things: obey his Word and share it with others. In your prayer tell God that you are ready to obey what he will show you and that you are willing to share that application with others.

Method 6-Devotional Bible Read

Step 1-Open Part 4-6 For Deep Work, Deep Study Bible. Then Open Bible. Choose A devotional Book.

1. Amplified Cross-Reference Bible.
2. New Spirit-Filled Life Bible_ Kingdom Equipping Through the Power of the Word.
3. The MacArthur Study Bible, English Standard Version.

Step 2-Record Passage Information

1. Record the name of the book in which passage you are studying is found.
2. Record chapter and verse number you have selected to study.

Step 3 Identify The Subject

1. Read the portion of Scripture which you have selected to study.
2. Select a title that summarises the subject and record it on your chart.

Step 4-identify the Key verse

1. Which verse provides the best summary of the scripture portion you are studying?
2. Write the verse and reference on your chart.

Step 5-Summarise

1. In your own words, summarise what the portion of Scriptures Teaches.
2. Outline the main points covered.
3. Use Chart to summarise the passage.
4. Make a brief summary statement.
5. Paraphrase the passage. Paraphrasing is when you take a verse and summarise it In your own word. Follow the text, but put it in the language today.

Step 6-Pray For Insight on How to Apply the Passage

1. Ask God to help you apply the Scripture you are studying and show you specifically what he wants you to do. You already know that God wants you to do two things: obey his Word and share it with others. In your prayer tell God that you are ready to obey what he will show you and that you are willing to share that application with others.

Step 7-Write out an Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.

Step 8-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

*Step 19-Ask Question. While Re-listen
Lectures, Read Books or Lecture Notes
1-1000 Times.*

1. **Ask Question. While Re-listen Lectures, Read Books or Lecture Notes 1-100 Times.**
 - A. Who?
 - B. What?
 - C. Where?
 - D. When?
 - E. Why?
 - F. How?
 - G. So What?
 - H. Ask What I do Understand and Find Out What I did not understand.
 - I. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.

Step 20 - Take Notes.

1. The Blank Sheet

The single biggest change you can make to getting more out of the books you read is using the blank sheet method.

Over the years I've tested multiple approaches and this one works best for simplicity and effectiveness — it will 10x your comprehension overnight.

The blank sheet primes your brain for what you're about to read and shows you what you're learning.

Here's how it works:

1. Before you start reading a new book, take out a blank sheet of paper. Write down what you know about the book / subject you're about to read — a mind map if you will.
2. After you finish a reading session, spend a few minutes adding to the map with a different color.
3. Before you start your next reading session, review the page.
4. When you're done reading, put these 'blank sheets' into a binder that you periodically review.

2. Conventional Notes

Forget the teacher that yelled at you for writing in your book when you were a kid. You bought this thing. It's your property. You need to [write in the margins](#).

Here is a very [simple process to take notes while reading](#):

- At the end of each chapter write a few bullet points that summarise the main idea or specific points. Use your own words and not the authors. Try and connect it to something in your life — a memory or another idea. Also, make note any unanswered questions you had while reading.
- When you're done the book, put it down for a week.
- Pick up the book again and go through all your notes. In a lot of cases, reading your notes will be as good as reading the book again.
- On the inside cover write out the main idea of the book using your own words. If you find yourself stuck, review your notes. (This is called [the Feynman Technique](#)). Writing is the process by which we often discover we don't know what we are talking about.
- You can even make a custom index on the back cover with themes or topics.
- (Optional) Copy out the excerpts by hand and put them on the back of your blank sheet from above or type them out and put them into Evernote. Tag accordingly.

3. Note Taking

- I. Normal note-taking with as much detail as you can.
 - Copy down the information you ordinarily you need to know as you encounter the material.
- II. Summarising the information in your own words, clarifying the significance and noting question.
 - Do not repeat the initial note, even if you took your notes in complete sentences.
 - Converting the note to language that helps you understand the meaning is essential.
 - Try to make connection and find relationship within the information.
 - List any questions you have about the notes you have took in step 1.
- III. Connecting this particular piece of information to the lesson at large.
 - State any connection you can find between the subject of that note and the broader topic you are studying.
 - Is there any cause and effect relationship with broader topic.
- IV. Answering remaining questions and then summarising each distinct page or section again.
 - Revisit, synthesise and transform the information you have learned.

4. Cornell Note Taking

This method of note taking is useful because it enables you to keep track of questions or thoughts that occur to you while making notes. It also allows you to go back and add comments to a page of notes or connect ideas from one source to another.

The Cornell note taking method serves multiple purposes:

- Notes from the lecture or readings, so that you have a record of information you may have forgotten (Details section).
- Summary of what was covered in the lecture or reading which you can easily look through (Summary section).
- A set of key points and/or questions that serve as a mini study guide (Main Ideas section).

Method

During class

- o take down information in largest area of the page.
- o when instructor moves to new point, skip a few lines.

After class

- o complete phrases & sentences as much as possible.
- o for all significant information, write cue in left margin.

After writing the notes in the main space, use the left-hand space to label each idea and detail with a key word or "cue"

An example of Cornell Note taking form is below – blank sample follows.

DATE:

IDEA/ Name of the lecture:

Main Ideas and Questions

Details

Summary of Notes After Class

Homework For Next Week or Months

Important Information For assignment, Exam or Other

5. Richard Feynman Note-Taking Technique.

- I. Choose a concept and Write At the TOP Page. Select a topic you're interested in learning about and write it at the top of a blank page in a notebook.**
 - A. Write What You do Know About The Topic or Concept. Write what you know, as if you were explaining to yourself.**
 - B. Write What you Do not Know About The Topic or Concept. You need to be specific. Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.**
 - C. What Book Explains the Best About This Topic.**
 - D. You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.**
 - E. Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.**
 - F. Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.**

G. Make it your own.

- Start with not knowing.
- Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
- Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.

H. Take Notes On the Topic From Study.

- I. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.

J. Don't write notes on notes: Life is short.

II. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

III. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

- IV. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.**
- V. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, podcast – and fill the gaps in your knowledge.**
- VI. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.**
 - A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
 - B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
 - C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

VII. Each it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.

- A. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.
- B. Remove any jargon or complexity.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
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- H. **You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes

you to tackle even more challenging subjects knowing you have a solid framework for learning.

VIII. Reflect, Refine, and Simplify.

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- E. Go back to the source material, reviewing the parts you don't quite understand yet.**
- F. Repeat until you have a simple explanation.**

IX. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

X. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

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XI. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

6. Flow Chart (More for the Debate, Discussion, Dialogue, Conversation and Communication)

A. Take Notes While the Opposition is speaking in Debate, Dialogue, Conversation and Communication:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.
- Opponent Answer.
- My response to the response of the opponent.

7. Use Cornell Note Taking.

- A. Name.**
- B. Date.**
- C. Class and Period.**
- D. Topic.**
- E. Essential Question at the Top of Page.**
- F. Questions and Main Ideas on the Left Page of the Blank Page.**
- G. Notes On the Right Page of the Blank Page.**
- H. Summary at the bottom of the page.**

8. **Analytical Learners: Outline/ List.** Good Works well for recording terms, definitions, facts and sequences.
9. **Sentence Method:** The goal is to jot down your thoughts as quickly as possible. Works well in meetings or lectures that lack organisation. Use when information is being presented very quickly.
10. **SQ3R (Survey, Question, Read, Recite, Review).** Use for dense readings (like business books, text books, white papers, etc.). You start the process by skimming the material for bolded text, images, diagrams and summaries in order to produce a list of headlines or main topics.
11. **Mapping.** Mapping is a nonlinear system of note-taking that resembles a tree and root structure. Ideas stem from one major concept and are connected by lines (or “branches”). As a note-taking system, mapping works particularly well for visual learners, but it can also be a great tool for analytical-thinkers who have trouble brainstorming because it allows you to make connections you’d otherwise miss with a linear format. Works well for planning essays, recording meetings. Use for big-picture brainstorming sessions.
12. **Smart Wisdom.** It’s a tool optimised for active listening in lecture situations. Instead of taking notes in full sentences, you record only keywords and place them in a chain that maps the thought process.
13. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
14. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
15. **Charting.** Charting is a great note-taking strategies when you need to compare and contrast ideas. The most widely used charting method is the Pro and Con list.

16. CERC.

- A. Claim.**
- B. Evidence.**
- C. Reasoning.**
- D. Conclusion.**

17. Use Smart Notes.

- A. What is big Idea.**
- B. Question.**
- C. Evidence.**
- D. Conclusion.**

*Step 21-Ask Question. While Re-listen
Lectures, Read Books or Lecture Notes
1-1000 Times. Do It Correctly, Slowly,
Patiently, Methodically, Logically Take It
Time and Do Not Rush Process.*

**1. Step 1-Ask Question. While Re-listen Lectures, Read Books or
Lecture Notes 1-100 Times.**

- A. Who?
- B. What?
- C. Where?
- D. When?
- E. Why?
- F. How?
- G. So What?
- H. Ask What I do Understand and Find Out What I did not understand.

Step 22 - Basic Exploration, Experimentation and Practice.

1. Basic Exploration, Experimentation and Practice.

- I. The primary goal here is to simply explore based on your instincts without attempting to achieve any particular purpose. The experimentation is obviously with respect to the particular module you are focusing.
- II. If your modules focus on some technology-orientated topic, then in this step you play around with different software to familiarise yourself with these different tools to understand ways in which they functions.
- III. If your topic is something more theoretical, then you would need to ponder what exactly you want to learn about and then form some hypotheses about how those concepts or process manifest themselves, and the best way you can start learning them.
- IV. The goal of this step is to stipulate (demand) our mind to start asking the right questions about our modules. These questions will be most important outcome of this step.
- V. This step entails answering the questions you came up with in the previous step.
- VI. In this steps you will attempt to answer at least some of these questions if not all of them. For this, you would need to revisit the various resources you aggregated earlier and use them to first, answer all the questions you came up. Second to acquire as much knowledge as you can. Continue this process until you believe you have learned enough about this specific module.
- VII. You would need to go back and forth between learning new things and applying them practically to reinforce your newfound knowledge.
- VIII. Split time between learning and practical application.
- IX. Experiment on trial and error.
- X. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

Step 23 - Take Notes.

1. The Blank Sheet

The single biggest change you can make to getting more out of the books you read is using the blank sheet method.

Over the years I've tested multiple approaches and this one works best for simplicity and effectiveness — it will 10x your comprehension overnight.

The blank sheet primes your brain for what you're about to read and shows you what you're learning.

Here's how it works:

1. Before you start reading a new book, take out a blank sheet of paper. Write down what you know about the book / subject you're about to read — a mind map if you will.
2. After you finish a reading session, spend a few minutes adding to the map with a different color.
3. Before you start your next reading session, review the page.
4. When you're done reading, put these 'blank sheets' into a binder that you periodically review.

2. Conventional Notes

Forget the teacher that yelled at you for writing in your book when you were a kid. You bought this thing. It's your property. You need to [write in the margins](#).

Here is a very [simple process to take notes while reading](#):

- At the end of each chapter write a few bullet points that summarise the main idea or specific points. Use your own words and not the authors. Try and connect it to something in your life — a memory or another idea. Also, make note any unanswered questions you had while reading.
- When you're done the book, put it down for a week.
- Pick up the book again and go through all your notes. In a lot of cases, reading your notes will be as good as reading the book again.
- On the inside cover write out the main idea of the book using your own words. If you find yourself stuck, review your notes. (This is called [the Feynman Technique](#)). Writing is the process by which we often discover we don't know what we are talking about.
- You can even make a custom index on the back cover with themes or topics.
- (Optional) Copy out the excerpts by hand and put them on the back of your blank sheet from above or type them out and put them into Evernote. Tag accordingly.

3. Note Taking

- I. Normal note-taking with as much detail as you can.
 - Copy down the information you ordinarily you need to know as you encounter the material.
- II. Summarising the information in your own words, clarifying the significance and noting question.
 - Do not repeat the initial note, even if you took your notes in complete sentences.
 - Converting the note to language that helps you understand the meaning is essential.
 - Try to make connection and find relationship within the information.
 - List any questions you have about the notes you have took in step 1.
- III. Connecting this particular piece of information to the lesson at large.
 - State any connection you can find between the subject of that note and the broader topic you are studying.
 - Is there any cause and effect relationship with broader topic.
- IV. Answering remaining questions and then summarising each distinct page or section again.
 - Revisit, synthesise and transform the information you have learned.

4. Cornell Note Taking

This method of note taking is useful because it enables you to keep track of questions or thoughts that occur to you while making notes. It also allows you to go back and add comments to a page of notes or connect ideas from one source to another.

The Cornell note taking method serves multiple purposes:

- Notes from the lecture or readings, so that you have a record of information you may have forgotten (Details section).
- Summary of what was covered in the lecture or reading which you can easily look through (Summary section).
- A set of key points and/or questions that serve as a mini study guide (Main Ideas section).

Method

During class

- o take down information in largest area of the page.
- o when instructor moves to new point, skip a few lines.

After class

- o complete phrases & sentences as much as possible.
- o for all significant information, write cue in left margin.

After writing the notes in the main space, use the left-hand space to label each idea and detail with a key word or "cue"

An example of Cornell Note taking form is below – blank sample follows.

DATE:

IDEA/ Name of the lecture:

Main Ideas and Questions

Details

Summary of Notes After Class

Homework For Next Week or Months

Important Information For assignment, Exam or Other

5. Richard Feynman Note Talking Technique

- I. Choose a concept and Write At the TOP Page. Select a topic you're interested in learning about and write it at the top of a blank page in a notebook.**
 - A. Write What You do Know About The Topic or Concept. Write what you know, as if you were explaining to yourself.**
 - B. Write What you Do not Know About The Topic or Concept. You need to be specific. Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.**
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6. Flow Chart (More for the Debate, Discussion, Dialogue, Conversation and Communication)

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- My Answer.
- Opponent Answer.
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7. Use Cornell Note Taking.

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- B. Date.**
- C. Class and Period.**
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- F. Questions and Main Ideas on the Left Page of the Blank Page.**
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- H. Summary at the bottom of the page.**

8. **Analytical Learners: Outline/ List.** Good Works well for recording terms, definitions, facts and sequences.
9. **Sentence Method:** The goal is to jot down your thoughts as quickly as possible. Works well in meetings or lectures that lack organisation. Use when information is being presented very quickly.
10. **SQ3R (Survey, Question, Read, Recite, Review).** Use for dense readings (like business books, text books, white papers, etc.). You start the process by skimming the material for bolded text, images, diagrams and summaries in order to produce a list of headlines or main topics.
11. **Mapping.** Mapping is a nonlinear system of note-taking that resembles a tree and root structure. Ideas stem from one major concept and are connected by lines (or “branches”). As a note-taking system, mapping works particularly well for visual learners, but it can also be a great tool for analytical-thinkers who have trouble brainstorming because it allows you to make connections you’d otherwise miss with a linear format. Works well for planning essays, recording meetings. Use for big-picture brainstorming sessions.
12. **Smart Wisdom.** It’s a tool optimised for active listening in lecture situations. Instead of taking notes in full sentences, you record only keywords and place them in a chain that maps the thought process.
13. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
14. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
15. **Charting.** Charting is a great note-taking strategies when you need to compare and contrast ideas. The most widely used charting method is the Pro and Con list.

16. CERC.

- A. Claim.**
- B. Evidence.**
- C. Reasoning.**
- D. Conclusion.**

17. Use Smart Notes.

- A. What is big Idea.**
- B. Question.**
- C. Evidence.**
- D. Conclusion.**

*PART 4: Rules of Reading For
Bible Study, Deep Work, Deep
Study And Powerful Goodness.*

Step 24- Decide The Rules of Reading For Bible Study Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method.

1. Decide The Rules of Reading For Bible Study, Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method.

- I. Method 1-Chapter Summary Method.
- II. Method 2-Character Quality Method.
- III. Method 3-Thematic Method.
- IV. Method 4-Biographical Method.
- V. Method 5-Topical Method.
- VI. Method 6-Word Study Method.
- VII. Method 7-Book Background Method.
- VIII. Method 8-Book Survey Method.
- IX. Method 9-Chapter Analysis Method.
- X. Method 10-Paragraph Study.
- XI. Method 11-Verse by Verse Analysis Method.
- XII. Method 12-Book Synthesis Method.
- XIII. Method 13-Theological Study Method.
- XIV. Method 14-Studying Bible Prophecy.
- XV. Method 15-Typological Study Method.
- XVI. Method 16- John MacArthur Way Bible Study.
- XVII. Method 17-Inductive Bible Study Method.
- XVIII. Method 18-BIBLICAL HERMENEUTICS.
- XIX. Method 19-Theological Group of Principles.
- XX. Method 20- How To Read A Book.

Step 25-How Many Pages Read A Day.

1. Step 1-How Many Pages Read A Day.

- I. Read no more than 2-25 pages a day, and do The Work Required to Have an Opinion on Any Topic and Anything.
- II. The ideal is not merely to read or Listen faster, but to read or Listen at different speeds, and to know when the different speeds are appropriate.

Step 26 - Do Not Speed Read.

1. Do Not Speed Read.

- I. **Don't fool yourself.** While reading is the key to getting smarter, speed reading is just a fancy way of fooling yourself into thinking you're learning something. In reality Speed reading is just turning pages quickly.
- II. **Reading fast is not thinking.** If you're reading fast you're not thinking and challenging what you're reading. You're not being critical. You're not making connections with existing knowledge. You're not arguing with the author. You're not reading something at the edge of your cognitive ability. All of that is work. And if you're not doing the work, you're only walking away with surface knowledge. Reading is mentally demanding.
- III. **Reading fast is worse than not reading.** Reading fast gives you two things that should never mix: surface knowledge and overconfidence. And that's a recipe for really bad decisions. Bad decisions reduce the free time we have. After all, we have to run around fixing all of these mistakes.
- IV. **Visible costs get attention, invisible ones don't.** Most people choose the path of low upfront visible costs and high visible costs later. If you're willing to incur the cost of reading correctly and appropriately (it takes more time than speed reading), you get a massive benefit later. If you speed-read, you're incurring invisible costs that show up later in your lack of real understanding. Ignorance is more expensive than investing the time necessary to get smarter.
- V. **There's a better solution, anyways.** Learning what a good book really looks like, and learning how to skip the bad ones, is a far more robust time saver than speed-reading. Hope your radar for a great book, be a little ruthless about culling and quitting the weak. Don't waste time reading.
- VI. **Most people want to create the impression they read.** That they have unique insights. That they know what they're talking about. In the end however, when it comes to doing the work, they walk away. That's why there is so much value in reading. Do the work.
- VII. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process Of Reading.**

Step 27-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honour bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 28-Isolating Myself For Deep Study, Deep Work AND Decide The Study or Work Philosophy

1. Listen and Apply Book on Deep Book and Power of Habits.

- I. 7 Habits of Highly Effective Families.
- II. Atomic Habit by James Clear.
- III. Deep Work by Cal Newport.
- IV. The Power of Habit_ Why We Do What We Do in Life and Business.
- V. The Ultimate Focus Strategy_ How to Set the Right Goals, Develop Powerful Focus, Stick to the Process, and Achieve Success.
- VI. Tools of Titans by Tim Ferris.

2. Create Physical and Mental Space For Isolated Work.

- I. Collaboration doesn't just happen online or over digital tools. And while most knowledge workers spend their days in **open offices** designed to create more interaction and collaboration. In reality, they rarely do that. Rather than increase our face-to-face interactions, open offices have been found to decrease them by up to 70%.
- II. If you **work at home** or remotely, you're not completely safe from this issue either. Yes, you need a physical space **devoid of distractions** to do focused work. But you also need to create mental space as well. This means getting over the feeling of needing to "catch up" and always be around on Slack and IM.
- III. To stay "bursty" try to only check in at specific times. That way your team knows when you're available and you can schedule your deep work around those periods.
- IV. To be the best collaborator possible, you need to balance between being around and being heads down. And according to the research, there are few better ways to do that then bringing a bit of "burstiness" into your day.

3. Power of Intermittent Isolation For Deep Study and Deep Work.

- I. We're actually more productive, efficient, and creative when we follow the lead of the ants and work "intermittently" rather than trying to be "always on." Especially when it comes to complex problem-solving.
- II. The isolated time helps to come up with the most creative ideas, and then came together as a group to explain, learn from each other, and narrow in on the highest-quality ones to present, I am working In the group.
- III. **We all do better work when we have time for both collaboration and private creative thinking.**
- IV. Constant communication—especially over tools like Slack and instant messengers—actually decrease both our productivity and **creativity**.
- V. Researchers looking at the productivity of remote teams found that those who practiced a "bursty" style of communication—rapid periods of collaboration followed by long periods of silence—were the most successful.
- VI. "During a rapid-fire burst of communication, team members can get input necessary for their work and develop ideas. Conversely, during longer periods of silence everyone is presumably hard at work acting upon the ideas that were exchanged in the communication burst."

4. Decide and Write Study Philosophy I Will Use For Today.

- I. **Monastic Philosophy.** The monastic philosophy involves cutting out all shallow activities to focus on deep work. This is a rather radical approach that focuses entirely on deep work and nothing else for weeks or months on end.
- II. **Bimodal Philosophy.** The bimodal philosophy involves splitting your schedule based on the amount of work. This would look like an individual spending at least a day or weeks on deep work, and once that is completed, the individual will focus on only shallow work. If you do this approach on a weekly basis, you could try to do all your deep work during weekdays, and your shallow work such as responding to emails, using social media, etc. on the weekends.
- III. **Rhythmic Philosophy.** The rhythmic strategy involves doing deep work as a daily habit. While the time of day you do your deep work each day doesn't matter, it's essential that if you choose this strategy, you stick with it. Time blocking certain hours, about 1 to 4 hours each day, to complete your deep work tasks is key. For example, Time blocking from 12 P.M. to 4 P.M. to do all your deep work tasks.

IV. Journalistic Philosophy. Journalistic strategy involves trying to do deep work whenever it fits into your schedule. This is extremely difficult to do. This is because constantly switching from deep to shallow work efficiently is hard and oftentimes only works for those who are more experienced with deep work.

Step 29 - The Power of Concentration

- I. Listen and Apply the following book-*The Ultimate Focus Strategy_ How to Set the Right Goals, Develop Powerful Focus, Stick to the Process, and Achieve Success.*
- II. The core of mindfulness is the ability to pay attention. That's exactly what Holmes does when he taps together the tips of his fingers, or exhales a fine cloud of smoke. He is centering his attention on a single element. And somehow, despite the seeming pause in activity, he emerges, time and time again, far ahead of his energetic colleagues.
- III. That's the thing about mindfulness. It seems to slow you down, but it actually gives you the resources you need to speed up your thinking.
- IV. All of humanity's problems stem from man's inability to sit quietly in a room alone."
- V. Step In Concentration
 - A. Eliminate distractions. How do we focus better if we are always bombarded with information? Make a practice to block time in your schedule to do a specific task or activity. During this time, request that you be left alone or go to a place where others are unlikely to disturb you: a library, a coffee shop, a private room.

Close social media and other apps, silence notifications, and keep your phone hidden from sight in a bag or backpack. As described in HBR, researchers found that cognitive capacity was significantly better when the phone was out of sight, not just turned off. Keep Your primary focus is to complete what you need to do. Shutting off both internal and external disturbances can help you to concentrate.
 - B. Reduce multitasking. Attempting to perform multiple activities at the same time makes us *feel* productive. It's also a recipe for lower focus, poor concentration, and lower productivity. And lower productivity can lead to burnout. Examples of multitasking include listening to a podcast while responding to an email or talking to someone over the phone while writing your report. Such multitasking not only hampers your ability to focus but compromises your work quality.

- C. Practice mindfulness and meditation. Meditating or practicing mindfulness activities can strengthen well-being and mental fitness and improve focus. During the meditation process, our brain becomes calmer and our whole body becomes more relaxed. We focus on our breath during the process so that we will not be distracted by our minds. With practice, we can learn to use our breath to bring our attention back to a particular task so that it can be done well even if we get interrupted. Steps in Mindfulness
- A. Step 1: Breathe In Deeply, And Breathe Out Slowly, Letting Yourself Relax.
 - B. Step 2: Gently Ask Your Mind To Keep Aside All Your Worries And Concerns.
 - C. Step 3: Bring More Awareness Into Breathing, Feeling It With Your Senses.
 - D. Step 4: Start Counting Your Breaths Slowly. Bring Your Mind Back If It Wanders.
 - E. Step 5: Get Immersed In The Present, Losing Consciousness Of Your Surroundings.
 - F. Step 6: Accept The Thoughts And Emotions Moving Across Your Mind Just As They Are.
- G. Get more sleep. Many factors affect your sleep. One of the most common is reading from an electronic device like a computer, phone, or tablet or watching your favourite movie or TV show on an LED TV just before bedtime. Research has shown that such devices emit light towards the blue end of the spectrum. Such light will stimulate your eye retina and prevent the secretion of melatonin that promotes sleep anticipation in the brain. Use a filter or "blue light" glasses to minimise such blue light or avoid all electronic devices before bed. Other ways to improve sleep include avoiding exercise late in the day, staying hydrated throughout the day, using journaling or breathing exercises to quiet the mind, and creating a predictable bedtime routine and schedule.
- H. Choose to focus on the moment. It might feel counterintuitive when you feel unable to concentrate, but remember that you choose where you focus. It's tough to concentrate when your mind is always in the

past and worrying about the future. While it isn't easy, make an effort to let go of past events. Acknowledge the impact, what you felt, and what you learned from it, then let it go. Similarly, acknowledge your concerns about the future, consider how you are experiencing that anxiety in your body, then choose to let it go. We want to train our mental resources to focus on the details of what matters at the moment. Our minds go in the direction we choose to focus.

- I. Take a short break. This also might seem counterintuitive, but when you focus on something for a long time, your focus may begin to die down. You may feel more and more difficulty devoting your attention to the task. Researchers have found that our brains tend to ignore sources of constant stimulation. Taking very small breaks by refocusing your attention elsewhere can dramatically improve mental concentration after that. The next time you are working on a project, take a break when you begin to feel stuck. Move around, talk to someone, or even switch to a different type of task. You will come back with a more focused mind to keep your performance high.
- J. Connect with nature. Research has found that even having plants in office spaces can help increase concentration and productivity, as well as workplace satisfaction and better air quality. Finding time to take a walk in the park or appreciating the plants or flowers in your garden can boost your concentration and help you feel refreshed.
- K. Train your brain. Scientific research is starting to amass evidence on the ability of brain training activities to enhance cognitive abilities, including concentration, in adults. Such brain training games can also help you develop your working and short-term memory, as well as your processing and problem-solving skills. Examples of such games include jigsaw puzzles, sudoku, chess, and brain-stimulating video games.
- L. Exercise. Start your day with simple exercise and get your body moving. According to the May 2013 issue of the Harvard Men's Health Watch, regular exercise releases chemicals key for memory, concentration, and mental sharpness. Other research found that exercise can boost the brain's dopamine, norepinephrine, and serotonin levels and all these will affect focus and attention.

Individuals who do some form of exercise or sports perform better on cognitive tasks when compared with those who have poor physical health. Physical movement helps relax the muscles and relieve tension in the body. Since the body and mind are so closely linked, when your body feels better so, too, will your mind.

M. Listen to music. Music has been shown to have therapeutic effects on our brains. Light music may help you to concentrate better, but some music may distract you. Experts generally agree that classical music and nature sounds, such as water flowing, are good choices for concentration while music with lyrics and human voices may be distracting. Multiple apps and services offer background music and soundscapes designed for different types of focus and work needs.

N. Eat well. Choose foods that moderate blood sugar, maintain energy, and fuel the brain. Fruits, vegetables, and high-fibre foods can keep your blood sugar levels even. Reduce sugary foods and drinks that cause spikes and dips in your sugar levels make you feel dizzy or drowsy.

Your brain needs lots of good fat to function properly. Nuts, berries, avocados, and coconut oil are all great ways to get healthy fats into your diet and help your brain run more smoothly. The science on Research has found that foods like blueberries can boost concentration and memory for up to 5 hours after consumption due to an enzyme that stimulates the flow of oxygen and blood to the brain, helping with memory as well as our ability to focus and learn new information. Leafy green vegetables such as spinach contain potassium which accelerates the connections between neurons and can make our brain more responsive.

O. Set a daily priority. Write down what you want to accomplish each day, ideally the night before, and identify a single priority that you commit to accomplishing. This will help focus your brain on what matters, tackling the big jobs first and leaving the small stuff till later. Break large tasks into smaller bytes so that you will not be overwhelmed. Identifying true priorities can help relieve distracting anxiety, and achieving small daily goals can wire your brain to achieve success.

- P. Create space for work.** Create a calm, dedicated space for work, if possible. Not everyone can have a well-appointed office, but desk organizers, noise-canceling headphones, an adjustable monitor, and adjustable lighting can help. Clear clutter out of sight, make it as ergonomic and comfortable as possible, and try to keep your space neat and ventilated.
- Q. Use a timer.** Train your brain to hyper-focus on a task by using a timer or phone alarm. First, decide what task you want to complete. Set your timer for 20 minutes (generally not more than 30 minutes) and concentrate on the task. When the alarm rings take a short break for 5 minutes. You can either take a walk and do some stretching exercise, then reset the timer and start again. This technique has shown to be effective to improve your concentration.
- R. Switch tasks.** While we may want to concentrate on a particular task, sometimes we get stuck and our brain needs something fresh to focus on. Try switching to other tasks or something you love to do. Switching tasks can help you stay alert and productive for a longer period.

Step 30-You Are Required To Do The Work to Have an Opinion on Any Topic.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. Do Not Have the Opinion and do not make any judgement about Anything, I see and hear, If I did not work Hard to have an opinion. I need to Read, Analyse, Research the topic from every angle, so that I can have an opinion or Make Judgement on the topic.
4. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.
5. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
6. Do not read the newest books, but the great books of western world, stoic and classics, as these books stood the test of time.

7. How Long Does it Take To Prepare:

- A. Depend on the topic and opponent, and how much he's written.
- B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
- C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

8. **Before Preparation.** The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialised for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

9. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas If The arguments are not supported by arguments and evidence..
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.

XIV.Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV.Never use cheap shots to win argument, like logical fallacies.

XVI.Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading, deductive and inductive methodology..
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

10. **Compound Knowledge-** Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

11. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Stratagem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that are very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft you're focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

12. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

*Step 31-Use The Chosen Rules of Reading
Method For Bible Study, Deep Work And
Follow Each Steps Of The Method Until
Finish All Steps,
And Follow Each Steps As many Times As
I Want, While Re-listen Lectures, Read
Books or Lecture Notes 1-1000 Times For
Each Step. Do It Correctly, Slowly,
Patiently, Methodically, Logically Take It
Time and Do Not Rush Process.*

SLOW READING- COMPLEX

TEXT-Bible Study, Deep Work, Deep Study

Method 1-Chapter Summary Method

Step 1-Tools Required for this Method

1. Cross Reference.
2. Treasure Scripture Knowledge.
3. BOOK
4. Read it in a Bible without notes. If you try using this method by reading a Bible in which you have made notes, you will have the tendency to concentrate on the same ideas. Let God speak to you in a fresh way and give you new insights.
5. Read it without stopping. During your first few readings, don't stop in the middle of a chapter, but read it from start to finish. Your goal is to feel the flow of the chapter, so don't be concerned with the details at the outset. Try to capture the central message and the writer's overall theme.
6. Read it in several different contemporary translations. This will give you additional insights as you see how each translator rendered the original writing. Make notes on the interesting differences you find.
7. Read it aloud quietly to yourself. If you have a problem with concentration, this will help tremendously because you will be hearing yourself read. Many people have found that reading aloud helps them better focus their attention on the text.

Step 2-Select A chapter Title

1. Record on chapter study chart the name of the book and chapter number you are studying.
2. Read the entire chapter and give it a title which reflects its content.

Step 3-Mark Paragraph Divisions

1. Mark the paragraph division within chapter.
2. If your Bible or Books has neither paragraph marks or bold face marking then you must determine the paragraph division your ourself.
3. Mark the paragraph division in you Bible by drawing a circle around the verse number where each paragraph begins.

Step 4-Create a Chapter Study Chart

1. On the chapter study Chart record the title of the chapter.
2. List the verse of the paragraph division.
3. Give each paragraph a title which reflects the content of that paragraph.
4. Use the column with the headings to record your thoughts about the relation between parts of the chapter.

Step 5-Create A Chapter Outline

1. Use paragraph divisions and paragraph titles for the main points.
2. Select sub-points and outline the verses in each paragraph of the chapter.
3. Record the verse number by points and sub-points.
4. Include any other Bible references which relate to the subject and explain it more fully.
5. If the number of the paragraphs exceeds the space on the chapter  form use additional forms.

Step 6-Content

1. Describe, summarise, paraphrase, outline, or make a list of the major points in a chapter. The method you choose will depend on the literary style of the chapter and on your own preference. Some people like to summarise; analytical people enjoy outlining. Choose the method with which you feel most comfortable and is easy for you to do. Don't try to interpret the chapter; just make observations on its contents. Record on your form what you feel the writer said.

Step 7-What Is Immediate Context of The Chapter?

Step 8- What Are The Facts Within Context Provided in The Chapter?

Step 9-Chief People

1. List the most important people in the chapter. Ask questions such as, Who are the main people in this chapter? Why are they included? What is significant about them? If the chapter contains pronouns (he, she, they, etc.) you may have to refer to the previous chapter to identify the people. Write down your reasons for choosing certain people as the chief ones of the chapter. When you come to long genealogies (lists of people), don't try to list each one, but summarise the list.

Step 10-Choice verse

1. Choose a verse that summarises the whole chapter or one that speaks to you personally. In some chapters you may find a key verse that summarises the writer's argument; in other chapters there may not be a key verse. On occasion you may want to pick a verse from which you will be writing your application, a verse that you believe God would have you apply to your life.

Step 11-Crucial Word/Words

1. Write down the key word or words of the chapter. Many times the key word will be the one that is used most frequently ("love" in 1 Corinthians 13 and "faith" in Hebrews 11). Sometimes the crucial word may be the most important word but not the most used one. In Romans 6, for example, the word "count" (kjv , "reckon") is the important word even though it is used only once (Rom. 6:11). Also, a chapter may have more than one crucial word.

Step 12-Challenges

1. List any difficulties you may have with the passage. Are there any statements you do not understand? Is there any problem or question you would like to study further? Often while doing a chapter summary you will get ideas for other types of studies you may want to do in the future. For instance, a certain word in the chapter may catch your attention. Take note of that word; later you may want to do an in-depth study of it (see chapter 7). A question about a doctrinal matter might motivate you to do a topical study on that particular teaching.

Step 13-Cross references

1. Using the cross-references in your study Bible, look up other verses that help clarify what the chapter is talking about and list them on your form. Ask the question, What else in the Bible helps me understand this chapter? Cross-references are important because they are helpful tools in interpreting the meaning of a chapter; they enable you to see what the Bible as a whole has to say on any given teaching. You can look for several types of cross-references, and these are described in the section on correlation in the Chapter Analysis Method (see chapter 10) and in chapter 10 of Walter A. Henrichsen and Gayle Jackson's book *Studying, Interpreting, and Applying the Bible*.

Step 14-Christ Seen

1. The entire Bible is a revelation of the person of Jesus Christ. In fact, Jesus used the Old Testament to teach his disciples about himself. On the day of resurrection on the Emmaus road, Jesus taught two of his disciples: "Beginning with Moses and all the Prophets, he explained to them what was said in all the Scriptures concerning himself" (Luke 24:27). As you study each chapter, be alert for statements that tell you something about Jesus Christ, the Holy Spirit, or God the Father. Ask yourself, What can I learn about the nature of Jesus from this chapter? What attributes of God in Christ are illustrated here? (Some examples: his love, justice, mercy, holiness, power, and faithfulness.) This step may be the most difficult to complete in some portions of the Bible, particularly in Old Testament narratives and in passages where symbolism is used.

Step 15-Central Lesson/Lessons

1. Write down the major principles, insights, and lessons you learn from this chapter. Ask yourself, Why does God want this passage in the Bible? What does he want to teach me from this chapter? What is the central thought the writer is trying to develop? A possible answer might be "We should be loving in all interpersonal relationships" (1 Cor. 13).

Step 16-Conclusion

1. This is the application portion of your study. As discussed in chapter 1, develop a project to help you implement in your life a lesson you have learned from the chapter or portion. It will benefit you to conclude your chapter summary by asking yourself two questions: (1) How do these truths apply to me personally and (2) What specifically am I going to do about them?

Step 17-What Further Analysis I Need To Do, Next Time?

Step 18-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a Book, bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 2 - Character Quality Method

Step 0-List of the Positive and Negative Characters Quality

1. Positive Characteristics to Look for in a Person.

- Honesty
- Integrity
- Dependability
- Loyalty
- Dedication
- Faithfulness
- Trustworthiness
- Sincerity
- Diligence
- Orderliness
- Righteousness
- Fairness
- Obedience
- Courteousness
- Respectfulness
- Reverence
- Deference
- Gratefulness
- Thankfulness
- Wisdom
- Discernment
- Sensitivity
- Perspective
- Discreetness
- Carefulness
- Cautiousness
- Discipline
- Thriftiness
- Good Stewardship

- Resourcefulness
- Observer
- Industry
- Creativity
- Enthusiasm
- Positiveness
- Lovingness
- Kindness
- Patience
- Self-denying
- Self-giving
- Sacrificing
- Compassionate
- Meekness
- Sympathy
- Generosity
- Forgiveness
- Gentleness
- Mercifulness
- Peacemaking
- Submissiveness
- Agreeableness
- Considerateness
- Self-control
- Wholeheartedness
- Determinate
- Stableness
- Energy
- Zealousness
- Earnestness
- Balance
- Moderateness
- Chasteness
- Pureness
- Cleanliness

- Modesty
- Cheerfulness
- Optimism
- Confidence
- Boldness
- Courageousness
- Man of Faith
- Bravery
- Durableness
- Humbleness
- Calmness
- Quietness
- Independence
- Tolerance
- Contentedness
- Uncomplaining
- Flexibleness
- Uncompromising
- A Servant
- Sense of Humour
- Characterised by the Beatitudes

2. Negative Characteristics and Sins to Look for in a Biographical Study

- A liar
- Unfaithful
- Unreliable
- Libellous
- Slanderer
- Gossiper
- Backbiter
- Compromising
- Flatterer
- Lazy
- A Sluggard
- Shallow
- Hypocritical
- Crafty/Sly
- Deceitful
- Dishonest
- Unfair
- Insulting
- Coarse
- Rude/Gross
- Impolite
- Rebellious
- A Busybody
- Tyrannical
- Disobedient
- Ungrateful
- Murmurer
- Shortsighted
- Lukewarm
- Halfhearted
- Foolish
- Talkative
- Idolatrous
- Careless

- Forgetful
- Wasteful
- Cruel
- Inhuman
- Selfish
- Malicious
- Unkind
- Insensitive
- Negligent
- Callous
- Prejudiced
- 261
- Unforgiving
- Harsh
- Unsociable
- Grudging
- Annoying
- Irritating
- Indifferent
- Apathetic
- Idle
- Cowardly
- A Cop-out
- Impulsive
- Humorless
- Fickle
- Double-minded
- Wavering
- Headstrong
- Proud
- Conceited
- Stubborn
- Boastful
- Sensual
- Immodest

- Gluttonous
- A Drunkard
- Reprobate
- Immoral
- Unclean
- Adulterous
- Fornicator
- Covetous
- Greedy
- Stingy
- Fearful
- Arrogant
- Dogmatic
- Vain
- Jealous
- Envious
- Sarcastic
- Scornful
- Blasphemous
- Bitter
- Violent
- Complaining
- Procrastinator
- Argumentative
- Disrespectful
- Manipulative
- Bigoted
- Worldly
- A Worrier
- Rejoices in Evil
- Lusts for Power
- Self-righteous
- Undisciplined
- Apostate
- Fears Men

- Presumptuous
- Profane
- Legalistic
- Doctrinally Off
- Friend of the World
- Angry without Cause
- Ashamed of Christ
- A Doubter
- Independent Spirit
- Loves Men's Praise
- Forgets God

Step 1-Tools Required for this Method

1. Book
2. Study Bible
3. An Exhaustive Concordance
4. The Building of Character by J. R . Miller (AMG Publishers)
5. Character Sketches, 2 volumes (Institute of Basic Life Principles)
6. The Master Bible, edited by J. Wesley Dickson (J. Wesley Dickson & Co.)
7. The Measure of a Man by Gene Getz (Regal Books)
8. The Measure of a Woman by Gene Getz (Regal Books)
9. Bible Dictionary
10. Word Study Book
11. Topical Bible
12. Cross Reference
13. Treasure Scripture Knowledge
14. An English dictionary
15. Only work on one quality at a time. Don't try to work on two or three or more, for it takes concentrated effort to see how that one quality applies to every area of your life. It is far better to build one quality solidly into your life than to work on several weak ones.
16. Don't rush it! Character development takes time. Even though one of the steps is writing out an illustration after one week, you should probably want to work on one quality for a much longer time. I have found in my own life that God works on an area for months (sometimes years) before it becomes part of my daily walk with him.
17. Stay with that one quality until you get victory in that specific area. Don't skip around, trying to work on many qualities, when you need victory in that one. Remember that the quality of diligence is one you want to work on.
18. Be alert to a negative quality in your life that is actually a positive one being misused. Realise that the Lord wants to turn your weak points into strong ones. If you are rigid, legalistic, and unbending, it might be that the quality of self-discipline is being misused. That discipline needs to be tempered with compassion and concern for others.
19. Trust the Holy Spirit to build these qualities in your life. In the final analysis, it is God's power in you that reproduces the fruit of the Spirit in your life. It is God alone who can change your character. "For it is God who works in you to will

and to act according to his good purpose” (Phil. 2:13). So let God do it, trusting the Holy Spirit to work in your life.

Step 2 Name the Quality

1. Select the quality you want to study and write it down. Then look it up in an English dictionary and jot down the definition of that word or concept. List any synonyms or related words that help you understand this quality.

Step 3-Name the Opposite Quality

1. Write down the opposite quality — the antonym — of the one you are studying, and write out its dictionary definition and similar words. If you can’t think of the opposite, use a dictionary of antonyms; some thesauruses also give antonyms. For example, unfaithfulness is the opposite of faithfulness. But in some qualities you might be studying, there might be two or more opposites. For example, you could have the following:
 - Faith and doubt.
 - Faith and apathy.
 - Faith and fear.

Step 4-Do a Simple Word Study

1. Look up the definition of the quality you are studying. Find the ways it is used in the scriptural contexts; then check a Bible dictionary, encyclopaedia, or word study book for the way the quality was used in biblical times and in the Scriptures. Some of the tools will tell you how many times the word is used in the Bible, each testament, the writings of different authors, and in the book you are studying. For example, if you were studying the quality of meekness, you would discover that the word meek in the original Greek meant “breaking something and bringing it under submission.” The word was used to describe the training of valuable horses, which were brought under submission to their masters. A stallion would still have all the power and strength of its wild days, but it was now under its master’s control. Meekness, therefore, is not weakness. As a Christian character quality, meekness is strength that is in submission to Jesus Christ.

Step 5-Find Some Cross References

1. Using cross-references will give you additional insights from other portions of the Bible. Scripture is still the best interpreter of Scripture. Use your concordance and topical Bible to find all the verses you can relating to this quality. Look up the word and its synonyms in the concordance and topical Bible, write the cross-reference on the form in the appropriate section, and give a brief description of that verse. Then ask some of the following questions about the quality you are studying as you meditate on the cross-reference verses:
 - What are the benefits this trait can bring me?
 - What are some bad consequences this trait can bring me?
 - What are benefits this trait can bring to others?
 - What are some bad consequences this trait can bring to others?
 - Is there any promise from God related to this trait?
 - Is there any warning or judgment related to this trait?
 - Is there a command related to this trait?
 - What factors produce this trait?
 - Did Jesus have anything to say about this quality? What?
 - What writer talked about this quality the most?
 - Is this trait symbolised by anything in Scripture? Is that significant?
 - Is this trait listed with a group of qualities? What is the relationship between them? What does this suggest?
 - What Scriptures tell me directly what God thinks of this trait?
 - Do I want more or less of this trait in my life?
2. After asking a series of questions such as these, or others that you think of, you might write a brief summary of the Bible's teaching on this quality. You may list any lessons or principles that you learned from this mini-topical study, or you may paraphrase a few key verses on this trait. Always be sure to write down any difficulties you have with the verses you looked up, or questions you would like to see answered. Possibly, later on you will understand what is difficult at present and then find answers to your problems; often one verse sheds light on another verse you have studied.

Step 6-Do a Brief Biographical Study

1. Now go back to your Book or Bible and try to find at least one person (more if possible) who showed this character quality in his or her life. Briefly describe this quality and write down the Scriptures that refer to it. Ask these questions as you do this part of the study:
 - What shows this quality in his/her life?
 - How did this quality affect his/her life?
 - Did the quality help or hinder his/her growth to maturity? How?
 - What results did it produce in his/her life?
2. An example of this step may be seen in the life of Joseph, the son of Jacob, who displayed different qualities of the fruit of the Spirit (Gal. 5:22 – 23) in each incident in his life. It is interesting to note his testimony before the heathen: “So Pharaoh asked them, ‘Can we find anyone like this man, one in whom is the spirit of God?’” (Gen. 41:38). We find these qualities in Joseph:
 - He displayed love in a difficult family situation (Gen. 47).
 - He displayed self-control in a difficult temptation (Gen. 39).
 - He displayed industry and patience in difficult circumstances (Gen.39:19 – 40:23).
 - He displayed faithfulness in a difficult task (Gen. 41:37 – 57).
 - He displayed goodness, gentleness, and kindness in difficult family reunions (Gen. 42; 50).

Step 7-What Is Immediate Context

Step 8- What is Whole Context

Step 9- What Are The Facts Within Context

Step 10-Find a Memory Verse

1. Write down at least one verse from your cross-reference or biographical portion of the study that really speaks to you and that you intend to memorise during the following week. This verse should come in handy when God provides an opportunity for you to work on this character quality in a specific way.

Step 11-Select a Situation or Relationship to Work on

1. We are now getting to the application part of the study. Think of an area in your life in which God wants you to work on this character quality — avoiding it if it's negative or building it up if it's positive. This can be either a situation or an interpersonal relationship. If it is a situation, anticipate in advance what you will do when the situation arises. Suppose you have been slothful, lazy. Your study on slothfulness has challenged you to get rid of this quality in your life. As you plan ahead, you know when situations will arise that will bring out the lazy streak in you, so you decide ahead of time what you will do: You will set two alarm clocks, one on the far side of the room, to help you get up in the morning to have a quiet time and be on time to work or school. If it is a relationship, determine ahead of time how you will respond in your interactions with that person. This person could be wife, husband, parents, children, girlfriend, boyfriend, work associates, school friends, or neighbors. Look for opportunities to work on that character quality in your relationships with that person or persons. Your goal is to have more mature relationships. One way of doing this is to think back and recall a good situation or relationship in your recent past when you did work on this quality.

Step 12-Plan a Specific Project

1. This is the practical part of your application and is the actual working out. Think of a project that you will work on to build a positive quality in your life or to get rid of a negative quality. Once I was working on the trait of gratefulness. One of my projects was to write grateful letters to five people who had been a blessing to me, saying, "I am grateful for you because. . . ." Remember: applications should be personal, practical, possible, and measurable.

Step 13-Write out Personal illustration

1. A few days after you have completed the first eight steps of this study, write out an illustration of how you were able to work on this quality. This is the “provable” (measurable) part of your application. Be specific, and write down where you have succeeded and where you might have failed. In just a short time you should be able to develop a whole set of personal examples of how God is working in your life, getting rid of negative qualities and building positive ones. These illustrations serve a number of purposes. When you get discouraged, read over the backlog of your illustrations and see how God has worked in you. When you are working with a “Timothy,” use your illustrations to teach him and to encourage him in his own illustrations. When you are sharing your testimony or teaching a class, use these illustrations to add a personal element to your presentation: “Here is how God worked in my life.” God often builds character in our lives by putting us in situations where we are tempted to do the opposite. For example, God may teach you honesty by placing you in a situation where you are tempted to be dishonest.

Step 14-What Further Analysis or Research I Need To Do, Next Time?

Step 15-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 3-Thematic Method

Step 1-Tools Required for this Method

1. Book
2. Study Bible
3. An Exhaustive Concordance
4. A topical Bible
5. You don't need many reference tools. You can do a limited study if you have only a topical Bible. But a topical Bible does not list all the references on a particular theme, so you will benefit by using an exhaustive concordance. You can make a list of every word that relates to the theme, then look up each word in the concordance and select the verses that deal specifically with your theme.
6. You can use this method when you don't have the time to do a full-scale topical study because the subject is too broad or because of the large number of Bible references on the subject.
7. This method is a good way to preview a topic by surveying the high points of its subordinate themes before attempting a regular topical study of the subject. Or you can use this approach when you are only interested in having certain questions answered on the theme. With this method you can discover exactly what you want to find out without spending valuable time on unrelated matters.
8. This method is one of the easiest types of personal Bible study to turn into a sermon or Sunday school lesson. After completing your personal study, make each of your questions a major point in your talk and share the biblical answers with your group, class, or congregation.
9. This method is a good one for teaching your "Timothy" or any new Christian. It is simple enough for someone who has not yet done any personal Bible study to grasp and do effectively.

Step 2-Choose a Theme to Study

1. Select a theme in which you are interested. If this is your first study of this kind, start with one that is small or short. In the Assignment section are some suggestions, including the questions; the example gives you a completed study.

Step 3-List all the verses you intended to study

1. Using your three tools — the study Bible, the exhaustive concordance, the topical Bible — make a list of all the Scripture verses that are related to the theme you have chosen. Remember to consider synonyms and other similar words and concepts when using the concordance. Select from this list the verses that are most important to your theme (unless you are trying to discover all the Bible says about your theme).

Step 4-Decide on the Questions you will ask

1. How do you know what questions to ask? Write down those in which you are most interested. What are some things you would like to know about your theme? Make a list of questions, not more than five in number. Remember that sometimes you may need to ask only one question. Write your question(s) on the form or on a blank sheet of paper.
 - Who?
 - What?
 - When?
 - Where?
 - Why?
 - How?
 - What are the things God hates?
 - According to the New Testament, what things should we “endure”?
 - What are the things we should “consider” as Christians?
 - What traits of a fool are given in the book of Proverbs?
 - According to Solomon (in Proverbs), what brings poverty?
 - What are the characteristics of an angry man?
 - What causes anger?
 - What are the results of anger?
 - What is the cure for anger?

Step 5-Ask your Questions of each reference

1. Read through your references, and ask your set of questions of each verse. Write down the answers you find in the appropriate places on your form or paper. Sometimes you will be able to answer all the questions in a given verse, but usually you will only answer part of them. Occasionally a verse may not answer any of your questions; in that case, leave that part blank on your form. If you are not finding any answers to your questions, start over and write a new set of questions.

Step 6-What Is Immediate Context?

Step 7- What is Whole Context?

Step 8- What Are The Facts Within Context?

Step 9-Draw some conclusion from your study

1. After you have finished checking the references and writing your answers, go back and summarise the answers to each of your questions. You might organise your study into an outline by grouping similar verses together and turning your questions into the major divisions of the outline. This will make it easy for you to share the insights you have discovered with others.

Step 10-What Further Analysis or Research I Need To Do, Next Time?

Step 11-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.

Method 4 - Biographical Method

Step 1-Tools Required for this Method

1. Book
2. Study Bible
3. Exhaustive concordance
4. Topical Bible
5. Bible Dictionary or Encyclopaedia
6. Start with a person on whom you can do a simple study. Begin with one about whom there is a small number of references. Some biblical people can be studied in a few hours; others take weeks to study, and some major persons can take a lifetime. Do not start doing this study on a person such as Jesus, Moses, or Abraham. Begin with some minor but important people such as Andrew, Barnabas, or Mary of Bethany.
7. The secret of a good biographical study is to live with that person during the study. Walk in his or her sandals. Try to get inside their mind and see how they think, feel, and respond to circumstances. Attempt to see things from their point of view, hear with their ears, mingle with their friends, and fight with their enemies. Become that person while you are studying them. This is only possible if you spend much time with that person, reading, and rereading all the Bible references about them. A friend of mine, Wayne Watts, has spent a lifetime studying Abraham. He has studied this biblical person so long that he has taken on many characteristics of Abraham. He is a great man of faith, as Abraham was.
8. Be careful not to confuse different people who have the same name when you look up the references about them. You will have to be sure that the verse is speaking about the person you have chosen to study. You would not want to confuse John the Baptist with John the Apostle or John Mark. For example, the Bible shows us that the following names were popular and refer to different people:

- Zechariah — 30 different men
 - Nathan — 20 men
 - Jonathan — 15 men
 - Judas — 8 men
 - Mary — 7 women
 - James — 5 men
 - John — 5 men
9. Be careful to find the various names that may apply to just one person. Since the Bible came out of a Hebrew-Aramaic-Greek context, some people's names changed in the different languages, in both the Old Testament and the New. The apostle Peter, for example, is known as Peter, Simon, Simeon, and Cephas. Daniel's three friends, Hananiah, Mishael, and Azariah, are better known as Shadrach, Meshach, and Abednego. Sometimes a name change came because of a character change, which was the case of Jacob becoming Israel. So be careful and find all the names used for the same person in your Bible study.
 10. Stay away from books written about biblical people until after you have exhausted every Bible reference about that person and have drawn every possible insight out of those texts. Don't let a Bible commentary rob you of the task of personal discovery or prejudice your views of a person. Do your own work first, then check other sources.

Step 2-Select the Person You want to Study

1. You might start out by selecting someone who either has a weakness that you have or a strength that you would like to develop. Choose a person whose life will give you some valuable insights into how you can conform more to God's standard for living and become more like Jesus Christ.

2. Major Men in the Bible or other major Men.

- Abraham
- Daniel
- David
- Elijah
- Elisha
- Ezekiel
- Ezra
- Isaiah
- Isaac
- Jacob
- Jeremiah
- Jesus
- John (Apostle)
- Joseph (O.T.)
- Joshua
- Moses
- Nehemiah
- Paul
- Peter
- Pharaoh
- Samson
- Samuel
- Saul (O.T.)
- Solomon

3. Minor But Important Men in the Bible or other major Men.

- Aaron
- Abel
- Abimelech
- Abner
- Absalom
- Achan
- Adam
- Ahab
- Ahithophel
- Amos
- Ananias
- Andrew
- Apollos
- Apostles (any)
- Aquila
- Asa
- Balaam
- Barnabas
- Barzillai
- Caiaphas
- Caleb
- Eli
- Esau
- Gehazi
- Gideon
- Habakkuk
- Haggai
- Haman
- Herod
- Hezekiah
- Hosea
- Jabez
- James
- Jehoshaphat

- Jeroboam
- Joab
- Job
- John the Baptist
- Jonah
- Jonathan
- Judas Iscariot
- Judges (any)
- Kings (any)
- Laban
- Lot
- Luke
- Mark
- Matthew
- Melchizedek
- Mephibosheth
- Mordecai
- Naaman
- Nathan
- Noah
- Philemon
- Philip
- Pontius Pilate
- Prophets (any)
- Rehoboam
- Shamgar
- Silas
- Stephen
- Timothy
- Titus
- Tychicus
- Uzziah
- Zechariah
- Zedekiah
- Zephaniah

- Zerubbabel

4. Prominent Women in the Bible And other Women.

- Abigail
- Abishag
- Anna
- Bathsheba
- Deborah
- Delilah
- Dinah
- Dorcas
- Elizabeth
- Esther
- Eunice
- Eve
- Hagar
- Hannah
- Jezebel
- Jochebed
- Leah
- Lydia
- Martha
- Mary (Jesus' Mother)
- Mary Magdalene
- Mary of Bethany
- Michal
- Miriam
- Naaman's Maid
- Naomi
- Priscilla
- Queen of Sheba
- Rachel
- Rahab
- Rebekah
- Ruth

- Sapphira
- Sarah
- The Shunammite
- Vashti
- Zipporah

Step 3-Make a list of all the references about that person

1. Using your reference tools, find all the Scripture passages you can about that person and things related to her life. This might include such things as her birth, major events of her life, her accomplishments, what others said about her, and her death. You will not be able to get all the necessary “vital statistics” about every person you study, but find out as much about them as you can. Also look up any references that deal with the historical background of her life. If you were studying Esther, you would need to study the background of her day: the Persian Empire. If you were studying the apostle Paul, you would have to study his missionary journeys.

Step 4-Write down first impressions (First reading)

1. Read through the Scripture references you have listed and make some notes. Write out the first impression you have of this person. Then write down some basic observations and important information you discover about him or her. Finally, list any problems, questions, or difficulties you wonder about as you read these references.

Step 4-Make a Chronological Outline (Second Reading)

1. For a major biblical person, read all the references again and make a chronological outline of the person’s life. This will help you gain a good perspective on his life, and you will see how different events relate to one another. Later, when you study the events associated with his life, you will know in what part of his life they occurred. For minor biblical people or those about whose lives few details are given, read the references and make an outline on the basis of the information you have. Try to read all the references in one sitting and in a modern translation. This will help you feel the flow of the person’s life. As you read, look for any natural, major divisions in his or her life. Then look for and write down any progressions and changes of attitude in that

person's life as times goes by. For example, a well known division of Moses' life is.

- Forty years in Pharaoh's court — learning to be a somebody.
 - Forty years in the Median desert — learning to be a nobody.
 - Forty years in the Sinai desert — learning that God is Somebody.
2. This is a real key to studying the characters of the people involved. See how God slowly molded and changed the people or how Satan brought them down.

Step 5-Get some insights into the person (Third Reading)

1. Go back over the references again, and look for possible answers to the questions suggested in appendix B. By answering some of these questions, you should get some helpful insights into the character of the person you are studying.

Step 6-Identify some Character Qualities (Fourth Reading)

1. As you review the references once again, use the suggested list of positive and negative characteristics in appendix C as a checklist. Write on your form or paper each quality, good and bad, that shows up in the person's life. Give a verse reference that shows each characteristic you have observed.

Step 7-Question to ask (Fifth Reading)

1. Reputation

- Who wrote what we know about this person?
- What did people say about him? What did his friends say about him?
- What did his enemies say about him?
- What did his family (wife, children, brothers, sisters, parents) say about him?
- What did God say about him?
- Why do you think God allowed this person to be mentioned in the Bible?

2. Tests of Character

- What were his aims and motives?
- What was he like in his home?
- How did he respond to failure? Did he get discouraged easily?
- How did he respond to adversity? Did he handle criticism well?
- How did he respond to success? Did he get proud when praised?

- How did he respond to the trivial and mundane things in life? Was he faithful in the little things?
- How quickly did he praise God for the good or bad things that happened to him?
- How quickly did he obey God when told to do something?
- How quickly did he submit to God-ordained authority?
- What was he like when he was alone with God?

3. Background

- What can you discover about his family and ancestry?
- What does his name mean? Why was he given that name? Was it ever changed?
- What was his home-life like? How was he raised? Where was he raised?
- What were the characteristics of his parents? How did they influence him?
- Was there anything special about his birth?
- Where did he live? What was his everyday life like?
- Was he exposed to other cultures? Did they affect him in any way?
- What was the condition of his country politically and spiritually during his lifetime?
- What kind of training did he have? Did he have any schooling?
- What was his occupation?
- How long did he live? Where did he die? How did he die?

4. Significant Events

- Was there any great crisis in his life? How did he handle it?
- What are the great accomplishments for which he is remembered?
- Did he experience a divine “call”? How did he respond to it?
- What crucial decisions did he have to make? How did they affect him? Others?
- Did any particular problem keep recurring in his life?
- Where did he succeed? Where did he fail? Why?
- How did the environment and circumstances affect him?
- What part did he play in the history of God’s plan?
- Did he believe in the sovereignty of God? (God’s control over all events) Relationships?

- How did he get along with other people? Was he a loner? Was he a team person?
- How did he treat other people? Did he use them, or serve them?
- What was his wife like? How did she influence him?
- What were his children like? How did they influence him?
- Who were his close companions? What were they like? How did they influence him?
- Who were his enemies? What were they like? How did they influence him?
- What influence did he have on others? On his nation? On other nations?
- Did he take care of his family? How did his children turn out?
- Did his friends and family help or hinder him in serving the Lord?
- Did he train anyone to take his place? Did he leave a disciple (a "Timothy") behind?

5. Personality

- What type of person was he? What made him the way he was?
- Was his temperament choleric, melancholic, sanguine, or phlegmatic?
- What were the outstanding strengths in his character? What traits did he have?
- Did his life show any development of character as time passed? Was there growth and progression there?
- What were his particular faults and weaknesses?
- What were his particular sins? What steps led to those sins?
- In what area was his greatest battle: lust of the flesh, lust of the eyes, or pride of life?
- What were the results of his sins and weaknesses?
- Did he ever get the victory over his particular sins and weaknesses?
- What qualities made him a success or failure?
- Was he in any way a type of Christ? Spiritual Life
- What personal encounters did he have with God that are recorded in Scripture?
- What was his purpose in life? Did he try to bring glory to God?
- What message did he preach and live? Was his life a message for or against Christ/God?
- Did he live a separated life, distinct from worldly ways?

- What did he believe? What great lessons did God teach him?
- Why do you think God dealt with him the way he did?
- What was his attitude toward the Word of God? Did he know the Scriptures existing at that time?
- What kind of prayer life did he have? Did he have close fellowship with God?
- Was he bold in sharing his testimony? Was he a courageous witness in times of persecution?
- How big was his faith in God? How did he show it? Did God give him any specific promises?
- Was he a good steward of what God had given him — time, wealth, talents?
- Was he filled with the Spirit? What were his spiritual gifts? Did he use them?
- Was he eager to do God's will, willingly and without question?

Step 8-What Is Immediate Context?

Step 9- What is Whole Context?

Step 10- What Are The Facts Within Context?

Step 11-Show how other Bible truths are illustrated in the Person's Life

1. Examine the person's life to see how it illustrates other truths taught in the Bible. For example, does his or her life show the principle of "you will reap what you sow"? Look in that life for illustrations of some of the Proverbs or of principles taught in the Psalms. For instance, you might ask, "Does his life illustrate the promise, 'Delight yourself in the Lord and he will give you the desires of your heart' " (Ps. 37:4)? Find cross-references that illustrate what the Bible says about some of the characteristics you found in this person's life.

Step 12-Summarise the main Lesson (s)

1. In a few sentences write out what you think is the main lesson that is taught or illustrated by this person's life. Is there any one word that could describe that life? What was his or her outstanding characteristic?

Step 13-What Further Analysis or Research I Need To Do, Next Time?

Step 14-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summaries the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 15-Make Study Transferable

1. Condense what you have learned into a simple outline that will help you remember it and enable you to share your conclusions with others. Make it “pass-on-able.” Ask yourself “What can this person’s life mean to others? What can I share that I have learned that would help someone else?” Divide the information into natural sequences of time and/or events and lessons learned. Use the progressions that you have found and recorded. Then think of some easily remembered ways to title each section. Keep these titles true to the major content of each section, making use of rhymes, alliterations, and other memory devices. Use your imagination in this last step! An illustration of a transferable outline of the life of Barnabas might look like this:

- He was an investor of money in the lives of church members (Act 4:36–37).
- He was the introducer of Saul (later Paul) to the apostles (Acts 9:26 – 28).
- He was the inspector of the new church at Antioch (Acts 11:22 – 24).
- He was an instructor of new Christians, including Paul and Mark (Acts 11:22 – 26; 15:39).
- He was the initiator on the first missionary journey, which he began as the team leader but ended as a team member (Acts 13 – 14).
- He was an interpreter of the doctrine of salvation and God’s plan for the Gentiles (Acts 13 – 14).
- He was insistent in giving Mark another chance to be trained in the gospel ministry (Acts 15:36 – 39).

Step 16-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 5-Topical Method

Step 1-Tools Required for this Method

1. Book.
2. Study Bible
3. Exhaustive concordance
4. Topical Bible
5. Thompson Chain Reference Bible
6. Dickson's New Analytical Study Bible
7. Zondervan Dictionary of Bible Themes
8. NIV Thematic Study Bible
9. It enables us to study the Word of God systematically, logically, and in an orderly manner.
10. It gives us a proper perspective and balance regarding biblical truth. We get to see the whole of a biblical teaching.
11. It allows us to study subjects that are of particular interest to us.
12. It enables us to study the great doctrines of the Bible.
13. It lends itself to good and lively discussions. The results of a topical study are always easy to share with others.
14. It allows us variety in our lifetime commitment to personal Bible study. The number of topics in the Bible that we can study is almost limitless.
15. Be systematic. Don't try to study the Bible in a haphazard manner that is basically undisciplined. Make a list of all the things related to your topic, and make it as comprehensive and complete as possible. Then take up these items one at a time, studying them in a systematic and logical order.
16. Be thorough. As far as possible, find and study every verse that relates to the topic. The only way to know everything God has said on a topic is to go through the entire Bible and find all the passages on that topic. Use your concordance to do this.
17. Be exact. Try to get the exact meaning of every verse you study. Be sure to examine the context of each verse to avoid misinterpretation. The biggest mistake you must avoid is taking a verse out of its context.

Step 2-Select a Topic

1. You may choose a general subject, for example, all of the miracles in the Bible. You may select a more specific subject such as the miracles performed by Jesus or the miracles recorded in a certain book of the Bible. For your first study it is best to limit the topic to a specific subject in one book rather than study a subject in the entire Bible. You may select a topic which pertains to a need in your own life. You might select a topic about which you have been asked and could not answer or a topic which you do not fully understand. You may want to study topics you can use in counselling others in time of need. For example, you may want to study the topic of death so you will know how to comfort others. Or you may want to study fear so you can help those who are fearful.

Step 3-Compile A list of Words

1. Make a list of all the related words (synonyms and antonyms), phrases, events, and anything else that could have something to do with your topic. If you are studying suffering, for example, you will want to list words such as affliction, anger, chastisement, grief, health, pain, sorrow, trials, and tribulation. If you see that your topic has become too broad, narrow it down to a manageable size.

Step 4-Collect Bible References

1. Take your reference tools and begin to gather all the verses you can find on the topic. Look up in your concordance each related word listed in Step One. Make a list of all verses that relate in any way to the topic. Also, you will want to use your topical Bible to find verses for study.

Step 5-Consider Each Reference individually

1. Using the Comparison Chart at the end of this chapter, look up, read, and study each individual reference and write down your observations and insights on it. (You will use the Comparison Chart for both Step Three and Step Four.) Be sure to check the context (surrounding verses) carefully when studying a verse, to make sure you are interpreting it correctly.
2. Ask as many questions as you can about each verse you study. Remember to use the great what, why, when, where, who, and how questions. Don't forget to define all key words you come across.

Step 6-Compare and group the references

1. After you have carefully studied all your verses individually, you will begin to notice that some of the references naturally complement each other and deal with the same areas of the topic under study. Categorise these references on a piece of scratch paper.

Step 7-Condense Your Study into an Outline

1. Using the categories from Step Four, logically arranged as your main divisions, outline your study. Do this by grouping related or similar references together into natural divisions. Then organise these divisions into a logical pattern. In helping you organize your study, this step will also enable you to share it with others.

Step 8-What Is Immediate Context?

Step 9- What is Whole Context?

Step 10- What Are The Facts Within Context?

Step 11-Summarise the Information

1. After you gather all the information on a topic you will probably have a long list of Scriptures. You must now organise these verses to make the subject easily understood. Study the verses you collected. Identify main points made by the verses. What other verses make this same point? Arrange these verses together, then create a chart or outline to summarise your studies. Remember: You not only want to learn all the Bible teaches.

Step 12-Conclude Your Study

1. In your two-part conclusion, summarise your findings in a brief paragraph and then write out a practical application drawn from this summary. Remember to be personal and practical, writing a possible and measurable application.

Step 13-What Further Analysis or Research I Need To Do, Next Time?

Step 14-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 15-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 6-Word Study Method

Step 1-Tools Required for this Method

1. Books.
2. Study Bible
3. Exhaustive concordance
4. Several recent translations. (These will enable you to see the words different translators chose from the original ones. Do not use paraphrases in this study.)
5. A Bible dictionary and/or encyclopaedia.
6. A set of word studies (see the Introduction to this book).
7. A good English dictionary.
8. Topical Bible
9. The Complete Word-Study Dictionary of the Old Testament by Eugene Carpenter (AMG)
10. Gems from the Original by Harold J. Berry (Back to the Bible Broadcast)
11. The New International Dictionary of New Testament Theology: Abridged Edition, edited by Verlyn Verbrugge (Zondervan)
12. New Testament Words by William Barclay (Westminster John Knox)
13. A Theological Word Book of the Bible, edited by Alan Richardson (Macmillan)
14. A Theological Word Book of the Old Testament, edited by Laird Harris et al. (Moody Press)
15. Vincent's Word Studies in the New Testament by Marvin R. Vincent (Hendrickson)
16. If you have had some Greek, The Englishman's Greek Concordance of the New Testament (Zondervan) will be useful.
17. The Word Study Concordance and its companion volume The Word Study New Testament by Ralph Winter (William Carey Library).
18. The Word Study Method of Bible Study takes a microscopic look at the origin, definition, occurrences, and uses of a particular word, especially as it relates to the context of a passage of Scripture. The purpose is to learn as precisely and comprehensively as possible what the biblical writer meant by the word he used.
19. Sometimes several Greek words are translated by just one English word. We have already noted that the English word servant has seven Greek

equivalents, each with a different shade of meaning. Be sure to check your concordance carefully to see if this might be true of the word you are studying. Find out what each different original word meant.

20. Sometimes one Greek or Hebrew word is translated several ways in English.

To overcome this difficulty you will have to do a careful study on all the different renderings of that original word. You can do this quite easily through the use of your exhaustive concordance. For example, the Greek word *koinonia* is translated five different ways in the King James Version: (1) “communication” — once; (2) “communion” — 4 times; (3) “contribution” — once; (4) “distribution” — once; and (5) “fellowship” — 12 times. Follow this procedure in solving this difficulty:

- List the different ways the word is translated.
- List how many times it is translated each way.
- Give examples of each translation (if possible).
- Write down how the different meanings might be related.
- Determine if the writer of the book is using the word you are studying in single sense or is giving it a multiple meaning.

21. Sometimes an original word is translated by a whole phrase in English. This difficulty will take a little more work to overcome because concordances do not list word translations by phrases. You will have to compare the recent versions of the Bible you are using to see how the various translators have rendered the word. For example, Paul declared to the Corinthians, “But we all, with open face beholding as in a glass the glory of the Lord, are changed into the same image from glory to glory, even as by the Spirit of the Lord” (2 Cor. 3:18 KJV). The phrase “beholding as in a glass” is just one word in the original Greek (*katoptrizomenoi*), and you will discover some interesting truths when you study the origin of that word.

Step 2-List of words (check topical Bible, Exhaustive Concordance, Dictionary).

1. Adoption
2. Adversary
3. Apostle
4. Atonement
5. Baptize
6. Believe
7. Bless
8. Body
9. Call
10. Chasten
11. Christ
12. Church
13. Confess
14. Covenant
15. Death
16. Disciple
17. Everlasting
18. Evil
19. Faint
20. Faith
21. Favor
22. Fear
23. Fellowship
24. Flesh
25. Good
26. Gospel
27. Grace
28. Hear
29. Hell
30. Holy
31. Hope
32. Immanuel
33. Iniquity
34. Jehovah

35. Jesus
36. Judgment
37. Kingdom
38. Know
39. Law
40. Laying on of
41. Hands
42. Life
43. Light
44. Lord
45. Love
46. Lust
47. Manifest
48. Marriage
49. Mediator
50. Meek
51. Mercy
52. Mind
53. Minister
54. Miracle
55. Mystery
56. Name
57. Obey
58. Passover
59. Peace
60. Perfect
61. Perish
62. Preach
63. Propitiation
64. Reconcile
65. Redeem
66. Remnant
67. Repent
68. Rest
69. Resurrection

- 70. Righteous
- 71. Sabbath
- 72. Sacrifice
- 73. Saint
- 74. Sanctify
- 75. Save
- 76. Servant
- 77. Sin
- 78. Soul
- 79. Spirit
- 80. Temptation
- 81. Trial
- 82. Truth
- 83. Understand
- 84. Vain
- 85. Vision
- 86. Watch
- 87. Wisdom
- 88. Witness
- 89. Word
- 90. World
- 91. Worship

Step 3-Choose Your Word

1. In your previous personal Bible study, you may have wondered what certain words meant. Choose a word that you wondered about or are interested in.

Step 4-Find Its English Definition

1. Use your English dictionary and write out the definition of the English word. List with the definition any synonyms or antonyms of the word.

Step 5-Compare Translations

1. Read in different recent translations the passages where this word is used. Write down the different renderings of the word that you find. Take note of any renderings that are repeatedly and commonly used in these translations.

Step 6-Write Down The Definition of the Original Word

1. Find out what the original word is in your exhaustive concordance or word study book and write down its definition. You may find it has a number of usages.

Step 7-Check The Word's Occurrences in the Bible

1. Using your concordance again, find out how and where the word is used in the Bible. Ask these questions:
 - How many times does the word occur in the Bible?
 - In what books does it occur?
 - What writers used the word?
 - In what book does it occur most?
 - Where does the word occur first in the Bible?
 - Where does it occur first in the book I am studying?

Step 8-Find The Root Meaning and Original of the word

1. This step brings you into some research. You will want to read a fuller discussion of the meaning and origin of the word you are studying, using a Bible dictionary, a Bible encyclopaedia, a word study set, or a theological word book.

Step 9-Discover the Word's Usage in the Bible

1. Here you will want to find out how the word is used in the Bible. The study of the root meaning (Step Six) told you what the word meant originally and where it came from, but some words change their meanings with the passage of time. Also, they might have different meanings in different situations and contexts. In the final analysis, the usage of a word is the most important factor in determining its true meaning. Fulfil this step in the following three ways:
2. Find out how the word was used during the time the book of the Bible was written. How was it used in other writings besides the Bible? To find out what the word meant and how it was used in the culture of the day, you will have to look at extra-biblical materials (for example, histories of the time); many times, however, the word study set you are using will have this information. Advanced students and people who know the original languages may find this information in theological dictionaries and Hebrew and Greek lexicons.
3. Find out how the word is used in the Bible. Using your exhaustive concordance, find out how the word is translated every time it appears in the Bible. Often the Scriptures define words through usage and illustrations; this is a way of finding out the scriptural definition. You may also ask some or all of the following questions:
 - How does the writer use the word in other parts of the book?
 - How does the writer use the word in other books he has written?
 - How is the word used throughout the whole testament?
 - Does the word have more than one usage? If so, what are its other uses?
 - What is the most frequent use of the word?
 - How is it used the first time in the Scriptures?
4. Find out how the word is used in the context of the passage. This is the ultimate test. The context will be your most reliable source for insights into what the writer really meant. Ask these questions:
 - Does the context give any clues to the meaning of the word?
 - Is the word compared or contrasted with another word in the context?
 - Is there any illustration in the context that clarifies the meaning of the word?

Step 10-What Is Immediate Context?**Step 11- What is Whole Context?****Step 12- What Are The Facts Within Context?****Step 13-Summarise your Study**

1. During the first three steps of word study make notes on what you learn about the word. Write down the meanings of the word from the Bible margin, concordance, word study book, and modern dictionary. Record notes on its use in other Bible passages. When you complete your study, use what you have learned about charts and outlines to summarise your word study notes. Remember to record somewhere on your chart or outline the book, chapter, verse number, and word you are studying.

Step 14-What Further Analysis or Research I Need To Do, Next Time?**Step 15-Write out a Personal Application**

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.

17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."
18. Be especially careful to keep your goal of "application, not interpretation only" in mind when you do a word study. Remember that you are doing personal Bible study, not just conducting an academic exercise. Discovering the full meaning of a biblical word is not an end in itself, because a word study without application has little spiritual value. In doing this study, constantly ask yourself, "How can understanding this word strengthen my spiritual life?"

Step 16-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 7-Book Background Method

Step 1-Tools Required for this Method

1. Books
2. Study Bible
3. Exhaustive concordance
4. A Bible dictionary and/or Bible encyclopaedia
5. A Bible handbook
6. A Bible atlas
7. Archaeology and Bible History by Joseph Free and Howard Vos (Zondervan)
8. The Bible and Archaeology by J.A. Thompson (Eerdmans)
9. Everyday Life in Bible Times (National Geographic Society)
10. Great People of the Bible and How They Lived (Reader's Digest Association)
11. Harper's Encyclopaedia of Bible Life by Madeleine S. and J. Lane Miller (Books Sales)
12. The Oxford History of the Biblical World by Michael Coogan (Oxford University Press)
13. The Wycliffe Historical Geography of Bible Lands by Howard Vos (Hendrickson)
14. Church History
15. The Bible Knowledge Background Commentary, edited by Craig Evans, 3 vols. (Victor)
16. Chronological and Background Charts of the New Testament by H. Wayne House (Zondervan)
17. Chronological and Background Charts of the Old Testament by John Walton (Zondervan)
18. The IVP Bible Background Commentary: New Testament by Craig Keener (InterVarsity Press)
19. The IVP Bible Background Commentary: Old Testament by John Walton et al. (InterVarsity Press)
20. Manners and Customs in the Bible by Victor H. Matthews (Hendrickson)
21. The Zondervan Illustrated Bible Background Commentary: New Testament, edited by Clinton Arnold, 4 vols. (Zondervan)

22. The Zondervan Illustrated Bible Background Commentary: Old Testament, edited by John Walton, 4 vols. (Zondervan)

Step 2-Choose The Subject or Book of the Bible

1. Choose the subject, person, word, or book of the Bible you want to study, and begin gathering reference materials for your research. The availability of reference tools will largely determine the scope of your study.

Step 3-List Your Reference Tools

1. List all the reference tools you have gathered to do this study (see Tools You Will Need above). This is to help you remember which books were most useful for the background material you researched and what books you may want to refer to in future background studies.

Step 4-Get Insights from Archeology

1. Read Number of books about archeology of the time, also Biblical Archeology.

Step 5-Obtain Insights from Geography

1. You will need to become familiar with the geography of Palestine and the Near East in general. This includes the types of land found there, the major mountains and hills, elevation and rainfall, the major bodies of water (seas, lakes, rivers), location of cities and countries, famous landmarks, and the borders of surrounding countries of the time you are studying.
2. As you study the New Testament, particularly Paul's missionary travels, you will need to become acquainted with the Mediterranean countries and cities that were active during the days of the Roman Empire.
3. In all of your study of biblical geography, you must continually ask this question: "What is the effect of the surrounding geography on what I am studying?"
4. In this step, list all the insights you can get on geography for the subject or book you are studying.

Step 6-Get insights from History

1. You should have a working knowledge of the chronology (order of historical events) of the nation of Israel in the Old Testament. Learn the periods of history of the Hebrew nation; find out the origin and history of famous cities; learn the divisions of Jesus' ministry; be well versed on the history surrounding Paul's missionary travels. It is also helpful to know what major events were going on in other parts of the world during the time you are studying, in order to have a proper perspective on what God was doing in the world.
2. You might ask yourself, "What caused this particular event that I am studying? How did it affect the people involved? How did it affect the passage I am studying?" Be especially aware of events that illustrate God's sovereign control over the progress of history.
3. In this step, list all the insights you can get on history surrounding the subject or book you are studying.

Step 7-Discover Some Insights from Culture

1. If you are to understand what went on in Bible times, you need to learn about the total lifestyle of the ancient people in the Scriptures. Here are some areas you can research while asking yourself, "How do all these things affect the message and the people about whom I am studying?"
 - Types of clothing people wore.
 - Professions and trades in biblical times.
 - Music in the Bible.
 - Architectural styles in the Near East.
 - Manners and customs in Scripture.
 - Recreation in ancient times.
 - Family life in the Middle East.
 - Art in the Bible.
 - Languages and literature of surrounding nations.
 - Religious ceremonies in Israel and among pagan neighbours.
 - False religions of the area.
 - Weapons and tools used by the people.
2. In this step, list all the insights you derive from the way people lived in their cultures.

Step 8-Research Insights from Political environment

1. Much of what happened in Israel in the Old Testament and in the Roman world of Jesus, Paul, and the apostles is related to the political environment of the times.
2. Kings, emperors, rulers, and other powers governed the people of the time. Israel, for example, spent much of its history under foreign rule and even in exile. These other nations and political systems were bound to have an effect on the way God's people lived. Recognize, however, that God is always in control of the political situation. Even King Nebuchadnezzar acknowledged this fact (Dan. 4:34 – 35).
3. Egypt, Philistia, Assyria, Babylon, Persia, Greece, and Rome all played a major part in the Bible. What were these nations like? How did they affect Israel or the New Testament church? Many of the prophets' messages can only be understood in light of their current political climate.
4. In this step, write down all the insights you can from your research into the political conditions of the time period you are studying.

Step 9-What Is Immediate Context?

Step 10- What is Whole Context?

Step 11- What Are The Facts Within Context?

Step 12-Summarise Your Research

1. Now go back over Step Three through Step Six, and from the data you have gathered, summarise your research by answering these two questions:
 - How does this background information help me understand better what I am studying?
 - What influence did any of these factors have on the subject (or book) that I am studying?

Step 13-What Further Analysis or Research I Need To Do, Next Time?

Step 14-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."
18. Although a personal application may be hard to come by in this type of study, you should be able to get one from your original subject. In fact, research into the background of your subject may enable you to find an application you may need today, and the data can help you make that application personally relevant.

Step 15-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 8-Book Survey Method

Step 1-Tools Required for this Method

1. Books
2. Study Bible
3. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
4. A Bible dictionary and/or Bible encyclopaedia.
5. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
6. Bible atlases
7. Historical
8. Geographies
9. Historical background books
10. Bible surveys
11. Later you may check yourself and your conclusions against what other reliable scholars have done
12. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
13. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
14. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
15. New Testament Survey by Merrill C. Tenney (Eerdmans)
16. New Testament Times by Merrill C. Tenney (Baker)
17. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
18. Old Testament Times by R.K. Harrison (Baker)
19. Old Testament Today by John Walton and Andrew Hill (Zondervan)
20. Survey of the Bible by William Hendriksen (Baker)
21. A Survey of the New Testament by Robert H. Gundry (Zondervan)
22. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
23. Survey — get a bird's-eye view of the book.
24. Analysis — study everything in each chapter in detail.
25. Synthesis — put it back together again and draw some conclusions.

Step 2-Read the Book

1. This first step may seem obvious, but some people spend all their time reading about the Bible rather than reading the Scripture text itself. The only tools needed for this first step are your study Bible and several recent translations. Do not read any Bible surveys, handbooks, or commentaries at this point. Follow these seven suggestions:
2. Read through the book at one sitting. Except for the Psalms, the longest book in the Bible is Isaiah, and it can be read in three or four hours. Most of the other books, particularly those in the New Testament, can be read in much less time. If you have to break up your reading, try to finish a book in no more than two sittings. (For example, read Isaiah 1 – 39 at one sitting, then Isaiah 40 – 66.) You will be amazed at what you begin to see in Scripture as you do this.
3. Read through the book in a recent translation. This will enable you to understand what you are reading better, because you will be doing your reading in contemporary language.
4. Read through the book rapidly, ignoring the chapter divisions. Remember that the chapter divisions and verses were not in the original writing; they were added much later for convenience. Right now your purpose is to get the flow of the book and feel the pulse of the writer. Don't be concerned with the details at this stage (you will do that in the Chapter Analysis Method, chapter 10), but read the book quickly to get its main thrust.
5. Read through the book repeatedly. Repeat the process of reading as many times as you can. (Obviously, you will not be able to read the book of Isaiah as many times as the book of Colossians in a given time frame.) Each time you read the book through, you will notice some new things and the overall picture will become clearer and clearer. The more times you read a book through, the better you will be able to understand it. So stay with it.
6. Read through the book without referring to commentaries or someone else's notes. It is good to read in a Bible in which you have not made any notes yourself. Otherwise, when you see the notes you may have written (your own or others'), your mind will naturally fall back into that pattern and you will be hindered from seeing new things. After you have finished Step One, you may begin consulting with reference helps.
7. Read through the book prayerfully. Ask God to speak to your heart and open your eyes that you may see wonderful things in his law (Ps. 119:18).

8. Read through the book with pen or pencil in hand. As you begin reading the second or third time through, begin taking notes and making observations on what you are reading (see Step Two and the Book Survey Form).

Step 3-Make notes on what you Read

1. As you read through the book (see Step One), write down your impressions and the important facts you discover. Make these notes on a separate piece of paper or on the Book Survey Form found at the end of this chapter. Look for the following nine items:
2. Category: Is the book history? Poetry? Prophecy? Law? A biography? A letter?
3. First Impressions: What is the first impression you get from the book? What do you think is the purpose of the writer? What “feel” do you get from reading it?
4. Key Words: What are some of the significant words the writer uses? What words are repeated the most? What word or words is he emphasizing?
5. Key Verse: What seems to be the key verse (if any)? What ideas or phrases are repeated that may show his main thought? What is the writer’s key statement?
6. Literary Style: Is the book a narrative? A drama? A personal letter? A discourse? Poetry? A combination of narration and poetry? Does the writer use figurative speech? Is he using a logical argument?
7. Emotional Tone: Is the writer angry? Sad? Happy? Worried? Excited? Depressed? Calm? How do you think his hearers must have felt when they received this writing? How does it make you feel?
8. Main Theme(s): What is the main theme? Is there more than one? What is the writer saying? What is his major emphasis?
9. Structure of the Book: Are there obvious divisions of thought in the book? How is the book organized? Around people? Events? Places? Ideas? Time spans?
10. Major People: Who are the principal personalities in the book? Which people are mentioned the most, and what parts do they play in the book?

Step 4-Initial Survey

1. Read the entire book at one sitting to identify the theme (subject) of the book. Choose a title that summarizes the theme. You will use this title on the Book Study Chart. This will also become the title of your outline.
2. Determine the purpose for which the book was written, to whom it was written, and the author.
3. Some books state the name of the author but for the names of others you will need to consult an outside Bible study resource.* Each author had a special reason for writing under the inspiration of the Holy Spirit. This purpose is usually reflected in the content of the book.
4. Determine the geographic setting of the book. This is where the events occurred. Record this on the Book Study Chart.
5. Summarize the basic life and ministry principle in one sentence. This is the basic truth of the book which is applicable to your life or ministry. There are many principles taught in a single book, but try to determine the most important for this summary statement. Remember, the chapter divisions in the Bible are not divinely inspired. They were made by man for ease in locating specific passages in the Bible. When you read the entire book without chapter divisions you are reviewing the message as it was originally given.
6. In this first reading do not be concerned with details. Survey the book for general information: Theme, author, purpose, to whom, geographic setting, and basic life and ministry principle. Read quickly to gain an overview of the entire book. Do not stop and analyze what you are reading. You will do that later.

Step 5-Book Study Chart

1. Read the book a second time. Note the major divisions of the book. These divisions may be determined by subject matter, events, biographical material, geographical settings, or other such factors.
2. Create titles for each chapter of the book. The chapter title should reflect the general content of a chapter but it should not be so general that it could fit any chapter of the Bible. Think of titles as handles with which to grasp the content of the chapter. Keep them short so they are easy to remember. Enter these chapter titles on the Book Study Chart.
3. Select the key verse of the book. The key verse should be one that best summarizes the purpose or content of the book. Enter the reference on the Book Study Chart. As you read, list the names of major characters in the space provided on the chart. This list will provide a selection from which to do biographical studies. You will learn how to do such studies later in this course.
4. Record key words and phrases on the chart. Key words and phrases are those basic to understanding the book. They are often repeated frequently or explained in detail in the book. You can use this list for word studies which you will learn how to do later in this course.

Step 6-Do Background Study

1. Find out the historical and geographical setting of the book. Into what background does the book fit? You can use the following questions to help you find some of the facts. Also use the ideas presented in the Book Background Method of Bible
2. Study (chapter 8). Many of the answers may be found right in the book itself, so look there first. If you can't find the answers in the text alone, then check outside references (see Tools You Will Need earlier in this chapter).
 - What can I learn about the writer(s)?
 - When was the book written? (Date)
 - Where was the book written?
 - To whom was the book written? Who were they? Who was he? Who was she? (Find out about their historical and geographical backgrounds.)
 - Why was the book written? (Investigate the circumstances related to the writing.)
 - What other background information sheds light on this book?

- What is the place of this book in the Bible? Is it a bridge between various periods of history?
- What are the geographic locations mentioned in the book? Where are they? (Draw a map if it will be helpful to you.)

Step 7-Make Horizontal chart of the Book's Content

1. One of the exciting steps in doing a book survey is making a horizontal chart. This is a diagramed layout of a book's contents on one or two sheets of paper. The value of such a chart is that it enables you to lay out visually the book's contents and divisions. It gives you a new perspective of the book. The three parts to a simple horizontal chart are the major divisions of the book, chapter titles, and paragraph titles. Why make a horizontal chart? You gain several benefits in this study by making one.
 - It helps you summarise the main ideas and contents of a book.
 - It enables you to see the contents of an entire book at a glance.
 - It helps you discover the relationships between chapters and between paragraphs.
 - It makes you aware of ideas repeated in several places in the book.
 - It serves as a memory device to help you recall a chapter's content quickly.
 - It enables you to think through a book and remember it. Preparation for making a horizontal chart. You need three tools to make a simple horizontal chart:
 - A Bible with paragraph divisions. Many recent versions have divided the text into paragraphs to enable you to see the units of thought. You have to know these in order to make the chart.
 - A pencil (or pen) and a ruler.
 - A blank sheet of paper, preferably 8 x 11 in size. Try to fit your chart on one sheet of paper so you can see the entire structure of the book at a glance. When you are working on a long book (e.g., Isaiah, Genesis, Psalms), try to use as few sheets as possible. In using more than one sheet, be sure to use the same scale so you can match the sheets. How to make a horizontal chart. Go through the following four steps for each chart you make.
2. On a blank sheet of paper, make as many vertical columns as there are chapters in the book. For longer books, make the columns narrower and abbreviate what you write in them and use two or three sheets of paper as needed.
3. Read through the book again and find its major divisions. Record these divisions in as few words as possible at the top of your chart (see the Sample Filled-out Form).

4. Read through the book again and think of a title for each chapter (or group of chapters in a longer book). Record these at the top of each column directly below the major divisions. Irving Jensen has suggested five characteristics of good chapter titles (Independent Bible Study, Moody Press, p. 108).
 - Preferably use one word, not more than four.
 - Use picturesque words that help you visualise the contents.
 - Use words taken directly from the text if possible.
 - Use words that have not been used previously as chapter titles in your study of other books.
 - Use words that tell you where you are in the book.
5. Read through the book once more and do the same thing to all the paragraphs in your book. Try to relate the paragraph titles to the chapter title under which they fall. As you become proficient in this exercise, you may add things to your charts that personalise your study.

Step 8-What Is Immediate Context?

Step 9- What is Whole Context?

Step 10-What Are The Facts Within Context?

Step 11-Make Tentative Outline of Book

1. After you have summarised the contents of the book on a horizontal chart, you are ready to make a simple tentative outline of the book. Later on, in the Book Synthesis Method of Bible Study (chap. 11), you will make your final, detailed outline of the book. In the current method you should merely outline the high points of the book and show their relationship with one another. Here are some suggestions:
2. Refer to your horizontal chart for ideas in outlining. Often your chart will readily show the natural organisation of the book's contents.
3. Outline from the major to the minor. Look for major divisions of the book first, then the subdivisions (which could be the chapters themselves), and finally the important points that fall under the subdivisions (which could be the paragraphs). In longer books you may need to have further subpoints under these.
4. Watch your paragraph divisions for clues in outlining. Since the paragraphs the basic unit of thought in writing, you can use the paragraph divisions as a guide in designing the outline of the chapter. Write a summary statement for each paragraph, then use those statements as the major points of your outline.
 - I. After you have done your own outlining, compare yours with as many other outlines as you can. Check the reference books available to you and compare your work with those writers. Don't be concerned if your outline does not match these exactly, for often there are many ways to outline a book. You will discover that even notable scholars disagree with each other.

Step 12-What Further Analysis or Research I Need To Do, Next Time?

Step 13-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."
18. Even though the main purpose of a book survey is to get you acquainted with its general contents, you should not forget to make a personal application of some insight you discover along the way. Select one thing the Lord spoke to you about from your survey and write a personal, practical, possible, and measurable application on that truth. (See the instructions in chapter 1 on how to write a meaningful application.)

Step 14-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 9 - Chapter Analysis Method

Step 1-Tools Required for this Method.

1. Books
2. Study Bible
3. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
4. A Bible dictionary and/or Bible encyclopaedia.
5. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
6. Bible atlases
7. Historical
8. Geographies
9. Historical background books
10. Bible surveys
11. Later you may check yourself and your conclusions against what other reliable scholars have done
12. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
13. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
14. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
15. New Testament Survey by Merrill C. Tenney (Eerdmans)
16. New Testament Times by Merrill C. Tenney (Baker)
17. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
18. Old Testament Times by R.K. Harrison (Baker)
19. Old Testament Today by John Walton and Andrew Hill (Zondervan)
20. Survey of the Bible by William Hendriksen (Baker)
21. A Survey of the New Testament by Robert H. Gundry (Zondervan)
22. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
23. Survey — get a bird's-eye view of the book.
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26. Methodical Bible Study by Robert A. Traina (Zondervan) [Very advanced]

27. The Navigator Bible Studies Handbook (NavPress)
28. The New Joy of Discovery in Bible Study by Oletta Wald (Augsburg Fortress)
29. Personal Bible Study by William Lincoln (Bethany Fellowship)
30. Basic Biblical Interpretation by Roy Zuck (Victor)
31. Basics of Bible Interpretation by Bob Smith (Word Books)
32. Getting the Message by Daniel Doriani (Presbyterian & Reformed)
33. Grasping God's Word by Scott Duvall and Daniel Hays (Zondervan)
34. How to Read the Bible for All Its Worth by Gordon Fee and Douglas Stuart (Zondervan)
35. How to Understand Your Bible by T. Norton Sterrett (InterVarsity Press)
36. Protestant Biblical Interpretation by Bernard Ramm (Baker)
37. Studying, Interpreting, and Applying the Bible by Walter Henrichsen and Gayle Jackson (Zondervan)

Step 2-Select Chapter Title

1. Record on the Chapter Study Chart the name of the book and chapter number you are studying. Read the entire chapter and give it a title which reflects its content. (If you have done a book survey, you will have already selected a chapter title. Chapter Eleven on book study explains how to select chapter titles).

Step 3-Mark Paragraph Divisions

1. Mark the paragraph divisions within the chapter. In some Bibles the paragraphs are marked with a special paragraph mark (¶). In other Bibles they are marked with a boldface verse number. (Boldface means that the number is darker than the numbers in front of other verses.) If your Bible has neither paragraph marks or boldface markings then you must determine the paragraph divisions yourself. To do this you must know the definition of a paragraph: "A paragraph is a group of verses which relate to the same subject matter. When the subject changes, then a new paragraph has begun."
2. Mark the paragraph divisions in your Bible by drawing a circle around the verse number where each paragraph begins.

Step 4-Create Chapter Study Chart

1. On the Chapter Study Chart record the title of the chapter. List the verses of the paragraph divisions (see example). Then give each paragraph a title which reflects the content of that paragraph. Use the column with the heading "Notes" to record your thoughts about the relation between parts of the chapter (see example). These notes will assist you in creating the chapter outline.

Step 5-Write out Chapter Summary

1. You begin this step by reading and rereading the chapter many times. All you are doing here is making general observations on the chapter as a whole. After you have read it through several times, describe the general contents in one of the ways about to be described. Do not try to interpret what you see at this time, but merely aim to become familiar with the chapter. You may summarize it in one of the following ways:
2. Paraphrase it. The simplest way is just to rephrase the chapter in your own words. Summarize it in such a way that you could read your paraphrase to another person. You can check some recent paraphrase versions of the Bible for examples of this.
3. Outline it. Another simple way to summarize is through an outline that follows the paragraph divisions of the chapter. Give a title to each paragraph, then place some subpoints under each one.
4. Rewrite it without the modifying clauses and phrases. Use just the subjects, verbs, and objects in your summary. This is a great way to summarize some of Paul's writings, for example, where run-on sentences (especially in the King James Version) are hard to understand because of their complexity. After you have completed your chapter summary, give a title to the chapter, using either your title from the book survey or a new one that occurred to you during this study.

Step 6-List Your Observations

1. This step begins the verse-by-verse analysis of the chapter. You start with the activity of observation. In this step you are looking in detail at every sentence and word and then writing down everything you see. You are trying to answer the question, “What does it say?” Before you can begin to interpret the meaning of a verse or passage, you must first look at what it actually says. The purpose of observation is to saturate yourself completely with the contents of a Bible passage. The mark of good Bible students is that they have trained themselves to observe things in the text that others overlook.
2. Overlooking biblical facts — reasons why. There are three reasons why we often overlook things and miss so much in the biblical text: (1) We rush through a passage too quickly. So we need to slow down and not indulge in speed-reading.
3. (2) We don’t write down our observations. Louis Agassiz, a 19th-century professor of zoology at Harvard who taught his students the art of observation, used to say, “A pencil is the best eye.” We need to write down what we see, and then we will begin seeing more. (3) We give up too soon. The longer we squeeze a lemon, the more juice we get out of it — to a point. But unlike lemons, the Bible never goes dry. We can study a text a hundred times and never exhaust the riches that are in it. So we shouldn’t give up too soon; rather, we should keep on looking — the longer the better.
4. Asking questions. As has already been discussed, the secret of good Bible study is learning to ask the right questions (see the Introduction at the beginning of this book). The number of questions you can ask of a text of Scripture increases in proportion to your willingness to stick with it. As you continue growing in Bible study skills, the type and number of questions you ask will improve and you will be able to observe more and more. The key to good observations, then, is a combination of diligence, patience, asking many questions, and writing down everything you see.
5. To help you in your observations, appendix F lists 30 ideas from which you can select the ones that will suit your study.

Step 7-What Is Immediate Context?

Step 8- What is Whole Context?

Step 9-What Are The Facts Within Context?

Step 10-Ask Interpretation Questions

1. After observing all you can in the passage under study, you are ready to move on to interpretation. This step involves asking questions about meaning, then trying to find answers to them. In this exercise you discover the biblical writer's purpose and message by uncovering what he means by his idea. Interpretive questions include asking what or why. Some examples:
 - Why did the writer say this?
 - What is the meaning of?
 - What is the significance of?
 - What is the implication of?
 - Why is this important?
2. You should be able to think of many other interpretive questions to ask. Never think that any question is too silly or dumb. Always write every question down on your form even though you may not find an answer to it. Later on, in studying another chapter, you may be able to answer it; if so, come back to this chapter's form and fill in the answer. Remember that the more questions you ask, the more you will draw out of the text.
3. Listing difficulties. When you are writing down your questions, it is a good idea to include any difficulties you have in understanding what is being said. Two common types are personal difficulties — questions you would like answered in the future, or items for future study, and possible difficulties — matters that don't bother you at this time, but would be good to study so you can help others who might be bothered by them.
4. Finding the right meaning of the text. After you have listed all your questions of interpretation, you need to start finding some answers. There are several ways to do this.
5. Check the context. You should always start here, for often the answers to your questions will be found in the verses preceding or following the text. Always interpret a passage in light of its context. To review the context, you may have to go back to your observations or your book survey to answer these questions:
 - Who is speaking?
 - Who is being spoken to?
 - When is it being spoken?
 - Where is it being spoken?

- What is the occasion or circumstance?
 - What is the main subject of the message?
 - Is the aim of what is being said revealed?
 - What other background material clarifies this statement?
6. You can avoid a great deal of misinterpretation by first checking out the context of a verse.
 7. Define the words and phrases used. You must interpret your text according to the correct and proper meaning of the words. Look up the important words in a Bible dictionary, word study set, or English dictionary.
 8. Study the grammar and structure of the sentences. Sometimes a problem of interpretation can be cleared up by diagramming a sentence or by understanding what grammatical usage the writer intended in the paragraph. Compare several translations of the text. Use different recent versions of the Bible to see how the various translators rendered a particular word, phrase, or paragraph.
 9. Study the background of the text. Interpret your text in light of the historical, cultural, geographic, economic, social, and political backgrounds of the book, including the current events of that time. This shows you the value of doing a book survey study before attempting a chapter analysis study. Use your reference tools to check on the background, the writer's purpose in writing the book, and other pertinent factors.
 10. Compare your text with other passages of Scripture. This next step — correlation— will give you some answers to interpretive questions as you compare Scripture with Scripture.
 11. Consult a commentary as a last resort. If you have tried diligently to find the meaning of the text yourself and your cross-references have not helped you, consult the works of great Bible scholars. There is a place for commentaries in Bible study, but it comes only after you have done your own work. Compare your interpretation with the writings of devout Christians and see if yours agrees with theirs. If you have a correct interpretation, you may be sure God has shown it to some other sincere Bible students in the past. If you can't find anyone who agrees with you, you have probably got a wrong interpretation.
 12. Ask the six vital observation questions: What? Why? When? How? Where? Who?
 13. Look for key words.

14. Look for repeated words and phrases.
15. Look for questions being asked.
16. Look for answers being given.
17. Look for commands.
18. Look for warnings.
19. Look for comparisons — things that are alike.
20. Look for contrasts — things that are different.
21. Look for illustrations.
22. Look for causes and effects and reasons for doing things.
23. Look for promises and their conditions for fulfilment.
24. Look for progression from the general to the specific.
25. Look for progression from the specific to the general.
26. Look for steps of progression in a narrative or biography.
27. Look for lists of things.
28. Look for results.
29. Look for advice, admonitions, and attitudes.
30. Look for the tone of the passage — emotional atmosphere.
31. Look for connectives, articles, and prepositions.
32. Look for explanations.
33. Look for Old Testament quotes in the New Testament.
34. Look for the literary form.
35. Look for paradoxes.
36. Look for emphasis through the use of space — proportion.
37. Look for planned exaggerations or hyperboles.
38. Look at the grammatical construction of each sentence.
39. Look for the use of the current events of the times.
40. Look for the force of the verbs.
41. Look for anything unusual or unexpected.

Step 11-Correlate Your Chapter with Other Scriptures

1. This step involves finding cross-references for the verses of your chapter in order to further explain the meaning of the text. It is based on the principle of interpretation that says, "The Bible interprets itself; Scripture best explains Scripture." You can often interpret passages that are not clear by passages that are. Ask yourself, "How do other Scriptures relate to and explain this one?"
Steps in cross-referencing. Here are some practical ways to correlate verses:
2. First, look for cross-references within the same book you are studying. This is internal correlation.
3. Second, compare statements in other writings by the same author. This is external correlation.
4. Then, compare with other books in the same testament.
5. Finally, compare references in all of Scripture. You can find cross-references in a study Bible or reference Bible or by looking up similar words in a concordance. Types of cross-references. There are several different types of cross-references, including the following:
 - The pure cross-reference. This is sometimes called the parallel cross reference because it says almost exactly the same thing as the verse you are analyzing.
 - The illustrative cross-reference. This type, which may involve a real event or person in history, illustrates what the verse you are studying is saying.
 - The contrasting cross-reference. This type says the opposite of what your verse says. It may look like a contradiction, but it is actually approaching the subject from a different viewpoint. One word of caution: Be sure to check the context of the verses you choose as cross-references. Otherwise you may be making them say what the writer did not say.

Step 12-List Some Possible Applications

1. The last part of the verse-by-verse analysis is to write down some possible applications. Remember that your goal in Bible study is not just interpretation but application. Because of the many applications a chapter may have, you will only be listing them here. Later on, in Step Seven, you will choose one of these to write out and to work on for a week. You have already seen that you cannot work on more than one application per week. It is better to record just one and fully apply that truth to your life than to write down several applications and then fail to implement any of them.

Step 13-Write Down Some Concluding Thoughts

1. Go back over the results of the first five steps, review them carefully, and write down some concluding thoughts on the chapter. These can include additional observations, some of your interpretations, themes you have discovered, possible topics and people you want to study in the future, words you may want to do a word study on, and any number of other thoughts that come to mind.

Step 14-What Further Analysis or Research I Need To Do, Next Time?

Step 15-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned
2. Who?
3. What?
4. When?
5. Where?
6. Why?
7. How?
8. Example to Follow.
9. Error to Avoid.
10. Duty to Perform.
11. Promise to claim.
12. Relationship to develop.
13. Changes to make.
14. Prayer to pray.

15. Did I see anything of myself in this person's life?
16. Did he show some of my weaknesses?
17. Did he reveal to me some of my strengths?
18. What impressed me most about this person's life?
19. Where do I fall short in this area?
20. What do I intend to do about it?
21. What were the positive character traits? Ask God to help you develop them in your own life.
22. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
23. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 16-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 10-Paragraph Study

Step 1-Tools Required for this Method

1. Book
2. Study Bible
3. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
4. A Bible dictionary and/or Bible encyclopaedia.
5. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
6. Bible atlases
7. Historical
8. Geographies
9. Historical background books
10. Bible surveys
11. Later you may check yourself and your conclusions against what other reliable scholars have done
12. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
13. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
14. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
15. New Testament Survey by Merrill C. Tenney (Eerdmans)
16. New Testament Times by Merrill C. Tenney (Baker)
17. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
18. Old Testament Times by R.K. Harrison (Baker)
19. Old Testament Today by John Walton and Andrew Hill (Zondervan)
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23. Survey — get a bird's-eye view of the book.
24. Analysis — study everything in each chapter in detail.
25. Synthesis — put it back together again and draw some conclusions.
26. Methodical Bible Study by Robert A. Traina (Zondervan) [Very advanced]

27. The Navigator Bible Studies Handbook (NavPress)
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35. How to Understand Your Bible by T. Norton Sterrett (InterVarsity Press)
36. Protestant Biblical Interpretation by Bernard Ramm (Baker)
37. Studying, Interpreting, and Applying the Bible by Walter Henrichsen and Gayle Jackson (Zondervan)

Step 2-Select Chapter Title

1. Record on the Chapter Study Chart the name of the book and chapter number you are studying. Read the entire chapter and give it a title which reflects its content. (If you have done a book survey, you will have already selected a chapter title. Chapter Eleven on book study explains how to select chapter titles).

Step 3-Mark Paragraph Divisions

1. Mark the paragraph divisions within the chapter. In some Bibles the paragraphs are marked with a special paragraph mark (¶). In other Bibles they are marked with a boldface verse number. (Boldface means that the number is darker than the numbers in front of other verses.) If your Bible has neither paragraph marks or boldface markings then you must determine the paragraph divisions yourself. To do this you must know the definition of a paragraph: "A paragraph is a group of verses which relate to the same subject matter. When the subject changes, then a new paragraph has begun."
2. Mark the paragraph divisions in your Bible by drawing a circle around the verse number where each paragraph begins.

Step 4-Create Chapter Study Chart

1. On the Chapter Study Chart record the title of the chapter. List the verses of the paragraph divisions (see example). Then give each paragraph a title which reflects the content of that paragraph. Use the column with the heading "Notes" to record your thoughts about the relation between parts of the chapter (see example). These notes will assist you in creating the chapter outline.

Step 5-Write out Chapter Summary

1. You begin this step by reading and rereading the chapter many times. All you are doing here is making general observations on the chapter as a whole. After you have read it through several times, describe the general contents in one of the ways about to be described. Do not try to interpret what you see at this time, but merely aim to become familiar with the chapter. You may summarise it in one of the following ways:
2. Paraphrase it. The simplest way is just to rephrase the chapter in your own words. Summarise it in such a way that you could read your paraphrase to another person. You can check some recent paraphrase versions of the Bible for examples of this.
3. Outline it. Another simple way to summarise is through an outline that follows the paragraph divisions of the chapter. Give a title to each paragraph, then place some sub-points under each one.
4. Rewrite it without the modifying clauses and phrases. Use just the subjects, verbs, and objects in your summary. This is a great way to summarise some of Paul's writings, for example, where run-on sentences (especially in the King James Version) are hard to understand because of their complexity. After you have completed your chapter summary, give a title to the chapter, using either your title from the book survey or a new one that occurred to you during this study.

Step 6-List Your Observations

1. This step begins the verse-by-verse analysis of the chapter. You start with the activity of observation. In this step you are looking in detail at every sentence and word and then writing down everything you see. You are trying to answer the question, “What does it say?” Before you can begin to interpret the meaning of a verse or passage, you must first look at what it actually says. The purpose of observation is to saturate yourself completely with the contents of a Bible passage. The mark of good Bible students is that they have trained themselves to observe things in the text that others overlook.
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3. Asking questions. As has already been discussed, the secret of good Bible study is learning to ask the right questions (see the Introduction at the beginning of this book). The number of questions you can ask of a text of Scripture increases in proportion to your willingness to stick with it. As you continue growing in Bible study skills, the type and number of questions you ask will improve and you will be able to observe more and more. The key to good observations, then, is a combination of diligence, patience, asking many questions, and writing down everything you see.
4. To help you in your observations, appendix lists 30 ideas from which you can select the ones that will suit your study.

Step 7-What Is Immediate Context?

Step 8-What is Whole Context?

Step 9-What Are The Facts Within Context?

Step 10-Ask Interpretation Questions

1. After observing all you can in the passage under study, you are ready to move on to interpretation. This step involves asking questions about meaning, then trying to find answers to them. In this exercise you discover the biblical writer's purpose and message by uncovering what he means by his idea. Interpretive questions include asking what or why. Some examples:
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 - Why is this important?
2. You should be able to think of many other interpretive questions to ask. Never think that any question is too silly or dumb. Always write every question down on your form even though you may not find an answer to it. Later on, in studying another chapter, you may be able to answer it; if so, come back to this chapter's form and fill in the answer. Remember that the more questions you ask, the more you will draw out of the text.
3. Listing difficulties. When you are writing down your questions, it is a good idea to include any difficulties you have in understanding what is being said. Two common types are personal difficulties — questions you would like answered in the future, or items for future study, and possible difficulties — matters that don't bother you at this time, but would be good to study so you can help others who might be bothered by them.
4. Finding the right meaning of the text. After you have listed all your questions of interpretation, you need to start finding some answers. There are several ways to do this.
5. Check the context. You should always start here, for often the answers to your questions will be found in the verses preceding or following the text. Always interpret a passage in light of its context. To review the context, you may have to go back to your observations or your book survey to answer these questions:
 - Who is speaking?
 - Who is being spoken to?
 - When is it being spoken?
 - Where is it being spoken?

- What is the occasion or circumstance?
 - What is the main subject of the message?
 - Is the aim of what is being said revealed?
 - What other background material clarifies this statement?
6. You can avoid a great deal of misinterpretation by first checking out the context of a verse.
 7. Define the words and phrases used. You must interpret your text according to the correct and proper meaning of the words. Look up the important words in a Bible dictionary, word study set, or English dictionary.
 8. Study the grammar and structure of the sentences. Sometimes a problem of interpretation can be cleared up by diagramming a sentence or by understanding what grammatical usage the writer intended in the paragraph. Compare several translations of the text. Use different recent versions of the Bible to see how the various translators rendered a particular word, phrase, or paragraph.
 9. Study the background of the text. Interpret your text in light of the historical, cultural, geographic, economic, social, and political backgrounds of the book, including the current events of that time. This shows you the value of doing a book survey study before attempting a chapter analysis study. Use your reference tools to check on the background, the writer's purpose in writing the book, and other pertinent factors.
 10. Compare your text with other passages of Scripture. This next step — correlation— will give you some answers to interpretive questions as you compare Scripture with Scripture.
 11. Consult a commentary as a last resort. If you have tried diligently to find the meaning of the text yourself and your cross-references have not helped you, consult the works of great Bible scholars. There is a place for commentaries in Bible study, but it comes only after you have done your own work. Compare your interpretation with the writings of devout Christians and see if yours agrees with theirs. If you have a correct interpretation, you may be sure God has shown it to some other sincere Bible students in the past. If you can't find anyone who agrees with you, you have probably got a wrong interpretation.
 12. Ask the six vital observation questions: What? Why? When? How? Where? Who?
 13. Look for key words.

14. Look for repeated words and phrases.
15. Look for questions being asked.
16. Look for answers being given.
17. Look for commands.
18. Look for warnings.
19. Look for comparisons — things that are alike.
20. Look for contrasts — things that are different.
21. Look for illustrations.
22. Look for causes and effects and reasons for doing things.
23. Look for promises and their conditions for fulfilment.
24. Look for progression from the general to the specific.
25. Look for progression from the specific to the general.
26. Look for steps of progression in a narrative or biography.
27. Look for lists of things.
28. Look for results.
29. Look for advice, admonitions, and attitudes.
30. Look for the tone of the passage — emotional atmosphere.
31. Look for connectives, articles, and prepositions.
32. Look for explanations.
33. Look for Old Testament quotes in the New Testament.
34. Look for the literary form.
35. Look for paradoxes.
36. Look for emphasis through the use of space — proportion.
37. Look for planned exaggerations or hyperboles.
38. Look at the grammatical construction of each sentence.
39. Look for the use of the current events of the times.
40. Look for the force of the verbs.
41. Look for anything unusual or unexpected.

Step 11-Correlate Your Chapter with Other Scriptures

1. This step involves finding cross-references for the verses of your chapter in order to further explain the meaning of the text. It is based on the principle of interpretation that says, "The Bible interprets itself; Scripture best explains Scripture." You can often interpret passages that are not clear by passages that are. Ask yourself, "How do other Scriptures relate to and explain this one?" Steps in cross-referencing. Here are some practical ways to correlate verses:
2. First, look for cross-references within the same book you are studying. This is internal correlation.
3. Second, compare statements in other writings by the same author. This is external correlation.
4. Then, compare with other books in the same testament.
5. Finally, compare references in all of Scripture. You can find cross-references in a study Bible or reference Bible or by looking up similar words in a concordance. Types of cross-references. There are several different types of cross-references, including the following:
 - The pure cross-reference. This is sometimes called the parallel cross reference because it says almost exactly the same thing as the verse you are analysing.
 - The illustrative cross-reference. This type, which may involve a real event or person in history, illustrates what the verse you are studying is saying.
 - The contrasting cross-reference. This type says the opposite of what your verse says. It may look like a contradiction, but it is actually approaching the subject from a different viewpoint. One word of caution: Be sure to check the context of the verses you choose as cross-references. Otherwise you may be making them say what the writer did not say.

Step 12-Observe the Details

1. The paragraphs in a chapter can relate to each other in different ways. Here are some special things to observe as you study paragraphs:
2. Connectives: Words called "connectives" are very important. They reveal relationships within and between paragraphs. The word "but" is a connective and introduces a contrast. For example: But these speak evil of those things which they know not; But what they know naturally, as brute beasts, in those things they corrupt themselves. (Jude 1:10).
3. There is a contrast in this paragraph. False teachers speak evil of things they do not know BUT they also corrupt the things they do know. The verse begins with the word "but" which should make you look back to verse 9 to see what the contrast is: Yet Michael the archangel, when contending with the devil he disputed about the body of Moses, durst not bring against him a railing accusation, but said, The Lord rebuke thee. (Jude 1:9) Verse 10 contrasts false teachers who speak evil of dignities with the archangel Michael. Even though he held a great position, he did not accuse the devil but said "The Lord rebuke thee." The connective word "or" indicates a contrast. For example: For God shall bring every work into judgment, with every secret thing, whether it be good OR whether it be evil. (Ecclesiastes 12:14) Other connective words to watch for are "like" and "as." Instead of a contrast these words show comparisons between things. For example in the following verse Satan is compared to a lion: . . . the Devil AS a roaring lion, walketh about, seeking whom he may devour. (I Peter 5:8) The word "and" is another connective. It adds to what has just been stated: Like wise also these filthy dreamers defile the flesh, despise dominion, AND speak evil of dignities. (Jude 1:8) The word "if" introduces a conditional statement. Many of the promises and prophecies of the Old Testament are stated this way. They tell what God will do IF (on the condition that) His people make a certain response: IF my people, which are called by my name, shall humble themselves, and pray, and seek my face, and turn from their wicked ways, then will I hear from Heaven and will forgive their sin, and will heal their land. (II Chronicles 7:14) The word "that" sets forth a purpose. It tells that something happened "in order that" a certain purpose would be accomplished: And He came and dwelleth in a city called Nazareth; THAT it might be fulfilled which was spoken by the prophets, He shall be called a Nazarene. (Matthew 2:23) Watch also for the connecting words "for,

because, therefore." These words introduce reasons and results: But when He saw the multitudes, He was moved with compassion on them, BECAUSE they fainted, and were scattered abroad, as sheep having no shepherd. (Matthew 9:36) The words "in, into, and with" are also important connectives. They also indicate relationships between concepts: He turned the sea INTO dry land and they went through the flood on foot: there did we rejoice in Him. (Psalm 66:6).

4. General Structure: As you study paragraphs observe the arrangement of ideas and how the verses relate to each other. Sometimes the author makes a general statement, then explains it with examples. Other times he lists a series of ideas and then summarizes with a general statement. In the example given later in this chapter, you will note that Jude wrote several paragraphs listing characteristics of false teachers. He then gave Old Testament examples which illustrated what he was teaching.
5. Repetitions: Each word of the Bible is inspired by the Holy Spirit. When words or phrases are repeated it is because they are especially important. The Holy Spirit inspired the writers to repeat words and phrases in order to fix them in your memory. The words "verily, verily" are an example of this. When Jesus preceded a statement with these words it was like an announcer saying "May I have your attention please. I have an important announcement to make." Study in detail any words, phrases, or verses that are repeated.
6. Questions And Answers: It is also important to observe the questions and answers of the Bible. Often an author will introduce a subject by asking a question. He will then explain this question and give answers which relate back to the question. A good example of this is Romans 6. Read the entire chapter. Note the questions in verses 1-3 and the answers developed throughout the chapter.
7. Introductions: Watch for paragraphs that introduce the subject that is to follow. For example, in the book of Jude which you studied in the last chapter verse 3 introduces the material to follow: Beloved, when I gave all diligence to write unto you of the common salvation, it was needful for me to write unto you, and exhort you, that ye should earnestly contend for the faith which was once delivered unto the saints. (Jude 1:3) This introductory paragraph explains the purpose of his writing. He is exhorting them to earnestly contend for the true faith. The remainder of the chapter gives reasons for this exhortation. There

are false teachers creeping into the church who are trying to turn them from the true faith.

8. **Summaries And Conclusions:** Be alert for paragraphs that summarize an entire passage, chapter, or even a book. For example, the book of Ecclesiastes contains one verse which summarizes the whole book. In Ecclesiastes the writer has described his quest for life apart from God. His final conclusion is: Let us hear the conclusion of the whole matter: Fear God, and keep His commandments: for this is the whole duty of man. For God shall bring every work into judgment, with every secret thing, whether it be good, or whether it be evil. (Ecclesiastes 12:13-14).
9. **Progressions In Thought:** When studying paragraphs, watch for progressions in thought. Note the following paragraph: And beside this, giving all diligence, add to your faith virtue; and to virtue knowledge; And to knowledge temperance; and to temperance patience; and to patience godliness; And to godliness brotherly kindness; and to brotherly kindness charity. For if these things be in you and abound, they make you that ye shall neither be barren or unfruitful in the knowledge of our Lord Jesus Christ. But he that lacketh these things is blind, and cannot see afar off, and hath forgotten that he was purged from his old sins. (II Peter 1:5-9) There is definite progression in this passage. We are to add one thing to another until we become fruitful.
10. **Literary Form:** Literary form refers to how a passage is written. Some passages are in narrative or story form. This means they read like a story. Other paragraphs are in poetic form (poems) like the passages in the book of Psalms. Some paragraphs are parables which are short stories illustrating a spiritual truth. Some paragraphs are in dramatic form. For example, the Song of Solomon contains dramatic as well as poetic form. Discourse form is much like a sermon. It is a series of paragraphs giving instruction on a certain subject.
11. **Key Words:** Identifying key words will help you understand the meaning of a paragraph. Key words are those important to the meaning of a paragraph. Often they are words which are repeated. Especially note key words which you do not understand. These words can be studied in a word study. (You will learn how to do this later in this course). For example, read the following verse: For there are certain men crept in unawares, who were before of old ordained to this condemnation, ungodly men, turning the grace of our God into

lasciviousness, and denying the only Lord God and our Lord Jesus Christ. (Jude 1:4) Do you know what the word "lasciviousness" means? It is an important word in this paragraph because it describes false teachers. One of their characteristics is that they have turned the grace of God into lasciviousness. This word is an example of a key word to study.

12. Grammatical Construction: The word "grammar" refers to parts of speech or words that fit together to make up sentences and paragraphs. Watch for words which are called verbs. These are words that show action telling what someone did in the past, is doing in the present, or will do in the future. They also are used in commands: GO ye into all the world and PREACH the Gospel to every creature. (Mark 16:15) The words "go" and "preach" are action words. They are verbs. They are commands for us to obey. A noun is a word that names a person, place, or thing. The words in capitals below are nouns: JUDE, the servant of JESUS CHRIST, and brother of JAMES... (Jude 1:1) Nouns tell who and what is involved and where the action took place. A pronoun is a word that replaces or stands for a noun. The words "him" and "her" are examples. Instead of saying "The Holy Spirit inspired Jude to write the book" you could say "The Holy Spirit inspired HIM to write the book." The word "him" is a pronoun standing for the noun Jude.

13. Adjectives and adverbs are important parts of speech also. Adverbs tell something about a verb. It tells how something happened. For example, in the sentence "He ran quickly," the word "quickly" is an adverb because it tells how he ran. An adjective describes a noun or pronoun. If we said "Jude was tall," the word "tall" is an adjective which describes Jude. If you have not studied parts of speech before this may seem confusing at first, but you will soon learn to identify these as you practice. Parts of speech are important because they identify people, places, and things. They tell who did something, where, when, and why. They tell how things were done and what was, is, or will be done. They also provide descriptions and details which increase understanding of the subject matter.

Step 13 Create Paragraph Study Chart

1. By studying paragraphs in detail as described in Step Two, you will identify certain paragraphs that relate to each other. Their relationship may be contrasts, comparisons, progressions, or otherwise. Select these for paragraph study. You will create a chart to summarize your study of these paragraphs. Select a general title for your chart which reflects the relationship of the paragraphs or the subject which they concern. The chart will also include the paragraph titles and divisions made during the chapter study.
2. Record on the chart the book, chapter, and paragraphs studied. Use margins of the chart to make observations and applications.

Step 14 Create Paragraph Outline

1. Use the chart to help you create an outline of the paragraphs. The outlines you create on chapters and paragraphs will help you as you share God's truth with others because they help you present what you have learned in an orderly way.

Step 15-What Further Analysis or Research I Need To Do, Next Time?

Step 16-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?

15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 17-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 11-Verse by Verse Analysis Method

Step 1-Tools Required for this Method

1. Books
2. Study Bible
3. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
4. A Bible dictionary and/or Bible encyclopaedia.
5. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
6. Bible atlases
7. Historical
8. Geographies
9. Historical background books
10. Bible surveys
11. Later you may check yourself and your conclusions against what other reliable scholars have done
12. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
13. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
14. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
15. New Testament Survey by Merrill C. Tenney (Eerdmans)
16. New Testament Times by Merrill C. Tenney (Baker)
17. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
18. Old Testament Times by R.K. Harrison (Baker)
19. Old Testament Today by John Walton and Andrew Hill (Zondervan)
20. Survey of the Bible by William Hendriksen (Baker)
21. A Survey of the New Testament by Robert H. Gundry (Zondervan)
22. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
23. Survey — get a bird's-eye view of the book.
24. Analysis — study everything in each chapter in detail.
25. Synthesis — put it back together again and draw some conclusions.

26. Methodical Bible Study by Robert A. Traina (Zondervan) [Very advanced]
27. The Navigator Bible Studies Handbook (NavPress)
28. The New Joy of Discovery in Bible Study by Oletta Wald (Augsburg Fortress)
29. Personal Bible Study by William Lincoln (Bethany Fellowship)
30. Basic Biblical Interpretation by Roy Zuck (Victor)
31. Basics of Bible Interpretation by Bob Smith (Word Books)
32. Getting the Message by Daniel Doriani (Presbyterian & Reformed)
33. Grasping God's Word by Scott Duvall and Daniel Hays (Zondervan)
34. How to Read the Bible for All Its Worth by Gordon Fee and Douglas Stuart (Zondervan)
35. How to Understand Your Bible by T. Norton Sterrett (InterVarsity Press)
36. Protestant Biblical Interpretation by Bernard Ramm (Baker)
37. Studying, Interpreting, and Applying the Bible by Walter Henrichsen and Gayle Jackson (Zondervan)
38. Unlocking the Bible.
39. The-bible-and-the-dead-sea-scrolls.

Step 2-Write Out a Personal Paraphrase

1. Write out the verse in your own words. Do not use one of the modern paraphrases except to get the idea of how to do it. Stay true to the verse you are paraphrasing, and try to condense rather than expand it.

Step 3-List some Questions, Answers and Observations

1. In column 3 of the Chapter Analysis Form at the end of this chapter, list any questions you have relating to words, phrases, persons, topics, and doctrines in that verse. Write down any answers you can find and also record any observations you have. Mark these as follows:
 - Q = Question.
 - A = Answer.
 - O = Observations.

Step 4-Find Some Cross References for Each Verse

1. Using the cross-references from your study Bible or from Scripture memory, write down some cross-references (at least one) for the verse you are studying. Identify the word or phrase you are cross-referencing at the end of this chapter. Use a concordance if you do not have a cross-referenced Bible.

Figure of Speech

1. Review the figure of speech of the following:

- Text.
- Writing.
- Book.
- Journal.
- Article.
- Report.
- Bible.
- Sermon.
- Dissertation.
- Government Documents.
- Theses and Dissertation.
- Newspaper.
- Magazines.
- Audiobook.
- Sermon and Preaching.
- Public Speaking.
- TV.
- Radio.
- Podcast.
- Communication.
- Talk.
- Speak.
- Conversation discussion.
- Debates.
- Discussion.

2. These are the following books to use for Figure of Speech

- **Glossary of Literary Terms by M. H. Abrams.**
- **Figures of Speech used in the Bible by E. W. Bullinger.**
- **Figure of Speech and exploration of used of idiomatic phrases in Conversation by Elizabet Jame Holt.**
- **Figures of Speech by Christina Alm Arvius.**
- **Figures of Speech or Figures of Thought by Ananda Coomaraswamy.**
- **The Princeton Encyclopedia of Poetry and Poetics by Roland Greene.**

Step 5-Record any insights you get from each verse

1. Having thought through the words, phrases, and concepts in the verse, record any insights that you get from them. These could be further observations, words and names that you have looked up and defined, or any other thought that comes to you. Let your imagination go and be as creative as you can in this fifth column, called Personal Application, in the form at the end of this chapter.

Step 6-What Is Immediate Context?

Step 7-What is Whole Context?

Step 8-What Are The Facts Within Context?

Step 9-Write down a brief personal application for each verse

1. Because of the number of verses in your study, you will not be able to design an application project for each verse. Instead, just try to record some devotional thoughts that come to you from each verse. Later, in a devotional Bible study, you can pick one of the thoughts and plan to work on it. Or, if a particular verse seems to meet an immediate need, go ahead and write out an application that is possible, practical, personal, and measurable.

Step 10-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.

5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 11-What Further Analysis or Research I Need To Do, Next Time?

Step 12-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 12 - Book Synthesis Method

Step 1-Tools Required for this Method

1. Books
2. Study Bible
3. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
4. A Bible dictionary and/or Bible encyclopaedia.
5. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
6. Bible atlases
7. Historical
8. Geographies
9. Historical background books
10. Bible surveys
11. Later you may check yourself and your conclusions against what other reliable scholars have done
12. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
13. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
14. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
15. New Testament Survey by Merrill C. Tenney (Eerdmans)
16. New Testament Times by Merrill C. Tenney (Baker)
17. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
18. Old Testament Times by R.K. Harrison (Baker)
19. Old Testament Today by John Walton and Andrew Hill (Zondervan)
20. Survey of the Bible by William Hendriksen (Baker)
21. A Survey of the New Testament by Robert H. Gundry (Zondervan)
22. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
23. Survey — get a bird's-eye view of the book.
24. Analysis — study everything in each chapter in detail.
25. Synthesis — put it back together again and draw some conclusions.
26. Methodical Bible Study by Robert A. Traina (Zondervan) [Very advanced]

27. The Navigator Bible Studies Handbook (NavPress)
28. The New Joy of Discovery in Bible Study by Oletta Wald (Augsburg Fortress)
29. Personal Bible Study by William Lincoln (Bethany Fellowship)
30. Basic Biblical Interpretation by Roy Zuck (Victor)
31. Basics of Bible Interpretation by Bob Smith (Word Books)
32. Getting the Message by Daniel Doriani (Presbyterian & Reformed)
33. Grasping God's Word by Scott Duvall and Daniel Hays (Zondervan)
34. How to Read the Bible for All Its Worth by Gordon Fee and Douglas Stuart (Zondervan)
35. How to Understand Your Bible by T. Norton Sterrett (InterVarsity Press)
36. Protestant Biblical Interpretation by Bernard Ramm (Baker)
37. Studying, Interpreting, and Applying the Bible by Walter Henrichsen and Gayle Jackson (Zondervan)

Step 2-Reread the Book

1. Reread the book several times. Read it at one sitting, in a recent translation, rapidly, repeatedly, prayerfully, without referring to commentaries, and with pen or pencil in hand.

Step 3-Write Out a detailed, final outline

1. Compare the horizontal chart and tentative outline you created in your book survey with the passage summaries you created in your chapter analysis studies. Based on this comparison and your recent readings, write out a detailed, final outline of the book. Merrill Tenney gives an excellent example in his book on Bible study methods.

Step 4-Write down a descriptive Book Title

1. From your horizontal chart in the book survey and your detailed, final outline in Step Two, write down a descriptive title for the book you have just studied. Think up an original title that describes in a few words what the book is all about. You might also consult your chapter titles and form a synthesis of them.

Step 5-Make summary of your insights

1. Review and compare the concluding thoughts in each of your chapter analysis studies and summarise what you believe are the major themes and conclusions of the book. Do not refer to commentaries at this point, for these should be your own insights into God's Word. These insights could also include observations gained from your new readings.

Step 6-What Is Immediate Context?

Step 7-What is Whole Context?

Step 8-What Are The Facts Within Context?

Step 9-What Further Analysis or Research I Need To Do, Next Time?

Step 10-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

18. Review all the personal applications you made in your book survey and chapter analysis studies and the possible applications you listed for each chapter. If you haven't fulfilled some of the written applications yet, write those down in this step and make specific plans to carry them out immediately. If you have done them, choose another possible application from the chapter studies or one from your synthetic study and write it out here. Refer to chapter 1 of this book for the ways to do this.

Step 11-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Step 12-Share The Results of your Study with others

1. Bible study should not just be food for your soul and increase your understanding of the Word of God. Its results, including your applications, need to be shared with others. You can do this in two ways:
2. Share with your "Timothy" (or Timothette) in a one-on-one situation. When you get together, share what you are learning from the Bible study, what applications you have been working on, and how he or she too can profit from their own study. The more you give out, the more you will learn yourself.
3. Share with your Bible study group. If you are not in one already, you might want to form a small group in which all of you are studying the same book of the Bible and sharing your findings. This way you will strengthen and help one another in areas of the studies that may not be clear to some in the group.

Method 13 - Theological Study Method

Step 1-Tools Required for this Method

1. Study Bible
2. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
3. Topical Book
4. Exhaustive Concordance
5. Cross Reference
6. Bible theology Books
7. Bibliology Books
8. Theology Books
9. Christology Book
10. Pneumatology Books
11. Angelology Books
12. Demonology Books
13. Satanology Books
14. Anthropology Books
15. Soteriology Books
16. Ecclesiology Books
17. Eschatology Books

Step 2 Select The topic

1. The following outline of Biblical theology will assist you in selecting topics for use in the theological method of Bible study:
2. Biblical Theology
 - Bibliology: The study of the doctrine of the Bible.
 - Origin.
 - Revelation.
 - Inspiration.
 - Authority.
 - Illumination (how the Holy Spirit illuminates or helps us understand the Bible).
 - Interpretation.
3. Theology: Study of God the Father.
 - The attributes of God.
 - The works of God.
 - The names of God.
 - The triune nature of God.

4. Christology: The study of the doctrine of Jesus Christ.

- The attributes of Jesus.
- The works of Jesus.
- The names of Jesus.
- The triune nature of Jesus.
- His life in the flesh:
 - A. Birth and childhood.
 - B. Baptism.
 - C. Temptation.
 - D. Transfiguration.
 - E. Teachings.
 - F. Miracles.
 - G. Sufferings and death.
 - H. Resurrection.
 - I. Ascension.
- The second return of Jesus Christ.
- The messianic kingdom.
- The deity of Jesus: The study of how Jesus was both divine and human, In one person.
- His preexistence with God the Father.
- Old Testament types of Jesus Christ.

5. Pneumatology: The study of the doctrine of the Holy Spirit.

- The attributes of the Holy Spirit.
- The work and ministry of the Holy Spirit.
 - A. In the Old Testament.
 - B. In the New Testament.
 - C. In the present Church age.
- The names of the Holy Spirit.
- Preexistence of the Holy Spirit with God the Father.
- Triune nature of the Holy Spirit.
- The Holy Spirit in the Old Testament contrasted with the Holy Spirit in the New Testament.
- Types and symbols of the Holy Spirit.
- Gifts of the Holy Spirit.

- Fruit of the Holy Spirit.
 - Baptism in the Holy Spirit.
6. Angelology: The study of good angels, the angels of God:
 - Their structure and organisation.
 - Names of angels.
 - The work of angels: Past, present, future.
 7. Demonology: The study of wicked angels who are the demons of Satan:
 - Origin.
 - Structure and organisation.
 - Names.
 - Work: Past, present, future.
 - Judgment and destination.
 8. Satanology: Study of Satan:
 - Origin.
 - Fall.
 - Names.
 - Work: Past, present, future.
 - Judgment and destination.
 9. Anthropology: The study of the origin and nature of man:
 - The origin of man.
 - The fall of man.
 - The sin nature of man.
 - God's remedy for man's sin.
 10. Soteriology: The study the doctrine of salvation.
 - The development of the plan of Salvation: Traced from the first promise of salvation in Genesis 3:15 throughout the Bible.
 - Study of the Saviour, Jesus Christ (see God the Son Jesus Christ, Cristology).
 - The finished work of the Saviour.
 - The terms of salvation.

11. Ecclesiology: This is the study of the doctrine of the Church. It focuses on all the Bible teaches regarding the spiritual Body of Jesus Christ which is called the Church:

- The Church as an organism: The body of Christ.
- The contrast between Israel and the Church.
- The organisation of the Church:
 - A. Ordinances.
 - B. Order.
 - C. Structure.
 - D. Service.
 - E. Doctrine of the church.

12. Eschatology: Study of the last events which are to happen before eternity begins:

- Prophecy concerning the Church.
- Prophecy concerning Israel.
- Prophecy concerning other nations of the world.
- Prophecy concerning the Messiah: His returns and establishing of His kingdom.
- The resurrections of the dead.
- The judgments.
- The tribulation.
- The millennium.
- The eternal states of the righteous and the unrighteous.

Step 3-Define The doctrine Selected

1. The definitions of basic Bible doctrines are given in the preceding outline. These include Christology, pneumatology, theology, Bibliology, angelology, demonology, satanology, anthropology, soteriology, ecclesiology, and eschatology.

Step 4-Select the Bible Portion to be studied

1. Decide the book or books of the Bible in which you will study this doctrine. Books of the New Testament are the best to use for theological research. The Old Testament is largely prophetic or in narrative (story) form. The New Testament, especially the Gospels and the Letters, provide much material for theological Bible study.

Step 5-Gather information on the doctrine

1. Use what you have learned about book, chapter, paragraph, verse, and word studies to help you gather information on the doctrine which you are studying. As you read, make notations on everything the Scriptures reveal about the doctrine.

Step 6-Summarise the information you gathered

1. Summarise the information you recorded during Bible study. Use the outline on theology given in this chapter to help you organize your study notes into an outline or chart.

Step 7-What Is Immediate Context?

Step 8-What is Whole Context?

Step 9-What Are The Facts Within Context?

Step 10-What Further Analysis or Research I Need To Do, Next Time?

Step 11-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?

12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 12-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 14-Studying Bible Prophecy

Step 1-Tools Required for this Method

1. Study Bible
2. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
3. Topical Book
4. Exhaustive Concordance
5. Cross Reference

Step 2-Define Prophecy

1. The word "prophecy" means to speak forth. Bible prophecy includes three basic kinds of speaking forth:
 - A message of inspiration from God.
 - Prediction of future events in God's eternal plan.
 - An interpretation for man of the acts of God.

Step 3-Method of Prophecy

1. THE SPOKEN WORD:
 - The method most often used was the spoken word. God would tell the prophet the words to speak. For example, God said to the prophet Jeremiah: . . . for thou shalt go to all that I shall send thee, and whatsoever I command thee thou shalt speak. (Jeremiah 1:7) Throughout the book of Jeremiah God's instructions to him were.
 - Go and cry in the ears of Jerusalem, saying, Thus saith the Lord. (Jeremiah 2:2).
 - Jeremiah spoke the words which God told him to speak.
2. ACTED PROPHECIES:
 - In addition to spoken prophecy, God had the prophets visually act out a message. For example, God told Jeremiah to: . . . Make thee bonds and yokes and put them upon thy neck. . . (Jeremiah 27:2).

- These yokes were a visual prophecy of the yokes of bondage which were to come on the people because of their sin. Jeremiah acted out the prophetic message of God.

Step 4-Source of Prophecy

1. The source of Biblical prophecy is God who reveals His message to man through the Holy Spirit: For the prophecy came not in old time by the will of man; but holy men of God spake as they were moved by the Holy Ghost. (II Peter 1:21).
2. But God hath revealed them unto us by His Spirit: for the Spirit searcheth all things, yea, the deep things of God. (I Corinthians 2:10).
3. God can speak accurately of the future because: Known unto God are all His works from the beginning of the world. (Acts 15:18).
4. Remember the former things of old: for I am God, and there is none else; I am God, and there is none like me. Declaring the end from the beginning, and from ancient times the things that are not yet done, saying, My counsel shall stand, and I will do all my pleasure. (Isaiah 46:9-10).
5. God raises up true prophets: The Lord thy God will raise up unto thee a Prophet from the midst of thee, of thy brethren, like unto me; unto him ye shall hearken. (Deuteronomy 18:15).
6. God reveals His future plans to these prophets: Surely the Lord God will do nothing but He revealeth His secret unto His servants the prophets. (Amos 3:7).

Step 5- False Prophets

1. Satan imitates true prophecy through false predictions by fortune tellers, witches, and astrologers. These methods are not of God. The Prophet Daniel said: Daniel answered in the presence of the king and said, The secret which the king hath demanded cannot the wise men, the astrologers, the magicians, the soothsayers shew unto the king.
2. But there is a God in heaven that revealeth secrets and maketh known to the king Nebuchadnezzar what shall be in the latter days. . . (Daniel 2:27-28).
3. True prophecy directs attention to Jesus Christ: Wherefore I give you to understand, that no man speaking by the Spirit of God calleth Jesus accursed;

and that no man can say that Jesus is the Lord, but by the Holy Ghost. (I Corinthians 12:3).

4. The Bible warns of false prophets (Matthew 24:11,24; Mark 13:22). A person called "the false prophet" will be evident in events at the end of the world (Revelation 13:11-17; 16:13; 19:20; 20:10). The Bible reveals several ways to identify false prophets:
 - They teach sexual immorality and permissiveness: II Peter 2:13.
 - They try to lead people away from obedience to God's Word: Deuteronomy 13:1-5.
 - They make false claims: Matthew 24:23-24.
 - They deceive people with miraculous signs: Matthew 24:11,24.
 - They do not prophecy according to the proportion of faith (in right relation to God's Word): Romans 12:6.
 - False prophets do not have the fruit of the Holy Spirit in their lives: Matthew 7:15-16; Galatians 5:22-23.
 - What they prophesy does not come to pass: Deuteronomy 18:20-22.

Step 6-Purpose of Prophecy

1. TO AUTHENTICATE GOD'S MESSAGE: Fulfilled prophecy proves that God's message is authentic (true). In Isaiah 41:21-23 God challenges the gods of the heathen nations to prove their power by foretelling future events. They could not do it because they were false gods: Produce your cause, saith the Lord; bring forth your strong reasons, saith the King of Jacob. Let them bring them forth, and shew us what shall happen: let them shew the former things, what they be, that we may consider them, and known the latter end of them; or declare us things for to come. Shew the things that are to come hereafter, that we may know that ye are gods. (Isaiah 41:21-23).
2. TO CONFIRM GOD'S MESSENGER: Prophecy confirms the true messengers of God: The prophet which prophesieth of peace, when the word of the prophet shall come to pass, then shall the prophet be known, that the Lord hath truly sent him. (Jeremiah 28:9).
3. TO INSTRUCT BELIEVERS: Believers are to receive instruction from prophecy and take heed (pay attention) to it: We have also a more sure word of prophecy; whereunto ye do well that ye take heed, as unto a light that shineth in a dark place. . . (II Peter 1:19).
4. IMPORTANCE OF STUDYING PROPHECY There are three main reasons why it is important to study Bible prophecy:
 - All Scripture is inspired of God and is profitable for study: All Scripture is given by inspiration of God, and is profitable for doctrine, for reproof, for correction, for instruction in righteousness; That the man of God may be perfect, thoroughly furnished unto all good works. (II Timothy 3:16-17).
 - Prophecy brings understanding of past, present, and future events in the plan of God: . . . the things which thou hast seen, and the things which are, and the things which shall be hereafter. (Revelation 1:19).
 - Understanding of God's future plan prevents deception by Satan: Then if any man shall say unto you, Lo, here is Christ, or there; believe it not. For there shall arise false Christs, and false prophets, and shall shew great signs and wonders: insomuch that, if it were possible, they shall deceive the very elect. BEHOLD, I HAVE TOLD YOU BEFORE. Wherefore if they shall say unto you, behold He is in the desert; go not forth: behold He is in the secret chambers; believe it not. (Matthew 24:23-26) God's future plan has been shared before it happens so we will not be deceived by Satan.

- There is a special blessing pronounced upon those who study Bible prophecy: Blessed is he that readeth, and they that hear the words of this prophecy, and keep those things which are written therein: for the time is at hand. (Revelation 1:3).

Figure of Speech

1. Review the figure of speech of the following:

- Text.
- Writing.
- Book.
- Journal.
- Article.
- Report.
- Bible.
- Sermon.
- Dissertation.
- Government Documents.
- Theses and Dissertation.
- Newspaper.
- Magazines.
- Audiobook.
- Sermon and Preaching.
- Public Speaking.
- TV.
- Radio.
- Podcast.
- Communication.
- Talk.
- Speak.
- Conversation discussion.
- Debates.
- Discussion.

2. These are the following books to use for Figure of Speech

- **Glossary of Literary Terms by M. H. Abrams.**
- **Figures of Speech used in the Bible by E. W. Bullinger.**
- **Figure of Speech and exploration of used of idiomatic phrases in Conversation by Elizabet Jame Holt.**
- **Figures of Speech by Christina Alm Arvius.**
- **Figures of Speech or Figures of Thought by Ananda Coomaraswamy.**
- **The Princeton Encyclopedia of Poetry and Poetics by Roland Greene.**

Step 7-Study of Prophecy

1. Bible prophecy is part of the "meat" of the Word of God which we referred to previously in this course. The "meat" of prophecy is more difficult to understand than the "milk" of God's Word which presents basic concepts of the Christian faith. If you are a new believer and do not have any background knowledge of the Bible, you should study other portions of God's Word before you try to study the prophetic books. Study the Gospels, Acts, and Letters of the New Testament. Study the Poetry, Law, and History divisions of the Old Testament. As you study, use what you have learned in this course about book, chapter, paragraph, verse, and word study. After you have a basic knowledge of these divisions, then study the prophetic books of the Bible. Do not worry if you do not understand all of the prophecies in the Bible. Many great Bible scholars have debated for years about the meaning of some portions of Bible prophecy.

Step 8-Prophetic Books

1. In addition to the books of prophecy there are many other chapters and verses of prophecy scattered throughout God's Word. The very first prophecy recorded in the Bible is in the book of Genesis: And I will put enmity between thee and the woman, and between thy seed and her seed: it shall bruise thy head, and thou shalt bruise His heel. (Genesis 3:15)
2. This verse prophesies the coming of Jesus Christ who, through His death for the sins of man, would crush the enemy, Satan. It is not possible to list in this manual every prophecy in the Word of God. We just want you to be aware that there are prophecies throughout the entire Bible. Prophecy is not just confined to the books known as the Books of Prophecy. With study and experience you will be able to identify the prophetic theme that runs throughout the entire Bible.

Step 9-Understanding Prophecy

1. Some people are frustrated when they try to study Bible prophecy. Because prophecy is more difficult than other portions of the Bible, they wonder if God really intended for them to understand it. It is possible to understand Bible prophecy. God wanted so much for Daniel to understand prophecy that he sent an angel to explain it to him. The angel said: . . . I am now come forth to give thee skill and understanding.(Daniel 9:22).
2. Jesus took time to explain Old Testament prophecy to His Disciples: And He said unto them, These are the words which I spake unto you, while I was yet with you, that all things must be fulfilled, which were written in the law of Moses, and in the prophets, and in the psalms concerning me. (Luke 24:44)
3. When the Disciples asked Jesus about the end of the world, Jesus listed several prophetic signs for which they were to watch. He wanted them to understand future events. Jesus said: So likewise ye, when ye shall see all these things, know that it is near, even at the doors. (Matthew 24:33).
4. In the introduction to the book of Revelation, a book which some consider quite difficult to understand, it is clear that God wants His people to understand prophecy: The Revelation of Jesus Christ which God gave unto Him, to shew unto His servants things which must shortly come to pass. . . (Revelation 1:1).

Step 10-What Is Immediate Context?

Step 11-What is Whole Context?

Step 12-What Are The Facts Within Context?

Step 13-Keys to Understanding

1. ONE: THE BASIC THEME OF PROPHECY The Lord Jesus Christ is the basic theme of Bible prophecy. There are many other subjects of Bible prophecy. For example, there are prophecies of judgment of wicked nations by God. But the underlying theme of all Bible prophecies is that they somehow relate to Jesus and the purpose of God regarding Him: Having made known unto us the mystery of His will, according to His good pleasure which He hath purposed in Himself; That in the dispensation of the fullness of times He might gather together in one all things in Christ, both which are in heaven, and which are on earth; even in Him. (Ephesians 1:9-10) All Bible prophecy, even when it deals with subjects such as judgment upon nations, etc., relates to the overall plan of God. That plan is to bring all mankind into right relationship with God through the Lord Jesus Christ. The purpose is to gather in one all things in Christ. The Bible states that the "spirit" or theme of Bible prophecy is Jesus: . . . for the testimony of Jesus is the spirit of prophecy. (Revelation 19:10) When you study Bible prophecy consider it in terms of this question: How does this prophecy relate to Jesus Christ (the spirit of prophecy) and God's overall plan concerning Him?
2. TWO: THE BIBLE INTERPRETS ITSELF Another key to understanding is to realize that often the Bible explains its own prophecies. For an example of how the Bible interprets itself read Daniel chapter 2. Here a king by the name of Nebuchadnezzar is given a dream from God. Upon waking he cannot remember the dream. He calls upon the astrologers and magicians to recall and interpret the dream. They cannot do it. Then God uses the prophet Daniel to tell the king what he dreamed and interpret it for him. The dream is described by Daniel in verses 31-35. The interpretation of the dream is given in verses 36- 45. This is an example of how, in many passages, the Bible interprets its own prophecies. The New Testament interprets many of the prophecies of the Old Testament because much of the Old Testament is fulfilled in the New Testament. For example, compare this Old Testament prophecy and the New Testament fulfillment: . . . and I will say to them which were not my people, Thou art my people, and they shall say, Thou art my God. (Hosea 2:23) Even us, whom He hath called, not of the Jews only, but also of the Gentiles? As he saith also in Osee, I will call them my people, which were not my people; and her beloved, which was not beloved. And it shall come to

pass that in the place where it was said unto them, ye are not my people; there shall they be called the children of the living God. (Romans 9:24-26) Fulfilled prophecy in the New Testament includes many Old Testament prophecies concerning the coming Messiah, Jesus Christ.

3. **THREE: THE RULE OF DOUBLE REFERENCE** Another key to understanding Bible prophecy is the "rule of double reference." This rule for interpreting Bible prophecy states that a prophecy of immediate fulfillment is made as a means of teaching a deeper truth or foretelling an event to be fulfilled farther in the future. Many times in the Bible a prophecy was fulfilled immediately after it was given, but the same prophecy applied not only to the event which was fulfilled immediately, but also to a second fulfillment farther in the future. For example, there is a prophecy given in Ezekiel 28:1-19 which is addressed to Ethbaal who was then the king of Tyre. He was a wicked king. He was a type of the Antichrist who will arise during the end of the world. By saying Ethbaal is a "type" we mean that in nature and actions he was like the Antichrist which will come in the future. (You will learn more about "types" in the next chapter.) When God spoke in prophecy through Ezekiel, it was fulfilled in the immediate future in the life of Ethbaal. But there is a future event, as yet unfulfilled, where the same prophecy applies to the evil end time ruler called the Antichrist. As you study Bible prophecy remember this rule of double reference. Ask yourself two questions:

- What did this prophecy mean at the time it was given for the people to whom it was given?
- Is there a future double reference in this prophecy?

4. **FOUR: PROPHETIC PERSPECTIVE** The prophets described future events as if they were continuous and in immediate order. For example, Isaiah prophesied: The Spirit of the Lord God is upon me; because the Lord hath anointed me to preach good tidings unto the meek; He hath sent me to bind up the broken hearted, to proclaim liberty to the captives, and the opening of the prison to them that are bound; To proclaim the acceptable year of the Lord, and the day of vengeance of our God; to comfort all that mourn; To appoint unto them that mourn in Zion, to give unto them beauty for ashes, the oil of joy for mourning, the garment of praise for the spirit of heaviness; that they might be called trees of righteousness, the planting of the Lord, that He might be

glorified. (Isaiah 61:1-3) When Jesus read from this portion of Isaiah in Luke 4:17-20 He stopped with the phrase "to proclaim the acceptable year of the Lord." Then He closed the book and said that these Scriptures were fulfilled in Him that day. By this He meant that He was fulfilling this prophecy. He was the one with God's Spirit upon Him to preach good tidings, bind up the broken hearted, proclaim liberty, and open the prisons. But it is significant that Jesus stopped reading with the phrase "to proclaim the acceptable year of the Lord." He did not read the portion regarding "the day of vengeance of our God" because the day of vengeance had not yet come. Already a gap of almost 2,000 years has elapsed since Jesus read this passage. The day of God's vengeance still has not yet come. Prophetic perspective records events as if they were immediate. Through the revelation of the Holy Spirit Isaiah saw the whole plan of God. He saw Jesus coming to preach, bind up, proclaim liberty, open the prison, proclaim the acceptable year of the Lord, and bring the vengeance of God. Isaiah saw the events as you would look at distant ranges of mountains. The valleys in between the mountains are not visible until you climb to the top of the nearest range. Prophetic perspective reveals the whole plan of God from a distance. Sometimes events seem to appear as though they happen immediately in sequence. But as the prophecies are fulfilled there are often valleys of time between them as illustrated by this passage from Isaiah. Jesus has not yet fulfilled the Scriptures about the day of vengeance.

5. FIVE: THE CONDITIONAL NATURE OF PROPHECY Much Bible prophecy is conditional in nature. This means that God says He will do certain things based on the response of man. IF man does NOT listen to God's message, certain things will happen. IF man HEARS God's message and RESPONDS properly to it, then something else will happen. God said: At what instant I shall speak concerning a nation, and concerning a kingdom, to pluck up, and to pull down, and to destroy it; IF that nation, against whom I have pronounced, turn from their evil, I will repent of the evil that I thought to do unto them. And at what instant I shall speak concerning a nation, and concerning a kingdom, to build and to plant it, IF it do evil in my sight, that it obey not my voice, then I will repent of the good, wherewith I said I would benefit them. (Jeremiah 18:7-10) In much Bible prophecy, you must continue studying in order to discover man's response to it because the fulfillment of prophecy is often conditional upon man's response. For a good example of this principle read the book of Jonah.

The Prophet Jonah revealed that God would destroy Ninevah in three days IF they did not repent. The destruction never came. The reason was that Ninevah responded properly to the message of God and repented of their sins.

6. OLD TESTAMENT PROPHECY Prophecy in the Old Testament centers on:

- The people of Israel which was the nation God raised up through which to reveal Himself to the world. During the period of time when Israel was divided into two kingdoms this prophecy is directed to Israel and Judah. An example of prophecy to Israel is the book of Hosea. An example of prophecy to Judah is the book of Joel.
- Prophecies to the nations surrounding the people of Israel. For example, prophecies are given regarding Babylon, Egypt, Tyre, Edom, etc. An example is the prophecy of Obadiah directed to the nation of Edom.
- Prophecies concerning the coming Messiah, Jesus Christ. These are not contained in any one prophetic book. They are scattered throughout the Old Testament. A good example is Isaiah 7:14.
- Prophecies concerning the entire world, its destiny, future events, the end of the world, and the end of time as we know it. The book of Daniel is an excellent example of this type of prophecy. The following chart condenses the general content of the books of prophecy in the Old Testament. As you use this chart be sure to remember the rule of double reference. Although prophecies were directed to certain nations and fulfilled in the immediate future, many of the prophecies spoke of even greater events in the far future:

7. NEW TESTAMENT PROPHECY There are many prophecies scattered throughout the New Testament. Most of these deal with future events which are to happen prior to the end of the world. For examples read the prophecies in Matthew chapter 24. There is only one book in the prophecy division in the New Testament, however. That is the book of Revelation. John, a Disciple of Jesus, was given this revelation from God through the Holy Spirit. It is a revelation of Jesus Christ: The Revelation of Jesus Christ, which God gave unto him, to shew unto his servants things which must shortly come to pass. . . (Revelation 1:1) John was told to. . . Write the things which thou hast seen, and the things which are, and the things which shall be hereafter. (Revelation

1:19) The Book of Daniel should be studied along with the book of Revelation as the two books relate to each other. There are many different interpretations given to the prophecies in the book of Revelation. Most of these interpretations center on the exact timing of certain events or specific details of these events. It is important to have a general understanding, however, of what the Bible says will happen. The following outline provides understanding of the major events: MAJOR EVENTS IN THE FUTURE.

- The Bible teaches that Jesus will return to earth for believers: John 14:2-3.
 - A. The Rapture: I Thessalonians 4:13-18 gives the most detail about Christ's return for believers. This return is called the rapture:
 - Christ Himself will return: Verse 16.
 - There will be a resurrection from the grave of those who were believers when they died: Verse 16.
 - There will be rapture, which means "the act of taking a person from one place to another." Living believers will be taken from earth to meet Jesus: Verse 17.
 - There will be a reunion between believers who have previously died, believers living at the time of Christ's return, and the Lord Jesus Christ: Verse 17.
8. The Tribulation: The Bible tells of a terrible time on earth which is called the tribulation.
- The tribulation will last for 42 months or 1,260 days: Daniel 9:24-27.
 - It will be a very difficult time. There have been many difficult times in the world, but three things will distinguish the tribulation from all other times of trouble.
 - A. First, it will be worldwide and not just local: Revelation 3:10.
 - B. Second, people will realize the end of the world is near: Revelation 6:16.
 - C. Third, the intensity of the trouble will be greater than ever before experienced: Matthew 24:4-14.
 - Its description: There are a series of judgments on earth during the tribulation. These are described in Revelation chapters 6, 8-9, and 16 and Matthew 24:4-14.

- The reason for the tribulation: The wickedness of man must be punished, Satan defeated, and Jesus acknowledged as Lord of all. This completes God's plan of the ages spoken of in Ephesians 1:8-9.
9. The timing of the rapture: Some people believe the rapture will occur before the tribulation and that believers will not have to experience any of this terrible time on earth. Others believe the rapture will happen midway through this period. Still other believe the rapture will happen at the end of the tribulation. The most common interpretation is that the rapture of believers will happen before the tribulation begins. The different views of the timing of the rapture result from various interpretations of prophetic information given in Revelation and other books of the Bible. What is most important is to know you are a true believer and will be ready to go with Jesus in the rapture when it does occur.
 10. The Millennium: The Millennium is a period of 1,000 years after the tribulation during which Jesus will rule the earth in righteousness (Zechariah 14:9; Daniel 7:14). The city of Jerusalem will be the center of government (Isaiah 2:3). This period will end when Satan stages a last revolt against God (Revelation 20:7-9). God will send fire from heaven and end all opposition. Satan will be cast into the lake of fire for eternity. (Revelation 20:10).
 11. Judgment: All created beings will be judged by God. This is known as the time of eternal judgment. Those who died as unbelievers will be resurrected to face judgment. Because they did not repent from sin and accept Jesus as Savior they will be condemned to eternity in Hell (Revelation 20:12-15). True believers who repented from sin and accepted Jesus as Savior will spend eternity in heaven in the presence of God (Revelation 21).

Step 14-What Further Analysis or Research I Need To Do, Next Time?

Step 15-Write out a Personal Application

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 16-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 15-Typological Study Method

Step 1-Tools Required for this Method

1. Study Bible
2. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
3. Topical Book
4. Exhaustive Concordance
5. Cross Reference

Step 2-Define Method

1. To understand how to do a typological study you must first understand the meaning of the word type. There are several verses in the Bible which explain the meaning of a Biblical type.
2. Key Verse for this chapter, Hebrews 10:1, speaks of the law having a shadow of good thing to come. "Shadow" is one word to describe a Biblical type. A shadow is an exact outline, although the details may be dim and sometimes it contrasts the thing that casts the shadow.
3. "Figure" is another word which describes type: Nevertheless death reigned from Adam to Moses, even over them that had not sinned after the similitude of Adam's transgression, who is the figure of Him that was to come. (Romans 5:14).
4. According to this verse, Adam was a "figure" of someone else who was to come. The meaning of the word "figure" is similar to that of type. Adam was a type of the Lord Jesus Christ who was to come later. The offering of sacrifices for sin in the Old Testament was a type of the final sacrifice for sin which was to be offered by Jesus in the New Testament:
5. The Holy Ghost thus signifying that the way into the holiest of all was not yet made manifest, while as the first tabernacle was yet standing: Which was a figure for the time then present, in which were offered both gifts and sacrifices that could not make him that did the service perfect, as pertaining to the conscience. (Hebrews 9:8-9) "Pattern" is another word describing Biblical

types: For if he were on earth, he should not be a priest, seeing that there are priests that offer gifts according to the law; Who serve unto the example and shadow of heavenly things, as Moses was admonished of God when he was about to make the tabernacle: for, See, saith he, that thou make all things according to the pattern shewed to thee in the mount. (Hebrews 8:4-5) Each of these words--shadow, figure, and pattern--all contain the idea we refer to when we speak of types. A type is a person or thing in the Bible which God used to represent some other person, thing, or event that would appear in the future. It was a shadow, a figure, or a pattern of what was to come.

Step 3-Method Explained

1. When we study these types it is called typological Bible study. We study a person, place, event, or thing and then we study the thing of which it is a type. In a way, types are like prophecy. They give an advance view of what is to come in God's future plan. Like prophecy, some types have been fulfilled. Others remain to be fulfilled. Although the type is important in itself, it has an even greater significance in the future person or event which it represented. Types are physical pictures of spiritual realities. For example, the experience of the children of Israel being healed from the bites of serpents is an actual Old Testament event. The Old Testament account in Numbers 21:6-9 tells that serpents bit the people and caused many of them to die. Moses made a bronze serpent and set it on a pole. Everyone who looked at the bronze serpent recovered from the serpent's bite. This event is a type of the death of Jesus: And as Moses lifted up the serpent in the wilderness, even so must the Son of man be lifted up; that whosoever believeth in Him should not perish, but have eternal life. (John 3:14-15) Many of the truths of the Bible are so simply stated that a child can understand them. There are other truths that are "hidden riches of secret places." They require more intense study to understand. The typical teachings of the Bible are like hidden riches. You must take time to search out these truths to discover the richest teachings of the Word of God. All types fall into four general classifications:

- Persons.
- Places.
- Events (historical, ceremonial, etc.).
- Material things.

Step 4-What Is Immediate Context?**Step 5-What is Whole Context?****Step 6-What Are The Facts Within Context?****Step 7-Write out a Personal Application**

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 8-What Further Analysis or Research I Need To Do, Next Time?**Step 9-Meditate on Verse you have chosen to study**

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarize its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 16-John MacArthur Way Bible

Study

Step 1-Read or Listen Bible on repetitious basis

1. Take any Book of Bible and Divide the book equally into 4-8 chapters.
2. Read or listen every day for the next 30-90 days all those 4-8 chapters.
3. Read or Listen 4-8 chapters as many time per day as possible.
4. In 2.5 years you could listen or read entire New Testament.
5. Repetitious reading or listen leads to remember the text better.

Step 2-Tools need

1. Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study.
2. Treasure of scripture knowledge.
3. Handbooks.
4. Dictionary.
5. Cross References.
6. Atlas.
7. Doctrinal issues.
8. Books on custom.
9. Books on Culture.
10. Books on economy.
11. Books on political.
12. Books on geography.
13. Books on social.
14. Books on reconstructing the time.
15. Concordance.
16. Biblical greek dictionary.
17. Biblical Hebrew Dictionary.
18. Biblical Greek text.
19. Biblical Hebrew text.

20. Biblical Hebrew Grammar-Beginners to Advanced.
21. Biblical Greek Grammar-Beginners to Advanced.
22. Life and time of Jesus the Messiah.
23. Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles.
24. Topical Study.

Step 3-Old Testament-Read in narrative

1. Read or Listen Through Old Testament 1-100 times.
2. Themes of Old Testament.
 - Scripture is God's self disclosure. Note in mind what is true about God.
 - Scripture points out that God has Law which man violates.
 - Scripture reveal who keeps the law of God.
 - Saviour Coming.

Step 4-Every Scripture has one true interpretation

1. Exegesis - draw out of text.
2. Epexegetis-put in the text your own ideas (Do not Use it for interpretation).
3. Bible best interpreting itself.

Step 5-Things to avoid in interpretation

1. What does it mean to me? (This is not the question to ask while study, read or listen Bible).
2. Refrain to make a point for the correct interpretation (Taking text out of the correct context and interpreting).
3. Do not over spiritualise the text or do not over allegorise the text.
4. Do not use Bible and abused.
5. Avoid superficial study.
 - This is hard work.
 - Try to piece together the information.
 - Meaning is clear, but it takes hard work to get it.

Step 6-Observation

1. What does the text mean?
2. What the author intent (author intent) and divine author intent?
3. What it means to the author?
4. What it mean to the audience?
5. 5W1H?
6. What it not said in the passage?

Step 7-Literal Principle

1. Real people.
2. Real history.
3. Normal language.
4. Real meaning.
5. Interpret the scripture to normal language.
6. Figure of Speech.
 - These are the following books to use for Figure of Speech.
 - I. **Glossary of Literary Terms by M. H. Abrams.**
 - II. **Figures of Speech used in the Bible by E. W. Bullinger.**
 - III. **Figure of Speech and exploration of used of idiomatic phrases in Conversation by Elizabet Jame Holt.**
 - IV. **Figures of Speech by Christina Alm Arvius.**
 - V. **Figures of Speech or Figures of Thought by Ananda Coomaraswamy.**
 - VI. **The Princeton Encyclopaedia of Poetry and Poetics by Roland Greene.**

Step 8-Analysis of Logic.

Step 9-Analysis of Grammar.

Step 10-Discourse Analysis of The Text

- A. Use the Following Books for Discourse Analysis:
 - Critical Discourse Analysis_ The Critical Study of Language.
 - Discourse analysis.
 - The Routledge handbook of discourse analysis.

Step 10- Analysis of Genre.

A. Open Figure Of Speech Folder. Use the Following Books for Analysis of Genre :

- Literary Device.
- FIGURES OF SPEECH - Biblical Research Journal.
- Figures of Speech.

Step 11- Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context
4. Historical Principle.
 - Context is very important.
5. Cultural Context.
6. Custom Context.
7. Economic Context.
8. Geographical context.
9. Political context.
10. Religious context.
11. What world view they have?
12. How people think?
13. What problems they faced?
14. Perspective of people?
15. What is going on at the time?
16. What historical city?
17. What social pressure?
18. What cultural condition?
19. Where was tension?
20. What location?
21. What were crisis?
22. Grammatical Principle.
 - Look at the language.
 - Lexicography.
 - Find out the way words arrange.
 - Proposition pronoun.
 - Analyse the English Bible grammatically.

- Analyse the original Bible language (Greek, Hebrew and Aramaic)
- Word Meaning.
 - A. Word meaning studies.
 - B. Analyze word meaning.
 - C. Syntax analysis- how the words constructed.
 - D. Know greek and Hebrew languages.
- Look for main verb.

23. Logical Principle.

- Definition.
- Terms.
- Arguments.
- All logical principles involved analysing arguments.

24. Synthesis principle.

- Scripture interpret scripture.
 - A. Use Treasury of Scripture Knowledge.
- Compare with related text.

Step 12-What Are The Facts Within Context?

Step 13-Implication

- What are implication of this?

Step 14-What Further Analysis or Research I Need To Do, Next Time?

Step 15-Write out a Personal Application.

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?

14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.
17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 16-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 17-Inductive Bible Study Method

Step 1-Tools Required for this Method.

1. Study Bible
2. Exhaustive concordance
3. Treasury of Scripture Knowledge Topical Bible
4. A Bible dictionary and/or Bible encyclopaedia
5. A Bible handbook
6. A Bible atlas
7. Archaeology and Bible History by Joseph Free and Howard Vos (Zondervan)
8. The Bible and Archaeology by J.A. Thompson (Eerdmans)
9. Everyday Life in Bible Times (National Geographic Society)
10. Great People of the Bible and How They Lived (Reader's Digest Association)
11. Harper's Encyclopedia of Bible Life by Madeleine S. and J. Lane Miller (Books Sales)
12. The Oxford History of the Biblical World by Michael Coogan (Oxford University Press)
13. The Wycliffe Historical Geography of Bible Lands by Howard Vos (Hendrickson)
14. Church History
15. The Bible Knowledge Background Commentary, edited by Craig Evans, 3 vols. (Victor)
16. Chronological and Background Charts of the New Testament by H. Wayne House (Zondervan)
17. Chronological and Background Charts of the Old Testament by John Walton (Zondervan)
18. The IVP Bible Background Commentary: New Testament by Craig Keener (InterVarsity Press)
19. The IVP Bible Background Commentary: Old Testament by John Walton et al. (InterVarsity Press)
20. Manners and Customs in the Bible by Victor H. Matthews (Hendrickson)
21. The Zondervan Illustrated Bible Background Commentary: New Testament, edited by Clinton Arnold, 4 vols. (Zondervan)

22. The Zondervan Illustrated Bible Background Commentary: Old Testament, edited by John Walton, 4 vols. (Zondervan)
23. Several contemporary translations. (These enable you to see different renderings of the same material by able scholars.)
24. A Bible dictionary and/or Bible encyclopaedia.
25. A Bible handbook. (Look under the name of the book you are studying as well as under the writer and the city or people to whom the original might have been sent.)
26. Bible atlases
27. Historical
28. Geographies
29. Historical background books
30. Bible surveys
31. Later you may check yourself and your conclusions against what other reliable scholars have done
32. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
33. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)
34. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
35. New Testament Survey by Merrill C. Tenney (Eerdmans)
36. New Testament Times by Merrill C. Tenney (Baker)
37. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
38. Old Testament Times by R.K. Harrison (Baker)
39. Old Testament Today by John Walton and Andrew Hill (Zondervan)
40. Survey of the Bible by William Hendriksen (Baker)
41. A Survey of the New Testament by Robert H. Gundry (Zondervan)
42. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
43. Survey — get a bird's-eye view of the book.
44. Analysis — study everything in each chapter in detail.
45. Synthesis — put it back together again and draw some conclusions.
46. Later you may check yourself and your conclusions against what other reliable scholars have done
47. The Illustrated Guide to Biblical History by Kendall Easley (Broadman & Holman)
48. Nelson's New Testament Survey by Mark Bailey and Tom Constable (Nelson)

49. Nelson's Old Testament Survey by Charles Dyer and Eugene Merrill (Nelson)
50. New Testament Survey by Merrill C. Tenney (Eerdmans)
51. New Testament Times by Merrill C. Tenney (Baker)
52. The Old Testament Speaks by Samuel J. Schultz (HarperSanFrancisco)
53. Old Testament Times by R.K. Harrison (Baker)
54. Old Testament Today by John Walton and Andrew Hill (Zondervan)
55. Survey of the Bible by William Hendriksen (Baker)
56. A Survey of the New Testament by Robert H. Gundry (Zondervan)
57. What the Bible Is All About: NIV Edition by Henrietta C. Mears (Regal)
58. Survey — get a bird's-eye view of the book.
59. Analysis — study everything in each chapter in detail.
60. Synthesis — put it back together again and draw some conclusions.
61. Methodical Bible Study by Robert A. Traina (Zondervan) [Very advanced]
62. The Navigator Bible Studies Handbook (NavPress)
63. The New Joy of Discovery in Bible Study by Oletta Wald (Augsburg Fortress)
64. Personal Bible Study by William Lincoln (Bethany Fellowship)
65. Basic Biblical Interpretation by Roy Zuck (Victor)
66. Basics of Bible Interpretation by Bob Smith (Word Books)
67. Getting the Message by Daniel Doriani (Presbyterian & Reformed)
68. Grasping God's Word by Scott Duvall and Daniel Hays (Zondervan)
69. How to Read the Bible for All Its Worth by Gordon Fee and Douglas Stuart (Zondervan)
70. How to Understand Your Bible by T. Norton Sterrett (InterVarsity Press)
71. Protestant Biblical Interpretation by Bernard Ramm (Baker)
72. Studying, Interpreting, and Applying the Bible by Walter Henry and Gayle Jackson (Zondervan)

Step 2-Choose The Subject or Book of the Bible

1. Choose the subject, person, word, or book of the Bible you want to study, and begin gathering reference materials for your research. The availability of reference tools will largely determine the scope of your study.

Step 3-List Your Reference Tools

1. List all the reference tools you have gathered to do this study (see Tools You Will Need above). This is to help you remember which books were most useful for the background material you researched and what books you may want to refer to in future background studies.

Step 4-Get Insights from Archeology

1. Read Number of books about archeology of the time, also Biblical Archeology.

Step 5-Obtain Insights from Geography

1. You will need to become familiar with the geography of Palestine and the Near East in general. This includes the types of land found there, the major mountains and hills, elevation and rainfall, the major bodies of water (seas, lakes, rivers), location of cities and countries, famous landmarks, and the borders of surrounding countries of the time you are studying.
2. As you study the New Testament, particularly Paul's missionary travels, you will need to become acquainted with the Mediterranean countries and cities that were active during the days of the Roman Empire.
3. In all of your study of biblical geography, you must continually ask this question: "What is the effect of the surrounding geography on what I am studying?"
4. In this step, list all the insights you can get on geography for the subject or book you are studying.

Step 6-Get insights from History

1. You should have a working knowledge of the chronology (order of historical events) of the nation of Israel in the Old Testament. Learn the periods of history of the Hebrew nation; find out the origin and history of famous cities; learn the divisions of Jesus' ministry; be well versed on the history surrounding Paul's missionary travels. It is also helpful to know what major events were going on in other parts of the world during the time you are studying, in order to have a proper perspective on what God was doing in the world.
2. You might ask yourself, "What caused this particular event that I am studying? How did it affect the people involved? How did it affect the passage I am studying?" Be especially aware of events that illustrate God's sovereign control over the progress of history.
3. In this step, list all the insights you can get on history surrounding the subject or book you are studying.

Step 7-Discover Some Insights from Culture

1. If you are to understand what went on in Bible times, you need to learn about the total lifestyle of the ancient people in the Scriptures. Here are some areas you can research while asking yourself, "How do all these things affect the message and the people about whom I am studying?"
 - Types of clothing people wore.
 - Professions and trades in biblical times.
 - Music in the Bible.
 - Architectural styles in the Near East.
 - Manners and customs in Scripture.
 - Recreation in ancient times.
 - Family life in the Middle East.
 - Art in the Bible.
 - Languages and literature of surrounding nations.
 - Religious ceremonies in Israel and among pagan neighbours.
 - False religions of the area.
 - Weapons and tools used by the people.
2. In this step, list all the insights you derive from the way people lived in their cultures.

Step 8-Research Insights from Political environment

1. Much of what happened in Israel in the Old Testament and in the Roman world of Jesus, Paul, and the apostles is related to the political environment of the times.
2. Kings, emperors, rulers, and other powers governed the people of the time. Israel, for example, spent much of its history under foreign rule and even in exile. These other nations and political systems were bound to have an effect on the way God's people lived. Recognize, however, that God is always in control of the political situation. Even King Nebuchadnezzar acknowledged this fact (Dan. 4:34 – 35).
3. Egypt, Philistia, Assyria, Babylon, Persia, Greece, and Rome all played a major part in the Bible. What were these nations like? How did they affect Israel or the New Testament church? Many of the prophets' messages can only be understood in light of their current political climate.
4. In this step, write down all the insights you can from your research into the political conditions of the time period you are studying.

Step 9-Summarise Your Research

1. Now go back over Step Three through Step Six, and from the data you have gathered, summarize your research by answering these two questions:
 - How does this background information help me understand better what I am studying?
 - What influence did any of these factors have on the subject (or book) that I am studying?

Step 10-Read the Book

1. This first step may seem obvious, but some people spend all their time reading about the Bible rather than reading the Scripture text itself. The only tools needed for this first step are your study Bible and several recent translations. Do not read any Bible surveys, handbooks, or commentaries at this point. Follow these seven suggestions:
2. Read through the book at one sitting. Except for the Psalms, the longest book in the Bible is Isaiah, and it can be read in three or four hours. Most of the other books, particularly those in the New Testament, can be read in much less time. If you have to break up your reading, try to finish a book in no more than two sittings. (For example, read Isaiah 1 – 39 at one sitting, then Isaiah 40 – 66.) You will be amazed at what you begin to see in Scripture as you do this.
3. Read through the book in a recent translation. This will enable you to understand what you are reading better, because you will be doing your reading in contemporary language.
4. Read through the book rapidly, ignoring the chapter divisions. Remember that the chapter divisions and verses were not in the original writing; they were added much later for convenience. Right now your purpose is to get the flow of the book and feel the pulse of the writer. Don't be concerned with the details at this stage (you will do that in the Chapter Analysis Method, chapter 10), but read the book quickly to get its main thrust.
5. Read through the book repeatedly. Repeat the process of reading as many times as you can. (Obviously, you will not be able to read the book of Isaiah as many times as the book of Colossians in a given time frame.) Each time you read the book through, you will notice some new things and the overall picture will become clearer and clearer. The more times you read a book through, the better you will be able to understand it. So stay with it.
6. Read through the book without referring to commentaries or someone else's notes. It is good to read in a Bible in which you have not made any notes yourself. Otherwise, when you see the notes you may have written (your own or others'), your mind will naturally fall back into that pattern and you will be hindered from seeing new things. After you have finished Step One, you may begin consulting with reference helps.
7. Read through the book prayerfully. Ask God to speak to your heart and open your eyes that you may see wonderful things in his law (Ps. 119:18).

8. Read through the book with pen or pencil in hand. As you begin reading the second or third time through, begin taking notes and making observations on what you are reading (see Step Two and the Book Survey Form).

Step 11-Make notes on what you Read

1. As you read through the book (see Step One), write down your impressions and the important facts you discover. Make these notes on a separate piece of paper or on the Book Survey Form found at the end of this chapter. Look for the following nine items:
2. Category: Is the book history? Poetry? Prophecy? Law? A biography? A letter?
3. First Impressions: What is the first impression you get from the book? What do you think is the purpose of the writer? What “feel” do you get from reading it?
4. Key Words: What are some of the significant words the writer uses? What words are repeated the most? What word or words is he emphasising?
5. Key Verse: What seems to be the key verse (if any)? What ideas or phrases are repeated that may show his main thought? What is the writer’s key statement?
6. Literary Style: Is the book a narrative? A drama? A personal letter? A discourse? Poetry? A combination of narration and poetry? Does the writer use figurative speech? Is he using a logical argument?
7. Figure of Speech.
 - These are the following books to use for Figure of Speech.
 - I. **Glossary of Literary Terms by M. H. Abrams.**
 - II. **Figures of Speech used in the Bible by E. W. Bullinger.**
 - III. **Figure of Speech and exploration of used of idiomatic phrases in Conversation by Elizabet Jame Holt.**
 - IV. **Figures of Speech by Christina Alm Arvius.**
 - V. **Figures of Speech or Figures of Thought by Ananda Coomaraswamy.**
 - VI. **The Princeton Encyclopaedia of Poetry and Poetics by Roland Greene.**

8. Analysis of Propaganda

- **These are the following books to use for Review and Analysis of Propaganda:**

- I. All Art of Propaganda by George Orwell.**
- II. Computational Propaganda by Samuel Woolley.**
- III. Fake News, Propaganda and plain old lies by Donald Barclay.**
- IV. How Propaganda Works by Jason Stanley.**
- V. Propaganda and Persuasion by Garth Jowett.**
- VI. Media, persuasion and Propaganda by Marshall Soules.**
- VII. Primetime Propaganda by Ben Shapiro.**
- VIII. Propaganda Studies by Jonathan Auerbach.**

9. Emotional Tone: Is the writer angry? Sad? Happy? Worried? Excited? Depressed? Calm? How do you think his hearers must have felt when they received this writing? How does it make you feel?
10. Main Theme(s): What is the main theme? Is there more than one? What is the writer saying? What is his major emphasis?
11. Structure of the Book: Are there obvious divisions of thought in the book? How is the book organised? Around people? Events? Places? Ideas? Time spans?
12. Major People: Who are the principal personalities in the book? Which people are mentioned the most, and what parts do they play in the book?

Step 12-Analysis of Logic.

Step 13-Analysis of Grammar.

Step 14- Analysis of Genre.

- A. Open Figure Of Speech Folder. Use the Following Books for Analysis of Genre :

- Literary Device.
- FIGURES OF SPEECH - Biblical Research Journal.
- Figures of Speech.

Step 15- Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context

Step 16-Initial Survey

1. Read the entire book at one sitting to identify the theme (subject) of the book. Choose a title that summarises the theme. You will use this title on the Book Study Chart. This will also become the title of your outline.
2. Determine the purpose for which the book was written, to whom it was written, and the author.
3. Some books state the name of the author but for the names of others you will need to consult an outside Bible study resource.* Each author had a special reason for writing under the inspiration of the Holy Spirit. This purpose is usually reflected in the content of the book.
4. Determine the geographic setting of the book. This is where the events occurred. Record this on the Book Study Chart.
5. Summarise the basic life and ministry principle in one sentence. This is the basic truth of the book which is applicable to your life or ministry. There are many principles taught in a single book, but try to determine the most important for this summary statement. Remember, the chapter divisions in the Bible are not divinely inspired. They were made by man for ease in locating specific passages in the Bible. When you read the entire book without chapter divisions you are reviewing the message as it was originally given.
6. In this first reading do not be concerned with details. Survey the book for general information: Theme, author, purpose, to whom, geographic setting, and basic life and ministry principle. Read quickly to gain an overview of the entire book. Do not stop and analyze what you are reading. You will do that later.

Step 17-Book Study Chart

1. Read the book a second time. Note the major divisions of the book. These divisions may be determined by subject matter, events, biographical material, geographical settings, or other such factors.
2. Create titles for each chapter of the book. The chapter title should reflect the general content of a chapter but it should not be so general that it could fit any chapter of the Bible. Think of titles as handles with which to grasp the content of the chapter. Keep them short so they are easy to remember. Enter these chapter titles on the Book Study Chart.

3. Select the key verse of the book. The key verse should be one that best summarizes the purpose or content of the book. Enter the reference on the Book Study Chart. As you read, list the names of major characters in the space provided on the chart. This list will provide a selection from which to do biographical studies. You will learn how to do such studies later in this course.
4. Record key words and phrases on the chart. Key words and phrases are those basic to understanding the book. They are often repeated frequently or explained in detail in the book. You can use this list for word studies which you will learn how to do later in this course.

Step 18-Do Background Study

1. Find out the historical and geographical setting of the book. Into what background does the book fit? You can use the following questions to help you find some of the facts. Also use the ideas presented in the Book Background Method of Bible.
2. Study (chapter 8). Many of the answers may be found right in the book itself, so look there first. If you can't find the answers in the text alone, then check outside references (see Tools You Will Need earlier in this chapter).
 - What can I learn about the writer(s)?
 - When was the book written? (Date).
 - Where was the book written?
 - To whom was the book written? Who were they? Who was he? Who was she? (Find out about their historical and geographical backgrounds.).
 - Why was the book written? (Investigate the circumstances related to the writing.).
 - What other background information sheds light on this book?
 - What is the place of this book in the Bible? Is it a bridge between various periods of history?
 - What are the geographic locations mentioned in the book? Where are they? (Draw a map if it will be helpful to you.)

Step 19-Make Horizontal chart of the Book's Content

1. One of the exciting steps in doing a book survey is making a horizontal chart. This is a diagramed layout of a book's contents on one or two sheets of paper. The value of such a chart is that it enables you to lay out visually the book's contents and divisions. It gives you a new perspective of the book. The three parts to a simple horizontal chart are the major divisions of the book, chapter titles, and paragraph titles. Why make a horizontal chart? You gain several benefits in this study by making one.
 - It helps you summarise the main ideas and contents of a book.
 - It enables you to see the contents of an entire book at a glance.
 - It helps you discover the relationships between chapters and between paragraphs.
 - It makes you aware of ideas repeated in several places in the book.
 - It serves as a memory device to help you recall a chapter's content quickly.
 - It enables you to think through a book and remember it. Preparation for making a horizontal chart. You need three tools to make a simple horizontal chart:
 - A Bible with paragraph divisions. Many recent versions have divided the text into paragraphs to enable you to see the units of thought. You have to know these in order to make the chart.
 - A pencil (or pen) and a ruler.
 - A blank sheet of paper, preferably 8 x 11 in size. Try to fit your chart on one sheet of paper so you can see the entire structure of the book at a glance. When you are working on a long book (e.g., Isaiah, Genesis, Psalms), try to use as few sheets as possible. In using more than one sheet, be sure to use the same scale so you can match the sheets. How to make a horizontal chart. Go through the following four steps for each chart you make.
2. On a blank sheet of paper, make as many vertical columns as there are chapters in the book. For longer books, make the columns narrower and abbreviate what you write in them and use two or three sheets of paper as needed.
3. Read through the book again and find its major divisions. Record these divisions in as few words as possible at the top of your chart (see the Sample Filled-out Form).

4. Read through the book again and think of a title for each chapter (or group of chapters in a longer book). Record these at the top of each column directly below the major divisions. Irving Jensen has suggested five characteristics of good chapter titles (Independent Bible Study, Moody Press, p. 108).
 - Preferably use one word, not more than four.
 - Use picturesque words that help you visualise the contents.
 - Use words taken directly from the text if possible.
 - Use words that have not been used previously as chapter titles in your study of other books.
 - Use words that tell you where you are in the book.
5. Read through the book once more and do the same thing to all the paragraphs in your book. Try to relate the paragraph titles to the chapter title under which they fall. As you become proficient in this exercise, you may add things to your charts that personalise your study.

Step 20-Make Tentative Outline of Book

1. After you have summarized the contents of the book on a horizontal chart, you are ready to make a simple tentative outline of the book. Later on, in the Book Synthesis Method of Bible Study (chap. 11), you will make your final, detailed outline of the book. In the current method you should merely outline the high points of the book and show their relationship with one another. Here are some suggestions:
 2. Refer to your horizontal chart for ideas in outlining. Often your chart will readily show the natural organisation of the book's contents.
 3. Outline from the major to the minor. Look for major divisions of the book first, then the subdivisions (which could be the chapters themselves), and finally the important points that fall under the subdivisions (which could be the paragraphs). In longer books you may need to have further subpoints under these.
 4. Watch your paragraph divisions for clues in outlining. Since the paragraphs the basic unit of thought in writing, you can use the paragraph divisions as a guide in designing the outline of the chapter. Write a summary statement for each paragraph, then use those statements as the major points of your outline.
1. After you have done your own outlining, compare yours with as many other outlines as you can. Check the reference books available to you and compare your work with those writers. Don't be concerned if your outline does not match these exactly, for often there are many ways to outline a book. You will discover that even notable scholars disagree with each other.

Step 21-Select Chapter Title

1. Record on the Chapter Study Chart the name of the book and chapter number you are studying. Read the entire chapter and give it a title which reflects its content. (If you have done a book survey, you will have already selected a chapter title. Chapter Eleven on book study explains how to select chapter titles).

Step 22-Mark Paragraph Divisions

1. Mark the paragraph divisions within the chapter. In some Bibles the paragraphs are marked with a special paragraph mark (¶). In other Bibles they are marked with a boldface verse number. (Boldface means that the number is darker than the numbers in front of other verses.) If your Bible has neither paragraph marks or boldface markings then you must determine the paragraph divisions yourself. To do this you must know the definition of a paragraph: "A paragraph is a group of verses which relate to the same subject matter. When the subject changes, then a new paragraph has begun."
2. Mark the paragraph divisions in your Bible by drawing a circle around the verse number where each paragraph begins.

Step 23-Create Chapter Study Chart

1. On the Chapter Study Chart record the title of the chapter. List the verses of the paragraph divisions (see example). Then give each paragraph a title which reflects the content of that paragraph. Use the column with the heading "Notes" to record your thoughts about the relation between parts of the chapter (see example). These notes will assist you in creating the chapter outline.

Step 24-Write out Chapter Summary

1. You begin this step by reading and rereading the chapter many times. All you are doing here is making general observations on the chapter as a whole. After you have read it through several times, describe the general contents in one of the ways about to be described. Do not try to interpret what you see at this time, but merely aim to become familiar with the chapter. You may summarize it in one of the following ways:
2. Paraphrase it. The simplest way is just to rephrase the chapter in your own words. Summarize it in such a way that you could read your paraphrase to

another person. You can check some recent paraphrase versions of the Bible for examples of this.

3. Outline it. Another simple way to summarize is through an outline that follows the paragraph divisions of the chapter. Give a title to each paragraph, then place some subpoints under each one.
4. Rewrite it without the modifying clauses and phrases. Use just the subjects, verbs, and objects in your summary. This is a great way to summarize some of Paul's writings, for example, where run-on sentences (especially in the King James Version) are hard to understand because of their complexity. After you have completed your chapter summary, give a title to the chapter, using either your title from the book survey or a new one that occurred to you during this study.

Step 25-List Your Observations

1. This step begins the verse-by-verse analysis of the chapter. You start with the activity of observation. In this step you are looking in detail at every sentence and word and then writing down everything you see. You are trying to answer the question, "What does it say?" Before you can begin to interpret the meaning of a verse or passage, you must first look at what it actually says. The purpose of observation is to saturate yourself completely with the contents of a Bible passage. The mark of good Bible students is that they have trained themselves to observe things in the text that others overlook.
2. Overlooking biblical facts — reasons why. There are three reasons why we often overlook things and miss so much in the biblical text: (1) We rush through a passage too quickly. So we need to slow down and not indulge in speed-reading.
3. (2) We don't write down our observations. Louis Agassiz, a 19th-century professor of zoology at Harvard who taught his students the art of observation, used to say, "A pencil is the best eye." We need to write down what we see, and then we will begin seeing more. (3) We give up too soon. The longer we squeeze a lemon, the more juice we get out of it — to a point. But unlike lemons, the Bible never goes dry. We can study a text a hundred times and never exhaust the riches that are in it. So we shouldn't give up too soon; rather, we should keep on looking — the longer the better.

4. Asking questions. As has already been discussed, the secret of good Bible study is learning to ask the right questions (see the Introduction at the beginning of this book). The number of questions you can ask of a text of Scripture increases in proportion to your willingness to stick with it. As you continue growing in Bible study skills, the type and number of questions you ask will improve and you will be able to observe more and more. The key to good observations, then, is a combination of diligence, patience, asking many questions, and writing down everything you see.
5. To help you in your observations, appendix F lists 30 ideas from which you can select the ones that will suit your study.

Step 26-Ask Interpretation Questions

1. After observing all you can in the passage under study, you are ready to move on to interpretation. This step involves asking questions about meaning, then trying to find answers to them. In this exercise you discover the biblical writer's purpose and message by uncovering what he means by his idea. Interpretive questions include asking what or why. Some examples:
 - Why did the writer say this?
 - What is the meaning of?
 - What is the significance of?
 - What is the implication of?
 - Why is this important?
2. You should be able to think of many other interpretive questions to ask. Never think that any question is too silly or dumb. Always write every question down on your form even though you may not find an answer to it. Later on, in studying another chapter, you may be able to answer it; if so, come back to this chapter's form and fill in the answer. Remember that the more questions you ask, the more you will draw out of the text.
3. Listing difficulties. When you are writing down your questions, it is a good idea to include any difficulties you have in understanding what is being said. Two common types are personal difficulties — questions you would like answered in the future, or items for future study, and possible difficulties — matters that don't bother you at this time, but would be good to study so you can help others who might be bothered by them.

4. Finding the right meaning of the text. After you have listed all your questions of interpretation, you need to start finding some answers. There are several ways to do this.
5. Check the context. You should always start here, for often the answers to your questions will be found in the verses preceding or following the text. Always interpret a passage in light of its context. To review the context, you may have to go back to your observations or your book survey to answer these questions:
 - Who is speaking?
 - Who is being spoken to?
 - When is it being spoken?
 - Where is it being spoken?
 - What is the occasion or circumstance?
 - What is the main subject of the message?
 - Is the aim of what is being said revealed?
 - What other background material clarifies this statement?
6. You can avoid a great deal of misinterpretation by first checking out the context of a verse.
7. Define the words and phrases used. You must interpret your text according to the correct and proper meaning of the words. Look up the important words in a Bible dictionary, word study set, or English dictionary.
8. Study the grammar and structure of the sentences. Sometimes a problem of interpretation can be cleared up by diagramming a sentence or by understanding what grammatical usage the writer intended in the paragraph. Compare several translations of the text. Use different recent versions of the Bible to see how the various translators rendered a particular word, phrase, or paragraph.
9. Study the background of the text. Interpret your text in light of the historical, cultural, geographic, economic, social, and political backgrounds of the book, including the current events of that time. This shows you the value of doing a book survey study before attempting a chapter analysis study. Use your reference tools to check on the background, the writer's purpose in writing the book, and other pertinent factors.

10. Compare your text with other passages of Scripture. This next step — correlation— will give you some answers to interpretive questions as you compare Scripture with Scripture.
11. Consult a commentary as a last resort. If you have tried diligently to find the meaning of the text yourself and your cross-references have not helped you, consult the works of great Bible scholars. There is a place for commentaries in Bible study, but it comes only after you have done your own work. Compare your interpretation with the writings of devout Christians and see if yours agrees with theirs. If you have a correct interpretation, you may be sure God has shown it to some other sincere Bible students in the past. If you can't find anyone who agrees with you, you have probably got a wrong interpretation.
12. Ask the six vital observation questions: What? Why? When? How? Where? Who?
13. Look for key words.
14. Look for repeated words and phrases.
15. Look for questions being asked.
16. Look for answers being given.
17. Look for commands.
18. Look for warnings.
19. Look for comparisons — things that are alike.
20. Look for contrasts — things that are different.
21. Look for illustrations.
22. Look for causes and effects and reasons for doing things.
23. Look for promises and their conditions for fulfilment.
24. Look for progression from the general to the specific.
25. Look for progression from the specific to the general.
26. Look for steps of progression in a narrative or biography.
27. Look for lists of things.
28. Look for results.
29. Look for advice, admonitions, and attitudes.
30. Look for the tone of the passage — emotional atmosphere.
31. Look for connectives, articles, and prepositions.
32. Look for explanations.
33. Look for Old Testament quotes in the New Testament.
34. Look for the literary form.

35. Look for paradoxes.
36. Look for emphasis through the use of space — proportion.
37. Look for planned exaggerations or hyperboles.
38. Look at the grammatical construction of each sentence.
39. Look for the use of the current events of the times.
40. Look for the force of the verbs.
41. Look for anything unusual or unexpected.

Step 27-Correlate Your Chapter with Other Scriptures

1. This step involves finding cross-references for the verses of your chapter in order to further explain the meaning of the text. It is based on the principle of interpretation that says, “The Bible interprets itself; Scripture best explains Scripture.” You can often interpret passages that are not clear by passages that are. Ask yourself, “How do other Scriptures relate to and explain this one?” Steps in cross-referencing. Here are some practical ways to correlate verses:
2. First, look for cross-references within the same book you are studying. This is internal correlation.
3. Second, compare statements in other writings by the same author. This is external correlation.
4. Then, compare with other books in the same testament.
5. Finally, compare references in all of Scripture. You can find cross-references in a study Bible or reference Bible or by looking up similar words in a concordance. Types of cross-references. There are several different types of cross-references, including the following:
 - The pure cross-reference. This is sometimes called the parallel cross reference because it says almost exactly the same thing as the verse you are analyzing.
 - The illustrative cross-reference. This type, which may involve a real event or person in history, illustrates what the verse you are studying is saying.
 - The contrasting cross-reference. This type says the opposite of what your verse says. It may look like a contradiction, but it is actually approaching the subject from a different viewpoint. One word of caution: Be sure to check the context of the verses you choose as cross-

references. Otherwise you may be making them say what the writer did not say.

Step 28-List Some Possible Applications

1. The last part of the verse-by-verse analysis is to write down some possible applications. Remember that your goal in Bible study is not just interpretation but application. Because of the many applications a chapter may have, you will only be listing them here. Later on, in Step Seven, you will choose one of these to write out and to work on for a week. You have already seen that you cannot work on more than one application per week. It is better to record just one and fully apply that truth to your life than to write down several applications and then fail to implement any of them.

Step 29-Write Down Some Concluding Thoughts

1. Go back over the results of the first five steps, review them carefully, and write down some concluding thoughts on the chapter. These can include additional observations, some of your interpretations, themes you have discovered, possible topics and people you want to study in the future, words you may want to do a word study on, and any number of other thoughts that come to mind.

Step 30-Observe the Details

1. The paragraphs in a chapter can relate to each other in different ways. Here are some special things to observe as you study paragraphs:
2. Connectives: Words called "connectives" are very important. They reveal relationships within and between paragraphs. The word "but" is a connective and introduces a contrast. For example: But these speak evil of those things which they know not; But what they know naturally, as brute beasts, in those things they corrupt themselves. (Jude 1:10).
3. There is a contrast in this paragraph. False teachers speak evil of things they do not know BUT they also corrupt the things they do know. The verse begins with the word "but" which should make you look back to verse 9 to see what the contrast is: Yet Michael the archangel, when contending with the devil he disputed about the body of Moses, durst not bring against him a railing accusation, but said, The Lord rebuke thee. (Jude 1:9) Verse 10 contrasts false teachers who speak evil of dignities with the archangel Michael. Even though he held a great position, he did not accuse the devil but said "The Lord rebuke thee." The connective word "or" indicates a contrast. For example: For God shall bring every work into judgment, with every secret thing, whether it be good OR whether it be evil. (Ecclesiastes 12:14) Other connective words to watch for are "like" and "as." Instead of a contrast these words show comparisons between things. For example in the following verse Satan is compared to a lion: . . . the Devil AS a roaring lion, walketh about, seeking whom he may devour. (I Peter 5:8) The word "and" is another connective. It adds to what has just been stated: Like wise also these filthy dreamers defile the flesh, despise dominion, AND speak evil of dignities. (Jude 1:8) The word "if" introduces a conditional statement. Many of the promises and prophecies of the Old Testament are stated this way. They tell what God will do IF (on the condition that) His people make a certain response: IF my people, which are called by my name, shall humble themselves, and pray, and seek my face, and turn from their wicked ways, then will I hear from Heaven and will forgive their sin, and will heal their land. (II Chronicles 7:14) The word "that" sets forth a purpose. It tells that something happened "in order that" a certain purpose would be accomplished: And He came and dwelleth in a city called Nazareth; THAT it might be fulfilled which was spoken by the prophets, He shall be called a Nazarene. (Matthew 2:23) Watch also for the connecting words "for,

because, therefore." These words introduce reasons and results: But when He saw the multitudes, He was moved with compassion on them, BECAUSE they fainted, and were scattered abroad, as sheep having no shepherd. (Matthew 9:36) The words "in, into, and with" are also important connectives. They also indicate relationships between concepts: He turned the sea INTO dry land and they went through the flood on foot: there did we rejoice in Him. (Psalm 66:6).

4. General Structure: As you study paragraphs observe the arrangement of ideas and how the verses relate to each other. Sometimes the author makes a general statement, then explains it with examples. Other times he lists a series of ideas and then summarizes with a general statement. In the example given later in this chapter, you will note that Jude wrote several paragraphs listing characteristics of false teachers. He then gave Old Testament examples which illustrated what he was teaching.
5. Repetitions: Each word of the Bible is inspired by the Holy Spirit. When words or phrases are repeated it is because they are especially important. The Holy Spirit inspired the writers to repeat words and phrases in order to fix them in your memory. The words "verily, verily" are an example of this. When Jesus preceded a statement with these words it was like an announcer saying "May I have your attention please. I have an important announcement to make." Study in detail any words, phrases, or verses that are repeated.
6. Questions And Answers: It is also important to observe the questions and answers of the Bible. Often an author will introduce a subject by asking a question. He will then explain this question and give answers which relate back to the question. A good example of this is Romans 6. Read the entire chapter. Note the questions in verses 1-3 and the answers developed throughout the chapter.
7. Introductions: Watch for paragraphs that introduce the subject that is to follow. For example, in the book of Jude which you studied in the last chapter verse 3 introduces the material to follow: Beloved, when I gave all diligence to write unto you of the common salvation, it was needful for me to write unto you, and exhort you, that ye should earnestly contend for the faith which was once delivered unto the saints. (Jude 1:3) This introductory paragraph explains the purpose of his writing. He is exhorting them to earnestly contend for the true faith. The remainder of the chapter gives reasons for this exhortation. There

are false teachers creeping into the church who are trying to turn them from the true faith.

8. **Summaries And Conclusions:** Be alert for paragraphs that summarize an entire passage, chapter, or even a book. For example, the book of Ecclesiastes contains one verse which summarizes the whole book. In Ecclesiastes the writer has described his quest for life apart from God. His final conclusion is: Let us hear the conclusion of the whole matter: Fear God, and keep His commandments: for this is the whole duty of man. For God shall bring every work into judgment, with every secret thing, whether it be good, or whether it be evil. (Ecclesiastes 12:13-14).
9. **Progressions In Thought:** When studying paragraphs, watch for progressions in thought. Note the following paragraph: And beside this, giving all diligence, add to your faith virtue; and to virtue knowledge; And to knowledge temperance; and to temperance patience; and to patience godliness; And to godliness brotherly kindness; and to brotherly kindness charity. For if these things be in you and abound, they make you that ye shall neither be barren or unfruitful in the knowledge of our Lord Jesus Christ. But he that lacketh these things is blind, and cannot see afar off, and hath forgotten that he was purged from his old sins. (II Peter 1:5-9) There is definite progression in this passage. We are to add one thing to another until we become fruitful.
10. **Literary Form:** Literary form refers to how a passage is written. Some passages are in narrative or story form. This means they read like a story. Other paragraphs are in poetic form (poems) like the passages in the book of Psalms. Some paragraphs are parables which are short stories illustrating a spiritual truth. Some paragraphs are in dramatic form. For example, the Song of Solomon contains dramatic as well as poetic form. Discourse form is much like a sermon. It is a series of paragraphs giving instruction on a certain subject.
11. **Key Words:** Identifying key words will help you understand the meaning of a paragraph. Key words are those important to the meaning of a paragraph. Often they are words which are repeated. Especially note key words which you do not understand. These words can be studied in a word study. (You will learn how to do this later in this course). For example, read the following verse: For there are certain men crept in unawares, who were before of old ordained to this condemnation, ungodly men, turning the grace of our God into

lasciviousness, and denying the only Lord God and our Lord Jesus Christ. (Jude 1:4) Do you know what the word "lasciviousness" means? It is an important word in this paragraph because it describes false teachers. One of their characteristics is that they have turned the grace of God into lasciviousness. This word is an example of a key word to study.

12. Grammatical Construction: The word "grammar" refers to parts of speech or words that fit together to make up sentences and paragraphs. Watch for words which are called verbs. These are words that show action telling what someone did in the past, is doing in the present, or will do in the future. They also are used in commands: GO ye into all the world and PREACH the Gospel to every creature. (Mark 16:15) The words "go" and "preach" are action words. They are verbs. They are commands for us to obey. A noun is a word that names a person, place, or thing. The words in capitals below are nouns: JUDE, the servant of JESUS CHRIST, and brother of JAMES... (Jude 1:1) Nouns tell who and what is involved and where the action took place. A pronoun is a word that replaces or stands for a noun. The words "him" and "her" are examples. Instead of saying "The Holy Spirit inspired Jude to write the book" you could say "The Holy Spirit inspired HIM to write the book." The word "him" is a pronoun standing for the noun Jude.

13. Adjectives and adverbs are important parts of speech also. Adverbs tell something about a verb. It tells how something happened. For example, in the sentence "He ran quickly," the word "quickly" is an adverb because it tells how he ran. An adjective describes a noun or pronoun. If we said "Jude was tall," the word "tall" is an adjective which describes Jude. If you have not studied parts of speech before this may seem confusing at first, but you will soon learn to identify these as you practice. Parts of speech are important because they identify people, places, and things. They tell who did something, where, when, and why. They tell how things were done and what was, is, or will be done. They also provide descriptions and details which increase understanding of the subject matter.

Step 31 Create Paragraph Study Chart

1. By studying paragraphs in detail as described in Step Two, you will identify certain paragraphs that relate to each other. Their relationship may be contrasts, comparisons, progressions, or otherwise. Select these for paragraph study. You will create a chart to summarise your study of these paragraphs. Select a general title for your chart which reflects the relationship of the paragraphs or the subject which they concern. The chart will also include the paragraph titles and divisions made during the chapter study.
2. Record on the chart the book, chapter, and paragraphs studied. Use margins of the chart to make observations and applications.

Step 32 Create Paragraph Outline

1. Use the chart to help you create an outline of the paragraphs. The outlines you create on chapters and paragraphs will help you as you share God's truth with others because they help you present what you have learned in an orderly way.

Step 33-Write Out a Personal Paraphrase

1. Write out the verse in your own words. Do not use one of the modern paraphrases except to get the idea of how to do it. Stay true to the verse you are paraphrasing, and try to condense rather than expand it.

Step 34-List some Questions, Answers and Observations

1. In column 3 of the Chapter Analysis Form at the end of this chapter, list any questions you have relating to words, phrases, persons, topics, and doctrines in that verse. Write down any answers you can find and also record any observations you have. Mark these as follows:
 - Q = Question.
 - A = Answer.
 - O = Observations.

Step 35-Find Some Cross References for Each Verse

1. Using the cross-references from your study Bible or from Scripture memory, write down some cross-references (at least one) for the verse you are studying. Identify the word or phrase you are cross-referencing at the end of this chapter. Use a concordance if you do not have a cross-referenced Bible.

Step 36-Record any insights you get from each verse

1. Having thought through the words, phrases, and concepts in the verse, record any insights that you get from them. These could be further observations, words and names that you have looked up and defined, or any other thought that comes to you. Let your imagination go and be as creative as you can in this fifth column, called Personal Application, in the form at the end of this chapter.

Step 37-Write down a brief personal application for each verse

1. Because of the number of verses in your study, you will not be able to design an application project for each verse. Instead, just try to record some devotional thoughts that come to you from each verse. Later, in a devotional Bible study, you can pick one of the thoughts and plan to work on it. Or, if a particular verse seems to meet an immediate need, go ahead and write out an application that is possible, practical, personal, and measurable.

Step 38-Reread the Book

1. Reread the book several times. Read it at one sitting, in a recent translation, rapidly, repeatedly, prayerfully, without referring to commentaries, and with pen or pencil in hand.

Step 39-Write Out a detailed, final outline

1. Compare the horizontal chart and tentative outline you created in your book survey with the passage summaries you created in your chapter analysis studies. Based on this comparison and your recent readings, write out a detailed, final outline of the book. Merrill Tenney gives an excellent example in his book on Bible study methods.

Step 40-Write down a descriptive Book Title

1. From your horizontal chart in the book survey and your detailed, final outline in Step Two, write down a descriptive title for the book you have just studied. Think up an original title that describes in a few words what the book is all about. You might also consult your chapter titles and form a synthesis of them.

Step 41-Make summary of your insights

1. Review and compare the concluding thoughts in each of your chapter analysis studies and summarise what you believe are the major themes and conclusions of the book. Do not refer to commentaries at this point, for these should be your own insights into God's Word. These insights could also include observations gained from your new readings.

Step 42-What Further Analysis or Research I Need To Do, Next Time?

Method 18-How To Understand and Apply

HERMENEUTICS

Step 1. Open Hermeneutic Folder. Decide, Which Of the Following Hermeneutics Books I will Use For Analysis Biblical Text.

- Listen, Follow and Apply Every Step of the Book How To Understand and Apply The New Testament By Andrew David Naselli.
- Listen, Follow and Apply Every Step of BIBLICAL HERMENEUTICS By Milton Terry.
- Listen, Follow and Apply Every Step of Introduction To Biblical Interpretation by William W Klein.
- Listen, Follow and Apply Every Step of Introduction To Biblical Hermeneutics by Walter C Kaiser Jr.

Step 2. Follow Each Step of the Book.

Step 3-Analysis of Logic.

Step 4-Analysis of Grammar.

Step 5- Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

Step 6- Analysis of Genre.

A. Open Figure Of Speech Folder. Use the Following Books for Analysis of Genre :

- Literary Device.
- FIGURES OF SPEECH - Biblical Research Journal.
- Figures of Speech.

Step 7- Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context

Step 8- Facts within The Context.

Step 9- Do the Fact Checking. Checking Facts, If they are correct or incorrect.

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:
- Wikipedia
 - E-book
 - Books about autobiography and Biography
 - Websites
 - University
 - Books
 - Audiobooks
 - Handbooks
 - Dictionary
 - Cross References
 - Atlas
 - Commentaries
 - Articles
 - Journals
 - Newspapers
 - Websites
 - Harvard business review

- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time

- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education

- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

C. Do full fact checking of the facts the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

D. Do full fact checking of the figures the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

E. Do full fact checking of the statistics the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

F. Do full fact checking of the formulas the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

G. Do full fact checking of the mathematical results the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

H. Do full fact checking of the evidences the author provided.

- Are The Facts Provided are Trustworthy?

- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

Step 10-Rhetorical Analysis Of The Text

- A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:
 - Rhetoric By Aristotle.
 - A Companion to Rhetoric and Rhetorical Criticism.
 - Ancient Rhetoric From Aristotle to Philostratus.
 - Ancient Rhetoric For Contemporary Students by Sharon Crowley.
 - Art Of Rhetoric By Aristotle.
 - Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
 - Encyclopaedia of Rhetoric.
 - On Rhetoric: Theory of Civic Discourse by Aristotle.
 - Politics and Rhetoric: The Persuasive Power of Metaphor.
 - Rhetoric By Jennifer Richards.
 - Rhetoric In Details By John Benjamins.
 - Rhetorical Grammar By Martha Kolln.
 - Sourcebook on Rhetoric By James Jasinski.
 - The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
 - The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
 - The Rhetoric of Reason By James Crosswhite.
 - Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
 - Writing Arguments: a RHETORIC With Reading by John Ramage.
- B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

Method 19 - Theological Group of Principles.

Step 1. Decide, Which Of the Following Theological Group of Principle or Sub-divided Context Mention Principles:

Theological Group of Principles:

1. The **Historical-grammatical** principle based on historical, socio-political, geographical, cultural and linguistic / grammatical context
2. Alternate, mutually exclusive, models of history:
 - A. The **Dispensational model** or The **Chronometrical Principle**: "During different periods of time, God has chosen to deal in a particular way with man in respect to sin and man's responsibility."
 - B. The **Covenantal model**: "We differentiate between the various contracts that God has made with his people; specifically their provisions, their parties and their purposes."
 - C. The **New-Covenantal** model: The Old Testament Laws have been fulfilled and abrogated or cancelled with Christ's death, and replaced with the Law of Christ of the New Covenant, although many of the Old Covenant laws are reinstitute under the New Covenant.
3. The **Ethnic Division Principle**: "The word of truth is rightly divided in relation to the three classes which it treats, i.e. Jews, **Gentiles** and the Church."
4. The **Breach Principle**: Interpretation of a certain verse or passage in Scripture is aided by a consideration of certain breaches, either breaches of promise or breaches of time.
5. The **Christo-Centric Principle**: "The mind of deity is eternally centered in Christ. All angelic thought and ministry are centered in Christ. All Satanic hatred and subtlety are centered at Christ. All human hopes are, and human occupations should be, centered in Christ. The whole material universe in creation is centered in Christ. The entire written word is centered in Christ."

6. The Moral Principle

7. The **Discriminational Principle**: "We should divide the word of truth so as to make a distinction where God makes a difference."

8. The Predictive Principle

9. The **Application Principle**: "An application of truth may be made only after the correct interpretation has been made"

10. The Principle of Human Willingness in Illumination

11. The **Context Principle**: "God gives light upon a subject through either near or remote passages bearing upon the same subject."

Sub-divided Context/Mention Principles:

1. The **First Mention Principle**: "God indicates in the first mention of a subject the truth with which that subject stands connected in the mind of God."

2. The **Progressive Mention Principle**: "God makes the revelation of any given truth increasingly clear as the word proceeds to its consummation."

3. The Comparative Mention Principle

4. The **Full Mention Principle** or The **Complete Mention Principle**: "God declares his full mind upon any subject vital to our spiritual life."

5. The **Agreement Principle**: "The truthfulness and faithfulness of God become the guarantee that he will not set forth any passage in his word that contradicts any other passage."

6. The **Direct Statement Principle**: "God says what he means and means what he says."

7. The **Gap Principle**: "God, in the Jewish Scriptures, ignores certain periods of time, leaping over them without comment."

8. The **Threefold Principle**: "The word of God sets forth the truths of salvation in a three-fold way: past - justification; present - sanctification/transformation; future - glorification/consummation."

9. The **Repetition Principle**: "God repeats some truth or subject already given, generally with the addition of details not before given."

10. The Synthetic Principle

11. The Principle of Illustrative Mention

12. The Double Reference Principle

Step 2. Decide the List of References of The Bible Text which would be appropriate For Analysis Specific Theological Group of Principle or Sub-divided Context Mention Principles

Step 3-Analysis of Logic.

Step 4-Analysis of Grammar.

Step 5- Analysis of Genre.

Step 6- Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?

Step 7-What Are The Facts Within Context?

Step 8-Implication.

- What are implication of this?

Step 9-What Further Analysis or Research I Need To Do, Next Time?

Step 10-Write out a Personal Application.

1. Application is when you personally apply to your life and ministry the truths you have learned.
2. Example to Follow.
3. Error to Avoid.
4. Duty to Perform.
5. Promise to claim.
6. Relationship to develop.
7. Changes to make.
8. Prayer to pray.
9. Did I see anything of myself in this person's life?
10. Did he show some of my weaknesses?
11. Did he reveal to me some of my strengths?
12. What impressed me most about this person's life?
13. Where do I fall short in this area?
14. What do I intend to do about it?
15. What were the positive character traits? Ask God to help you develop them in your own life.
16. What were the negative character traits? Do you see any of these in your own life? Ask God to help you overcome them.

17. Compose one sentence which summarizes the greatest truth you learned from this life. For example, a statement about the life of Sampson might be "Spiritual compromise results in failure."

Step 11-Meditate on Verse you have chosen to study

1. Meditate means think and dwell and ponder.
2. Select a bible portion to study, identify its subject and key verse and summarise its teaching, then meditate on passage.
3. Recall passage which is the most important in the portion of the text.

Method 20-How To Read A Book, Compact Literature and Literature of Composition

Step 1. Decide, Which Of the Following How To Read A Book By Mortimer Adler Editions and Compact of Literature and Literature of Composition I will Use For Analysis, Reading, Syntopicon, Research and Investigation and Investigative Journalism.

- **How To Read A Book: The Classical Guide To Intelligent Reading by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: Revised and Updated by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: The Art Of Getting A Liberal Education 1940 Edition by Mortimer Adler**
- **How To Read A Book: The Art Of Getting A Liberal Education 1972 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book:A Guide To Reading The Great Books 1966 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: The Classical Guide To Intelligent Reading 1972 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book1972 Edition by Mortimer Adler and Charles Van Doren.**
- **Compact of Literature.**
- **Literature of Composition.**

Step 2. Listen How to Read A Book or Compact of Literature and Literature of Composition of Your Choice, then follow and apply each Steps in Reading the Book or Text You are Analysing.

*Step 32 - Decide The Rules of Reading For
More In-depth Analysis, Syntopicon,
Research, Investigative Journalism or Mixed
Method. Use These Methods To Do Very
DEEP Analysis of the Text or Topic
Than Previous Methods.*

1. Decide The Rules of Reading For Deep Work, Shallow Work, Bible Study, Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method.

A. Practical-Mortimer Adler book how to read a book type of process

I. Method 21-How To Read A Book By Mortimer Adler Various Editions.

II. Method 22-How To Read A Book For Various Books.

- First Level of Reading
- Second Level Reading
- Third Level of Reading
- Aids to Reading
- How To Read Practical and Theoretical Books
- How To Read Imaginative Literature
- Reading Stories
- Reading Plays
- Reading Poems and Poetry
- How To Read History
- How To Read Biography

- How To Read Autobiography
- How To Read About Current Events
- How To Read Science and Mathematics
- How To Read Philosophy
- How To Read Theology
- How To Read Social Science
- Fourth Level of Reading: Syntopical Reading

B. For Syntopicon, Research- Advanced

- I. Method 23- Syntopicon.
- II. Method 24-The Craft of Research
- III. Method 25-Research Books can Be Used.

C. For Investigative Journalism- Advanced

- I. Method 26-Journalism: New Challenges

D. Mixed Method- Advanced

- I. Method 27-Mixed Methods of Rules of Reading

Step 33-How Many Pages Read A Day.

1. Step 1-How Many Pages Read A Day.

- I. Read no more than 2-25 pages a day, and do The Work Required to Have an Opinion on Any Topic and Anything.
- II. The ideal is not merely to read or Listen faster, but to read or Listen at different speeds, and to know when the different speeds are appropriate.

Step 34 - Do Not Speed Read.

1. Do Not Speed Read.

- I. **Don't fool yourself.** While reading is the key to getting smarter, speed reading is just a fancy way of fooling yourself into thinking you're learning something. In reality Speed reading is just turning pages quickly.
- II. **Reading fast is not thinking.** If you're reading fast you're not thinking and challenging what you're reading. You're not being critical. You're not making connections with existing knowledge. You're not arguing with the author. You're not reading something at the edge of your cognitive ability. All of that is work. And if you're not doing the work, you're only walking away with surface knowledge. Reading is mentally demanding.
- III. **Reading fast is worse than not reading.** Reading fast gives you two things that should never mix: surface knowledge and overconfidence. And that's a recipe for really bad decisions. Bad decisions reduce the free time we have. After all, we have to run around fixing all of these mistakes.
- IV. **Visible costs get attention, invisible ones don't.** Most people choose the path of low upfront visible costs and high visible costs later. If you're willing to incur the cost of reading correctly and appropriately (it takes more time than speed reading), you get a massive benefit later. If you speed-read, you're incurring invisible costs that show up later in your lack of real understanding. Ignorance is more expensive than investing the time necessary to get smarter.
- V. **There's a better solution, anyways.** Learning what a good book really looks like, and learning how to skip the bad ones, is a far more robust time saver than speed-reading. Hope your radar for a great book, be a little ruthless about culling and quitting the weak. Don't waste time reading.
- VI. **Most people want to create the impression they read.** That they have unique insights. That they know what they're talking about. In the end however, when it comes to doing the work, they walk away. That's why there is so much value in reading. Do the work.
- VII. **Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process Of Reading.**

Step 35-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

Step 36-Isolating Myself For Deep Study, Deep Work AND Decide The Study or Work Philosophy

1. Listen and Apply Book on Deep Book and Power of Habits.

- I. 7 Habits of Highly Effective Families.
- II. Atomic Habit by James Clear.
- III. Deep Work by Cal Newport.
- IV. The Power of Habit_ Why We Do What We Do in Life and Business.
- V. The Ultimate Focus Strategy_ How to Set the Right Goals, Develop Powerful Focus, Stick to the Process, and Achieve Success.
- VI. Tools of Titans by Tim ferris.

2. Create Physical and Mental Space For Isolated Work.

- I. Collaboration doesn't just happen online or over digital tools. And while most knowledge workers spend their days in **open offices** designed to create more interaction and collaboration. In reality, they rarely do that. Rather than increase our face-to-face interactions, open offices have been found to decrease them by up to 70%.
- II. If you **work at home** or remotely, you're not completely safe from this issue either. Yes, you need a physical space **devoid of distractions** to do focused work. But you also need to create mental space as well. This means getting over the feeling of needing to "catch up" and always be around on Slack and IM.
- III. To stay "bursty" try to only check in at specific times. That way your team knows when you're available and you can schedule your deep work around those periods.
- IV. To be the best collaborator possible, you need to balance between being around and being heads down. And according to the research, there are few better ways to do that then bringing a bit of "burstiness" into your day.

3. Power of Intermittent Isolation For Deep Study and Deep Work.

- I. We're actually more productive, efficient, and creative when we follow the lead of the ants and work "intermittently" rather than trying to be "always on." Especially when it comes to complex problem-solving.
- II. The isolated time helps to come up with the most creative ideas, and then came together as a group to explain, learn from each other, and narrow in on the highest-quality ones to present, I am working In the group.
- III. **We all do better work when we have time for both collaboration and private creative thinking.**
- IV. Constant communication—especially over tools like Slack and instant messengers—actually decrease both our productivity and **creativity**.
- V. Researchers looking at the productivity of remote teams found that those who practiced a "bursty" style of communication—rapid periods of collaboration followed by long periods of silence—were the most successful.
- VI. "During a rapid-fire burst of communication, team members can get input necessary for their work and develop ideas. Conversely, during longer periods of silence everyone is presumably hard at work acting upon the ideas that were exchanged in the communication burst."

4. Decide and Write Study Philosophy I Will Use For Today.

- I. **Monastic Philosophy.** The monastic philosophy involves cutting out all shallow activities to focus on deep work. This is a rather radical approach that focuses entirely on deep work and nothing else for weeks or months on end.
- II. **Bimodal Philosophy.** The bimodal philosophy involves splitting your schedule based on the amount of work. This would look like an individual spending at least a day or weeks on deep work, and once that is completed, the individual will focus on only shallow work. If you do this approach on a weekly basis, you could try to do all your deep work during weekdays, and your shallow work such as responding to emails, using social media, etc. on the weekends.
- III. **Rhythmic Philosophy.** The rhythmic strategy involves doing deep work as a daily habit. While the time of day you do your deep work each day doesn't matter, it's essential that if you choose this strategy, you stick with it. Time blocking certain hours, about 1 to 4 hours each day, to complete your deep work tasks is key. For example, Time blocking from 12 P.M. to 4 P.M. to do all your deep work tasks.

IV. Journalistic Philosophy. Journalistic strategy involves trying to do deep work whenever it fits into your schedule. This is extremely difficult to do. This is because constantly switching from deep to shallow work efficiently is hard and oftentimes only works for those who are more experienced with deep work.

Step 37-The Power of Concentration

- I. Listen and Apply the following book-*The Ultimate Focus Strategy_ How to Set the Right Goals, Develop Powerful Focus, Stick to the Process, and Achieve Success.*
- II. The core of mindfulness is the ability to pay attention. That's exactly what Holmes does when he taps together the tips of his fingers, or exhales a fine cloud of smoke. He is centering his attention on a single element. And somehow, despite the seeming pause in activity, he emerges, time and time again, far ahead of his energetic colleagues.
- III. That's the thing about mindfulness. It seems to slow you down, but it actually gives you the resources you need to speed up your thinking.
- IV. All of humanity's problems stem from man's inability to sit quietly in a room alone."
- V. Step In Concentration
 - A. Eliminate distractions. How do we focus better if we are always bombarded with information? Make a practice to block time in your schedule to do a specific task or activity. During this time, request that you be left alone or go to a place where others are unlikely to disturb you: a library, a coffee shop, a private room.

Close social media and other apps, silence notifications, and keep your phone hidden from sight in a bag or backpack. As described in HBR, researchers found that cognitive capacity was significantly better when the phone was out of sight, not just turned off. Keep Your primary focus is to complete what you need to do. Shutting off both internal and external disturbances can help you to concentrate.
 - B. Reduce multitasking. Attempting to perform multiple activities at the same time makes us *feel* productive. It's also a recipe for lower focus, poor concentration, and lower productivity. And lower productivity can lead to burnout. Examples of multitasking include listening to a podcast while responding to an email or talking to someone over the phone while writing your report. Such multitasking not only hampers your ability to focus but compromises your work quality.

- C. Practice mindfulness and meditation. Meditating or practicing mindfulness activities can strengthen well-being and mental fitness and improve focus. During the meditation process, our brain becomes calmer and our whole body becomes more relaxed. We focus on our breath during the process so that we will not be distracted by our minds. With practice, we can learn to use our breath to bring our attention back to a particular task so that it can be done well even if we get interrupted. Steps in Mindfulness
- A. Step 1: Breathe In Deeply, And Breathe Out Slowly, Letting Yourself Relax.
 - B. Step 2: Gently Ask Your Mind To Keep Aside All Your Worries And Concerns.
 - C. Step 3: Bring More Awareness Into Breathing, Feeling It With Your Senses.
 - D. Step 4: Start Counting Your Breaths Slowly. Bring Your Mind Back If It Wanders.
 - E. Step 5: Get Immersed In The Present, Losing Consciousness Of Your Surroundings.
 - F. Step 6: Accept The Thoughts And Emotions Moving Across Your Mind Just As They Are.
- G. Get more sleep. Many factors affect your sleep. One of the most common is reading from an electronic device like a computer, phone, or tablet or watching your favorite movie or TV show on an LED TV just before bedtime. Research has shown that such devices emit light towards the blue end of the spectrum. Such light will stimulate your eye retina and prevent the secretion of melatonin that promotes sleep anticipation in the brain. Use a filter or "blue light" glasses to minimize such blue light or avoid all electronic devices before bed. Other ways to improve sleep include avoiding exercise late in the day, staying hydrated throughout the day, using journaling or breathing exercises to quiet the mind, and creating a predictable bedtime routine and schedule.
- H. Choose to focus on the moment. It might feel counterintuitive when you feel unable to concentrate, but remember that you choose where you focus. It's tough to concentrate when your mind is always in the

past and worrying about the future. While it isn't easy, make an effort to let go of past events. Acknowledge the impact, what you felt, and what you learned from it, then let it go. Similarly, acknowledge your concerns about the future, consider how you are experiencing that anxiety in your body, then choose to let it go. We want to train our mental resources to focus on the details of what matters at the moment. Our minds go in the direction we choose to focus.

- I. Take a short break. This also might seem counterintuitive, but when you focus on something for a long time, your focus may begin to die down. You may feel more and more difficulty devoting your attention to the task. Researchers have found that our brains tend to ignore sources of constant stimulation. Taking very small breaks by refocusing your attention elsewhere can dramatically improve mental concentration after that. The next time you are working on a project, take a break when you begin to feel stuck. Move around, talk to someone, or even switch to a different type of task. You will come back with a more focused mind to keep your performance high.
- J. Connect with nature. Research has found that even having plants in office spaces can help increase concentration and productivity, as well as workplace satisfaction and better air quality. Finding time to take a walk in the park or appreciating the plants or flowers in your garden can boost your concentration and help you feel refreshed.
- K. Train your brain. Scientific research is starting to amass evidence on the ability of brain training activities to enhance cognitive abilities, including concentration, in adults. Such brain training games can also help you develop your working and short-term memory, as well as your processing and problem-solving skills. Examples of such games include jigsaw puzzles, sudoku, chess, and brain-stimulating video games.
- L. Exercise. Start your day with simple exercise and get your body moving. According to the May 2013 issue of the Harvard Men's Health Watch, regular exercise releases chemicals key for memory, concentration, and mental sharpness. Other research found that exercise can boost the brain's dopamine, norepinephrine, and serotonin levels and all these will affect focus and attention.

Individuals who do some form of exercise or sports perform better on cognitive tasks when compared with those who have poor physical health. Physical movement helps relax the muscles and relieve tension in the body. Since the body and mind are so closely linked, when your body feels better so, too, will your mind.

M. Listen to music. Music has been shown to have therapeutic effects on our brains. Light music may help you to concentrate better, but some music may distract you. Experts generally agree that classical music and nature sounds, such as water flowing, are good choices for concentration while music with lyrics and human voices may be distracting. Multiple apps and services offer background music and soundscapes designed for different types of focus and work needs.

N. Eat well. Choose foods that moderate blood sugar, maintain energy, and fuel the brain. Fruits, vegetables, and high-fibre foods can keep your blood sugar levels even. Reduce sugary foods and drinks that cause spikes and dips in your sugar levels make you feel dizzy or drowsy.

Your brain needs lots of good fat to function properly. Nuts, berries, avocados, and coconut oil are all great ways to get healthy fats into your diet and help your brain run more smoothly. The science on Research has found that foods like blueberries can boost concentration and memory for up to 5 hours after consumption due to an enzyme that stimulates the flow of oxygen and blood to the brain, helping with memory as well as our ability to focus and learn new information. Leafy green vegetables such as spinach contain potassium which accelerates the connections between neurons and can make our brain more responsive.

O. Set a daily priority. Write down what you want to accomplish each day, ideally the night before, and identify a single priority that you commit to accomplishing. This will help focus your brain on what matters, tackling the big jobs first and leaving the small stuff till later. Break large tasks into smaller bytes so that you will not be overwhelmed. Identifying true priorities can help relieve distracting anxiety, and achieving small daily goals can wire your brain to achieve success.

- P. Create space for work.** Create a calm, dedicated space for work, if possible. Not everyone can have a well-appointed office, but desk organizers, noise-canceling headphones, an adjustable monitor, and adjustable lighting can help. Clear clutter out of sight, make it as ergonomic and comfortable as possible, and try to keep your space neat and ventilated.
- Q. Use a timer.** Train your brain to hyper-focus on a task by using a timer or phone alarm. First, decide what task you want to complete. Set your timer for 20 minutes (generally not more than 30 minutes) and concentrate on the task. When the alarm rings take a short break for 5 minutes. You can either take a walk and do some stretching exercise, then reset the timer and start again. This technique has shown to be effective to improve your concentration.
- R. Switch tasks.** While we may want to concentrate on a particular task, sometimes we get stuck and our brain needs something fresh to focus on. Try switching to other tasks or something you love to do. Switching tasks can help you stay alert and productive for a longer period.

Step 38-You Are Required To Do The Work to Have an Opinion on Any Topic

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.
5. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.
6. Do not read the newest books, but the great books of western world, stoic and classics, as these books stood the test of time.
7. Do Not Have the Opinion and do not make any judgement about Anything, I see and hear, If I did not work Hard to have an opinion. I need to Read, Analyse, Research the topic from every angle, so that I can have an opinion or Make Judgement on the topic.

8. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

9. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading, Deductive and Inductive Methodology.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

10. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

11. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Stratagem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that are very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft you're focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

12. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment. **Step 40-** Use The Chosen Rules of Reading Method For Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method And Follow Each Steps Of The Method Until Finish All Steps,

*Step 39-Use The Chosen Rules of
Reading Method For Analysis, Syntopicon,
Research, Investigative Journalism or Mixed
Method And Follow Each Steps As many
Times As I Want, While Re-listen
Lectures, Read Books or Lecture Notes
1-1000 Times For Each Step. Do It
Correctly, Slowly, Patiently, Methodically,
Logically Take It Time and Do Not Rush
Process. Deep Work, Shallow Work, Bible*

*VERY VERY SLOW READING-
COMPLEX TEXT-Study, Analysis of
Text and Syntopicon -Advanced Level*

Method 21-How To Read A Book

Step 1. Decide, Which Of the Following How To Read A Book By Mortimer Adler Editions I will Use For Analysis Biblical Text.

- **How To Read A Book: The Classical Guide To Intelligent Reading by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: Revised and Updated by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: The Art Of Getting A Liberal Education 1940 Edition by Mortimer Adler**
- **How To Read A Book: The Art Of Getting A Liberal Education 1972 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book:A Guide To Reading The Great Books 1966 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book: The Classical Guide To Intelligent Reading 1972 Edition by Mortimer Adler and Charles Van Doren.**
- **How To Read A Book 1972 Edition by Mortimer Adler and Charles Van Doren.**
- **Compact Literature**
- **Composition of Literature**

Step 2. Listen How to Read A Book of Your Choice, then follow and apply each Steps in Reading the Book or Text You are Analysing.

Method 22 - How To Read A Book By

Mortimer Adler For Various Books

The First Level of Reading: Elementary Reading

Ours is a time of great interest in and concern about reading. Public officials have declared that the 1970s will be “the decade of reading.” Best-selling books tell us why Johnny can or can’t read. Research and experimentation in all fields of initial reading instruction proceed at an ever-increasing pace.

Three historical trends or movements have converged upon our time to produce this ferment. The first is the continuing effort of the United States to educate all of its citizens, which means, of course, at a minimum, to make them all literate. This effort, which Americans have supported almost from the beginning of the national existence and which is one of the cornerstones of our democratic way of life, has had remarkable results. Near-universal literacy was obtained in the United States earlier than anywhere else, and this in turn has helped us to become the highly developed industrial society that we are at the present day. But there have been enormous problems, too. They can be summed up in the observation that teaching a small percentage of highly motivated children, most of them the children of literate parents, to read—as was the case a century ago—is a far cry from teaching every child to read, no matter how little motivated he may be, or how deprived his background.

The second historical trend is in the teaching of reading itself. As late as 1870, reading instruction was little changed from what it had been in Greek and Roman schools. In America, at least, the so-called ABC method was dominant throughout most of the nineteenth century. Children were taught to sound out the letters of the alphabet individually—hence the name of this method—and to combine them in syllables, first two letters at a time and then three and four, whether the syllables so constructed were meaningful or not. Thus, syllables such as *ab*, *ac*, *ad*, *ib*, *ic* were practiced for the sake of mastery of the language. When a child could name all of a determined number of combinations, he was said to know his ABC’s.

This synthetic method of teaching reading came under heavy criticism around the middle of the last century, and two alternatives to it were proposed. One was a variant on the synthetic ABC method, known as the phonic method. Here the word was recognized by its sounds rather than by its letter-names. Complicated and ingenious systems of printing were evolved for the purpose of representing the different sounds made by a single letter, especially the vowels. If you are fifty or over, it is probable that you learned to read using some variant of the phonic method.

A wholly different approach, analytical rather than synthetic, originated in Germany and was advocated by Horace Mann and other educators after about 1840. This involved teaching the *visual* recognition of whole words before giving any attention to letter-names or letter-sounds. This so-called sight method was later extended so that whole sentences, representing units of thought, were introduced first, with the pupils only later learning to recognize the constituent words and then, finally, the constituent letters. This method was especially popular during the 1920s and 30s, which period was also characterized by the shift in emphasis from oral reading to silent reading. It was found that ability to read orally did not necessarily mean ability to read silently and that instruction in oral reading was not always adequate if silent reading was the goal. Thus, an almost exclusive emphasis on rapid, comprehensive silent reading was a feature of the years from about 1920 to 1925. More recently, however, the pendulum has swung back again toward phonics, which indeed had never entirely left the curriculum.

All of these different methods of teaching elementary reading were successful for some pupils, unsuccessful for others. In the last two or three decades, it has perhaps been the failures that have attracted the most attention. And here the third historical trend comes into play. It is traditional in America to criticize the schools; for more than a century, parents, self-styled experts, and educators themselves have attacked and indicted the educational system. No aspect of schooling has been more severely criticized than reading instruction. The current books have a long ancestry, and every innovation carries in its train a posse of suspicious and, one feels, unpersuadable observers.

The critics may or may not be right, but in any event the problems have taken on a new urgency as the continuing effort to educate all citizens has entered a new phase, resulting in ever-growing high school and college populations. A young man or woman who cannot read very well is hindered in his pursuit of the American dream, but that remains largely a personal matter if he is not in school. If he remains in school or goes to college, however, it is a matter of concern for his teachers as well, and for his fellow students.

Hence, researchers are very active at the present time, and their work has resulted in numerous new approaches to reading instruction. Among the more important new programs are the so-called eclectic approach, the individualized reading approach, the language-experience approach, the various approaches based on linguistic principles, and others based more or less closely on some kind of programmed instruction. In addition, new mediums such as the Initial Teaching Alphabet (i.t.a.) have been employed, and sometimes these involve new methods as well. Still other devices and programs are the "total immersion method," the "foreign-language-school method," and the method known variously as the "see-say," "look-say," "look-and-say," or "word method." Doubtless experiments are now being undertaken in methods and approaches that differ from all of these. It is perhaps too early to tell whether any of these is the long-sought panacea for all reading ills.

Stages of Learning to Read

One useful finding of recent research is the analysis of stages in learning to read. It is now widely accepted that there are at least four more or less clearly distinguishable stages in the child's progress toward what is called mature reading ability. The first stage is known by the term "reading readiness." This begins, it has been pointed out, at birth, and continues normally until the age of about six or seven.

Reading readiness includes several different kinds of preparation for learning to read. Physical readiness involves good vision and hearing. Intellectual readiness involves a minimum level of visual perception such that the child can take in and remember an entire word and the letters that combine to form it. Language readiness involves the ability to speak clearly and to use several sentences in correct order. Personal readiness involves the ability to work with other children, to sustain attention, to follow directions, and the like.

General reading readiness is assessed by tests and is also estimated by teachers who are often skilful at discerning just when a pupil is ready to learn to read. The important thing to remember is that jumping the gun is usually self-defeating. The child who is not yet ready to read is frustrated if attempts are made to teach him, and he may carry over his dislike for the experience into his later school career and even into adult life. Delaying the beginning of reading instruction beyond the reading readiness stage is not nearly so serious, despite the feelings of parents who may fear that their child is "backward" or is not "keeping up" with his peers.

In the second stage, children learn to read very simple materials. They usually begin, at least in the United States, by learning a few sight words, and typically manage to master perhaps three hundred to four hundred words by the end of the first year. Basic skills are introduced at this time, such as the use of context or meaning clues and the beginning sounds of words. By the end of this period pupils are expected to be reading simple books independently and with enthusiasm.

It is incidentally worth observing that something quite mysterious, almost magical, occurs during this stage. At one moment in the course of his development the child, when faced with a series of symbols on a page, finds them quite meaningless. Not much later—perhaps only two or three weeks later—he has discovered meaning in them; he knows that they say "The cat sat on the hat." How this happens no one really knows, despite the efforts of philosophers and psychologists over two and a half millennia to study the phenomenon. Where does meaning come from? How is it that a French child would find the same meaning in the symbols "*Le chat s'asseyait sur le chapeau*"? Indeed, this discovery of meaning in symbols may be the most astounding intellectual feat that any human being ever performs—and most humans perform it before they are seven years old!

The third stage is characterised by rapid progress in vocabulary building and by increasing skill in "unlocking" the meaning of unfamiliar words through context clues. In addition, children at this stage learn to read for different purposes and in different areas of

content, such as science, social studies, language arts, and the like. They learn that reading, besides being something one does at school, is also something one can do on one's own, for fun, to satisfy curiosity, or even to "expand one's horizons."

Finally, the fourth stage is characterized by the refinement and enhancement of the skills previously acquired. Above all, the student begins to be able to assimilate his reading experiences—that is, to carry over concepts from one piece of writing to another, and to compare the views of different writers on the same subject. This, the mature stage of reading, should be reached by young persons in their early teens. Ideally, they should continue to build on it for the rest of their lives.

That they often do not even reach it is apparent to many parents and to most educators. The reasons for the failure are many, ranging all the way from various kinds of deprivations in the home environment—economic, social, and/or intellectual (including parental illiteracy)—to personal problems of all kinds (including total revolt against "the system"). But one cause of the failure is not often noted. The very emphasis on reading readiness and on the methods employed to teach children the rudiments of reading has meant that the other, the higher, levels of reading have tended to be slighted. This is quite understandable, considering the urgency and extent of the problems found on this first level. Nevertheless, effective remedies for the overall reading deficiencies of Americans cannot be found unless efforts are made on *all* levels of reading.

Stages and Levels

We have described four levels of reading, and we have also outlined four stages of learning to read in an elementary fashion. What is the relation between these stages and levels?

It is of paramount importance to recognise that the four stages outlined here are all stages of the first level of reading, as outlined in the previous chapter. They are stages, that is, of elementary reading, which thus can be usefully divided somewhat in the manner of the elementary school curriculum. The first stage of elementary reading—reading readiness—corresponds to pre-school and kindergarten experiences. The second stage—word mastery—corresponds to the first grade experience of the typical child (although many quite normal children are not "typical" in this sense), with the result that the child attains what we can call second-stage reading skills, or first grade ability in reading or first grade literacy. The third stage of elementary reading—vocabulary growth and the utilisation of context—is typically (but not universally, even for normal children) acquired at about the end of the fourth grade of elementary school, and results in what is variously called fourth grade, or functional, literacy—the ability, according to one common definition, to read traffic signs or picture captions fairly easily, to fill out the simpler government forms, and the like. The fourth and final stage of elementary reading is attained at about the time the pupil leaves or graduates from elementary school or junior high school. It is sometimes called eighth grade, ninth grade, or tenth grade literacy. The child is a "mature" reader in the sense that he is now capable of reading almost anything, but still in a relatively

unsophisticated manner. In the simplest terms, he is mature enough to do high school work.

However, he is not yet a “mature” reader in the sense in which we want to employ the term in this book. He has mastered the first level of reading, that is all he can read on his own and is prepared to learn more about reading. *But he does not yet know how to read beyond the elementary level.*

We mention all this because it is highly germane to the message of this book. We assume—we must assume—that you, our reader, have attained ninth grade literacy, that you have mastered the elementary level of reading, which means that you have passed successfully through the four stages described. If you think about it, you realize that we could not assume less. No one can learn from a how-to-do-it book until he can read it; and it is particularly true of a book purporting to teach one to read that its readers must be able to read in some sense of the term.

The difference between aided and unaided discovery comes into play here. Typically, the four stages of elementary reading are attained with the help of living teachers. Children differ in their abilities, of course; some need more help than others. But a teacher is usually present to answer questions and smooth over difficulties that arise during the elementary school years. Only when he has mastered all of the four stages of elementary reading is the child prepared to move on to the higher levels of reading. Only then can he read independently and learn on his own. Only then can he begin to become a really good reader.

Higher Levels of Reading and Higher Education

Traditionally, the high schools of America have provided little reading instruction for their students, and the colleges have provided none. That situation has changed in recent years. Two generations ago, when high school enrollments increased greatly within a relatively short period, educators began to realize that it could no longer be assumed that entering students could read effectively. Remedial reading instruction was therefore provided, sometimes for as many as 75% or more students. Within the last decade, the same situation has occurred at the college level. Thus, of approximately 40,000 freshmen entering the City University of New York in the fall of 1971, upwards of half, or more than 20,000 young people, had to be given some kind of remedial training in reading.

That does not mean, however, that *reading instruction beyond the elementary level* is offered in many U.S. colleges to this day. In fact, it is offered in almost none of them. Remedial reading instruction is not instruction in the higher levels of reading. It serves only to bring students up to a level of maturity in reading that they should have attained by the time they graduated from elementary school. To this day, most institutions of higher learning either do not know how to instruct students in reading beyond the elementary level, or lack the facilities and personnel to do so.

We say this despite the fact that a number of four-year and community colleges have recently instituted courses in speed reading, or in “effective” reading, or “competence” in reading. On the whole (though there are exceptions), these courses are remedial. They are designed to overcome various kinds of failures of the lower schools. They are not designed to take the student beyond the first level or to introduce him to the kinds and levels of reading that are the main subject of this book.

This, of course, should not be the case. A good liberal arts high school, if it does nothing else, ought to produce graduates who are competent analytical readers. A good college, if it does nothing else, ought to produce competent syntopical readers. A college degree ought to represent general competence in reading such that a graduate could read any kind of material for general readers and be able to undertake independent research on almost any subject (for that is what syntopical reading, among other things, enables you to do). Often, however, three or four years of graduate study are required before students attain this level of reading ability, and they do not always attain it even then.

One should not have to spend four years in graduate school in order to learn how to read. Four years of graduate school, in addition to twelve years of preparatory education and four years of college—that adds up to twenty full years of schooling. It should not take that long to learn to read. Something is very wrong if it does.

What is wrong can be corrected. Courses could be instituted in many high schools and colleges that are based on the program described in this book. There is nothing arcane or even really new about what we have to propose. It is largely common sense.

Reading and the Democratic Ideal of Education

We do not want to seem to be mere carping critics. We know that the thunder of thousands of freshmen feet upon the stairs makes it hard to hear, no matter how reasonable the message. And as long as a large proportion, even a majority, of these new students cannot read effectively at the elementary level, we are aware that the first task to be faced must be to teach them to read in the lowest, the largest common-denominator, sense of the term.

Nor, for the moment, would we want it any other way. We are on record as holding that unlimited educational opportunity—or, speaking practically, educational opportunity that is limited only by individual desire, ability, and need—is the most valuable service that society can provide for its members. That we do not yet know how to provide that kind of opportunity is no reason to give up the attempt.

But we must also realize—students, teachers, and laymen alike—that even when we have accomplished the task that lies before us, we will not have accomplished the whole task. We must be more than a nation of functional literates. We must become a nation of truly competent readers, recognizing all that the word *competent* implies. Nothing less will satisfy the needs of the world that is coming.

The Second Level of Reading: Inspectional Reading

Inspectional reading is a true level of reading. It is quite distinct from the level that precedes it (elementary reading) and from the one that follows it in natural sequence (analytical reading). But, as we noted in Chapter 2, the levels of reading are cumulative. Thus, elementary reading is contained in inspectional reading, as, indeed, inspectional reading is contained in analytical reading, and analytical reading in syntopical reading.

Practically, this means that you cannot read on the inspectional level unless you can read effectively on the elementary level. You must be able to read an author's text more or less steadily, without having to stop to look up the meaning of many words, and without stumbling over the grammar and syntax. You must be able to make sense of a majority of the sentences and paragraphs, although not necessarily the best sense of all of them.

What, then, is involved in inspectional reading? How do you go about doing it? The first thing to realize is that there are two types of inspectional reading. They are aspects of a single skill, but the beginning reader is well-advised to consider them as two different steps or activities. The experienced reader learns to perform both steps simultaneously, but for the moment we will treat them as if they were quite distinct.

Inspectional Reading I: Systematic Skimming or Pre-reading

Let us return to the basic situation to which we have referred before. There is a book or other reading matter, and here is your mind. What is the first thing that you do?

Let us assume two further elements in the situation, elements that are quite common. First, you do not know whether you want to read the book. You do not know whether it deserves an analytical reading. But you suspect that it does, or at least that it contains both information and insights that would be valuable to you if you could dig them out.

Second, let us assume—and this is very often the case—that you have only a limited time in which to find all this out.

In this case, what you must do is *skim* the book, or, as some prefer to say, pre-read it. Skimming or pre-reading is the first sub level of inspectional reading. Your main aim is to discover whether the book requires a more careful reading. Secondly, skimming can tell you lots of other things about the book, even if you decide not to read it again with more care.

Giving a book this kind of quick once-over is a threshing process that helps you to separate the chaff from the real kernels of nourishment. You may discover that what you get from skimming is all the book is worth to you for the time being. It may never be worth more. But you will know at least what the author's main contention is, as well as what kind of book he has written, so the time you have spent looking through the book will not have been wasted.

The habit of skimming should not take much time to acquire. Here are some suggestions about how to do it..

1. LOOK AT THE TITLE PAGE AND, IF THE BOOK HAS ONE, AT ITS PREFACE.

Read each quickly. Note especially the subtitles or other indications of the scope or aim of the book or of the author's special angle on his subject. Before completing this step you should have a good idea of the subject, and, if you wish, you may pause for a moment to place the book in the appropriate category in your mind. What pigeonhole that already contains other books does this one belong in?

2. STUDY THE TABLE OF CONTENTS to obtain a general sense of the book's structure; use it as you would a road map before taking a trip. It is astonishing how many people never even glance at a book's table of contents unless they wish to look something up in it. In fact, many authors spend a considerable amount of time in creating the table of contents, and it is sad to think their efforts are often wasted. It used to be a common practice, especially in expository works, but sometimes even in novels and poems, to write very full tables of contents, with the chapters or parts broken down into many subtitles indicative of the topics covered. Milton, for example, wrote more or less lengthy headings, or "Arguments," as he called them, for each book of *Paradise Lost*. Gibbon published his *Decline and Fall of the Roman Empire* with an extensive analytical table of contents for each chapter. Such summaries are no longer common, although occasionally you do still come across an analytical table of contents. One reason for the decline of the practice may be that people are not so likely to read tables of contents as they once were. Also, publishers have come to feel that a less revealing table of contents is more seductive than a completely frank and open one. Readers, they feel, will be attracted to a book with more or less mysterious chapter titles—they will want to read the book to find out what the chapters are about. Even so, a table of contents can be valuable, and you should read it carefully before going on to the rest of the book. At this point, you might turn back to the table of contents of this book, if you have not already read it. We tried to make it as full and informative as we could. Examining it should give you a good idea of what we are trying to do.

3. CHECK THE INDEX if the book has one—most expository works do. Make a quick estimate of the range of topics covered and of the kinds of books and authors referred to. When you see terms listed that seem crucial, look up at least some of the passages cited. (We will have much more to say about crucial terms in Part Two. Here you must make your judgment of their importance on the basis of your general sense of the book, as obtained from steps 1 and 2.) The passages you read may contain the crux—the point on which the book hinges—or the new departure which is the key to the author's approach and attitude. As in the case of the table of contents, you might at

this point check the index of *this* book. You will recognize as crucial some terms that have already been discussed. Can you identify, for example, by the number of references under them, any others that also seem important?

4. If the book is a new one with a dust jacket, **READ THE PUBLISHER'S BLURB.** Some people have the impression that the blurb is never anything but sheer puffery. But this is quite often not true, especially in the case of expository works. The blurbs of many of these books are written by the authors themselves, admittedly with the help of the publisher's public relations department. It is not uncommon for authors to try to summarize as accurately as they can the main points in their book. These efforts should not go unnoticed. Of course, if the blurb is nothing but a puff for the book, you will ordinarily be able to discover this at a glance. But that in itself can tell you something about the work. Perhaps the book does not say anything of importance—and that is why the blurb does not say anything, either. Upon completing these first four steps you may already have enough information about the book to know that you want to read it more carefully, or that you do not want or need to read it at all. In either case, you may put it aside for the moment. If you do not do so, you are now ready to skim the book, properly speaking.
5. From your general and still rather vague knowledge of the book's contents, **LOOK NOW AT THE CHAPTERS THAT SEEM TO BE PIVOTAL TO ITS ARGUMENT.** If these chapters have summary statements in their opening or closing pages, as they often do, read these statements carefully.
6. Finally, **TURN THE PAGES, DIPPING IN HERE AND THERE, READING A PARAGRAPH OR TWO, SOMETIMES SEVERAL PAGES IN SEQUENCE, NEVER MORE THAN THAT.** Thumb through the book in this way, always looking for signs of the main contention, listening for the basic pulse beat of the matter. Above all, do not fail to read the last two or three pages, or, if these are an epilogue, the last few pages of the main part of the book. Few authors are able to resist the temptation to sum up what they think is new and important about their work in these pages. You do not want to miss this, even though, as sometimes happens, the author himself may be wrong in his judgment.
7. **Condemnation before investigation. Set Aside Whatever you been taught and believe about topic and look with fresh eyes and try to hear what text is saying.**

You have now skimmed the book systematically; you have given it the first type of inspectional reading. You should know a good deal about the book at this point, after having spent no more than a few minutes, at most an hour, with it. In particular, you should know whether the book contains matter that you still want to dig out, or whether it deserves no more of your time and attention. You should also be able to place the book even more accurately than before in your mental card catalogue, for further reference if the occasion should ever arise.

Incidentally, this is a very active sort of reading. It is impossible to give any book an inspectional reading without being alert, without having all of one's faculties awake and working. How many times have you daydreamed through several pages of a good book only to wake up to the realization that you have no idea of the ground you have gone over? That cannot happen if you follow the steps outlined here—that is, if you have a system for following a general thread.

Think of yourself as a detective looking for clues to a book's general theme or idea, alert for anything that will make it clearer. Heeding the suggestions we have made will help you sustain this attitude. You will be surprised to find out how much time you will save, pleased to see how much more you will grasp, and relieved to discover how much easier it all can be than you supposed.

Inspectional Reading II: Superficial Reading

The title of this section is intentionally provocative. The word “superficial” ordinarily has a negative connotation. We are quite serious, however, in using the term.

Everyone has had the experience of struggling fruitlessly with a difficult book that was begun with high hopes of enlightenment. It is natural enough to conclude that it was a mistake to try to read it in the first place. But that was not the mistake. Rather it was in expecting too much from the first going over of a difficult book. Approached in the right way, no book intended for the general reader, no matter how difficult, need be a cause for despair.

What is the right approach? The answer lies in an important and helpful rule of reading that is generally overlooked. That rule is simply this: *In tackling a difficult book for the first time, read it through without ever stopping to look up or ponder the things you do not understand right away.*

Pay attention to what you can understand and do not be stopped by what you cannot immediately grasp. Go right on reading past the point where you have difficulties in understanding, and you will soon come to things you do understand. Concentrate on these. Keep on in this way. Read the book through, undeterred and undismayed by the paragraphs, footnotes, comments, and references that escape you. If you let yourself get stalled, if you allow yourself to be tripped up by any one of these stumbling blocks, you are lost. In most cases, you will not be able to puzzle the thing out by sticking to it. You will have a much better chance of understanding it on a second reading, but that requires you to have read the book *through* at least once.

What you understand by reading the book through to the end—even if it is only fifty percent or less—will help you when you make the additional effort later to go back to the places you passed by on your first reading. And even if you never go back, understanding half of a really tough book is much better than not understanding it at all, which will be the case if you allow yourself to be stopped by the first difficult passage you come to.

Most of us were taught to pay attention to the things we did not understand. We were told to go to a dictionary when we met an unfamiliar word. We were told to go to an encyclopedia or some other reference work when we were confronted with allusions or statements we did not comprehend. We were told to consult footnotes, scholarly commentaries, or other secondary sources to get help. But when these things are done *prematurely*, they only impede our reading, instead of helping it.

The tremendous pleasure that can come from reading Shakespeare, for instance, was spoiled for generations of high school students who were forced to go through *Julius Caesar*, *As You Like It*, or *Hamlet*, scene by scene, looking up all the strange words in a glossary and studying all the scholarly footnotes. As a result, they never really read a Shakespearean play. By the time they reached the end, they had forgotten the beginning and lost sight of the whole. Instead of being forced to take this pedantic approach, they should have been encouraged to read the play at one sitting and discuss what they got out of that first quick reading. Only then would they have been ready to study the play carefully and closely because then they would have understood enough of it to learn more.

The rule applies with equal force to expository works. Here, indeed, the best proof of the soundness of the rule—give a book a first superficial reading—is what happens when you do *not* follow it. Take a basic work in economics, for example, such as Adam Smith's classic *The Wealth of Nations*. (We choose this book as an example because it is more than a textbook or a work for specialists in the field. It is a book for the *general* reader.) If you insist on understanding everything on every page before you go on to the next, you will not get very far. In your effort to master the fine points, you will miss the big points that Smith makes so clearly about the factors of wages, rents, profits, and interest that enter into the cost of things, the role of the market in determining prices, the evils of monopoly, the reasons for free trade. You will miss the forest for the trees. You will not be reading well on *any* level.

On Reading Speeds

We described inspectional reading in Chapter 2 as the art of getting the most out of a book in a limited time. In describing it further in the present chapter, we have in no way changed that definition. The two steps involved in inspectional reading are both taken rapidly. The competent inspectional reader will accomplish them both quickly, no matter how long or difficult the book he is trying to read.

That working definition, however, inevitably raises the question, What about speed reading? What is the relation between the levels of reading and the many speed reading courses, both academic and commercial, that are offered at the present day?

We have already suggested that such courses are basically remedial—that is, that they provide instruction mainly, if not exclusively, in reading on the elementary level. But more needs to be said.

Let it be understood at once that we are wholly in favour of the proposition that most people ought to be *able* to read faster than they do. Too often, there are things we *have* to read that are not really worth spending a lot of time reading; if we cannot read them quickly, it will be a terrible waste of time. It is true enough that many people read some things too slowly, and that they ought to read them faster. But many people also read some things too fast, and they ought to read those things more slowly. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.

Our point is really very simple. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem. But this is only one reading problem. The obstacles that stand in the way of comprehension of a difficult book are not ordinarily, and perhaps never primarily, physiological or psychological. They arise because the reader simply does not know what to do when approaching a difficult—and rewarding—book. He does not know the rules of reading; he does not know how to marshal his intellectual resources for the task. No matter how quickly he reads, he will be no better off if, as is too often true, he does not know what he is looking for and does not know when he has found it.

With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at *different speeds*—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Fixations and Regressions

Speed reading courses properly make much of the discovery—we have known it for half a century or more—that most people continue to sub-vocalise for years after they are first taught to read. Films of eye movements, furthermore, show that the eyes of young or untrained readers “fixate” as many as five or six times in the course of each line that is read. (The eye is blind while it moves; it can only see when it stops.) Thus single words or at the most two-word or three-word phrases are being read at a time, in jumps across the line. Even worse than that, the eyes of incompetent readers regress as often as once every two or three lines—that is, they return to phrases or sentences previously read.

All of these habits are wasteful and obviously cut down reading speed. They are wasteful because the mind, unlike the eye, does not need to “read” only a word or short phrase at a time. The mind, that astounding instrument, can grasp a sentence or even a paragraph at a “glance”—if only the eyes will provide it with the information it needs. Thus the primary task—recognised as such by all speed reading courses—is to correct the fixations and regressions that slow so many readers down. Fortunately, this can be done quite easily. Once it is done, the student can read as fast as his mind will let him, not as slow as his eyes make him.

There are various devices for breaking the eye fixations, some of them complicated and expensive. Usually, however, it is not necessary to employ any device more sophisticated than your own hand, which you can train yourself to follow as it moves more and more quickly across and down the page. You can do this yourself. Place your thumb and first two fingers together. Sweep this “pointer” across a line of type, a little faster than it is comfortable for your eyes to move. Force yourself to keep up with your hand. You will very soon be able to read the words as you follow your hand. Keep practicing this, and keep increasing the speed at which your hand moves, and before you know it you will have doubled or trebled your reading speed.

The Problem of Comprehension

But what exactly have you gained if you increase your reading speed significantly? It is true that you have saved time—but what about comprehension? Has that also increased, or has it suffered in the process?

There is no speed reading course that we know of that does not claim to be able to increase your comprehension along with your reading speed. And on the whole, there is probably some foundation for these claims. The hand (or some other device) used as a timer tends not only to increase your reading rate, but also to improve your concentration on what you are reading. As long as you are following your hand it is harder to fall asleep, to daydream, to let your mind wander. So far, so good. Concentration is another name for what we have called activity in reading. The good reader reads actively, with concentration.

But concentration alone does not really have much of an effect on comprehension, when that is properly understood. Comprehension involves much more than merely being able to answer simple questions of fact about a text. This limited kind of comprehension, in fact, is nothing but the elementary ability to answer the question about a book or other reading material: “What does it say?” The many further questions that, when correctly answered, imply higher levels of comprehension are seldom asked in speed reading courses, and instruction in how to answer them is seldom given.

To make this clearer, let us take an example of something to read. Let us take the Declaration of Independence. You probably have a copy of it available. Take it down and look at it. It occupies less than three pages when printed. How fast should you read it?

The second paragraph of the Declaration ends with the sentence: "To prove this, let facts be submitted to a candid world." The following two pages of "facts," some of which, incidentally, are quite dubious, can be read quickly. It is not necessary to gain more than a general idea of the *kind* of facts that Jefferson is citing, unless, of course, you are a scholar concerned with the historical circumstances in which he wrote. Even the last paragraph, ending with the justly celebrated statement that the signers "mutually pledge to each other our lives, our fortunes, and our sacred honour," can be read quickly. This is a rhetorical flourish, and it deserves what mere rhetoric always deserves. But the first two paragraphs of the Declaration of Independence require more than a first rapid reading.

We doubt that there is anyone who can read those first two paragraphs at a rate much faster than 20 words a minute. Indeed, individual words in the famous second paragraph—words like "inalienable," "rights," "liberty," "happiness," "consent," "just powers"—are worth dwelling over, puzzling about, considering at length. Properly read, for full comprehension, those first two paragraphs of the Declaration might require days, or weeks, or even years.

The problem of speed reading, then, is the problem of comprehension. Practically, this comes down to defining comprehension at levels beyond the elementary. Speed reading courses, for the most part, do not attempt this. It is worth emphasizing, therefore, that it is precisely comprehension in reading that this book seeks to improve. You cannot comprehend a book without reading it analytically; analytical reading, as we have noted, is undertaken primarily for the sake of comprehension (or understanding).

Summary of Inspectional Reading

A few words in summary of this chapter. There is no single right speed at which you should read; the ability to read at various speeds and to know when each speed is appropriate is the ideal. Great speed in reading is a dubious achievement; it is of value only if what you have to read is not really worth reading. A better formula is this: *Every book should be read no more slowly than it deserves, and no more quickly than you can read it with satisfaction and comprehension.* In any event, the speed at which they read, be it fast or slow, is but a fractional part of most people's problem with reading.

Skimming or pre-reading a book is always a good idea; it is necessary when you do not know, as is often the case, whether the book you have in hand is worth reading carefully. You will find that out by skimming it. It is generally desirable to skim even a book that you intend to read carefully, to get some idea of its form and structure.

Finally, do not try to understand every word or page of a difficult book the first time through. This is the most important rule of all; it is the essence of inspectional reading. Do not be afraid to be, or to seem to be, superficial. Race through even the hardest book. You will then be prepared to read it well the second time.

We have now completed our initial discussion of the second level of reading—inspectional reading. We will return to the subject when we come to Part Four, where we

will show what an important role inspectional reading plays in syntopical reading, the fourth and highest level of reading.

However, you should keep in mind during our discussion of the third level of reading—analytical reading—which is described in the second part of this book, that inspectional reading serves an important function at that level, too. The two stages of inspectional reading can both be thought of as anticipations of steps that the reader takes when he reads analytically. The first stage of inspectional reading—the stage we have called systematic skimming—serves to prepare the analytical reader to answer the questions that must be asked during the first stage of that level. Systematic skimming, in other words, anticipates the comprehension of a book's structure. And the second stage of inspectional reading—the stage we have called

superficial reading—serves the reader when he comes to the second stage of reading at the analytical level. Superficial reading is the first necessary step in the interpretation of a book's contents.

Before going on to explain analytical reading, we want to pause for a moment to consider again the nature of reading as an activity. There are certain actions the active or demanding reader must perform in order to read well. We will discuss them in the next chapter.

Inspectional Reading I: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed
4. Read or Listen The Full Book Without Stopping
5. Read or listen 25min and 5min break
 - Read or Listen 20 pages an Hour according Mortimer Adler
6. Read or Listen between 1-50 times the book
7. Speed of Audiobook.
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed.
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Inspectional Reading II: Superficial Reading

1. Read or Listen The Full Book Without Stopping.
2. That rule is simply this: In tackling a difficult book for the first time, read it through without ever stopping to look up or ponder the things you do not understand right away.
3. Pay attention to what you can understand and do not be stopped by what you cannot immediately grasp. Go right on reading past the point where you have difficulties in understanding, and you will soon come to things you do understand. Concentrate on these.

How to Be a Demanding Reader

The rules for reading yourself to sleep are easier to follow than are the rules for staying awake while reading. Get into bed in a comfortable position, make sure the light is inadequate enough to cause a slight eyestrain, choose a book that is either terribly difficult or terribly boring—in any event, one that you do not really care whether you read or not—and you will be asleep in a few minutes. Those who are experts in relaxing with a book do not have to wait for nightfall. A comfortable chair in the library will do any time.

Unfortunately, the rules for keeping awake do not consist in doing just the opposite. It is *possible* to keep awake while reading in a comfortable chair or even in bed, and people have been known to strain their eyes by reading late in light too dim. What kept the famous candlelight readers awake? One thing certainly—it made a difference to them, a great difference, whether or not they read the book they had in hand.

Whether you manage to keep awake or not depends in large part on your goal in reading. If your aim in reading is to profit from it—to grow somehow in mind or spirit—you have to keep awake. That means reading as actively as possible. It means making an effort—an effort for which you expect to be repaid.

Good books, fiction or nonfiction, deserve such reading. To use a good book as a sedative is conspicuous waste. To fall asleep or, what is the same, to let your mind wander during the hours you planned to devote to reading for profit—that is, primarily for understanding—is clearly to defeat your own ends.

But the sad fact is that many people who can distinguish between profit and pleasure—between understanding, on the one hand, and entertainment or the mere satisfaction of curiosity, on the other hand—nevertheless fail to carry out their reading plans. They fail even if they know which books give which. The reason is that they do not know how to be demanding readers, how to keep their mind on what they are doing by making it do the work without which no profit can be earned.

The Essence of Active Reading: The Four Basic Questions a Reader Asks

We have already discussed active reading extensively in this book. We have said that active reading is better reading, and we have noted that inspectional reading is always active. It is an effortful, not an effortless, undertaking. But we have not yet gone to the heart of the matter by stating the one simple prescription for active reading. It is: *Ask questions while you read—questions that you yourself must try to answer in the course of reading.*

Any questions? No. The art of reading on any level above the elementary consists in the habit of asking the right questions in the right order. There are four main questions you must ask about any book.

1. **WHAT IS THE BOOK ABOUT AS A WHOLE?** You must try to discover the leading theme of the book, and how the author develops this theme in an orderly way by subdividing it into its essential subordinate themes or topics.
2. **WHAT IS BEING SAID IN DETAIL, AND HOW?** You must try to discover the main ideas, assertions, and arguments that constitute the author's particular message.
3. **IS THE BOOK TRUE, IN WHOLE OR PART?** You cannot answer this question until you have answered the first two. You have to know what is being said before you can decide whether it is true or not. When you understand a book, however, you are obligated, if you are reading seriously, to make up your own mind. Knowing the author's mind is not enough.
4. **WHAT OF IT?** If the book has given you information, you must ask about its significance. Why does the author think it is important to know these things? Is it important to you to know them? And if the book has not only informed you, but also enlightened you, it is necessary to seek further enlightenment by asking what else follows, what is further implied or suggested.

We will return to these four questions at length in the rest of this book. Stated another way, they become the basic rules of reading with which Part Two is mainly concerned. They are stated here in question form for a very good reason. Reading a book on any level beyond the elementary is essentially an effort on your part to ask it questions (and to answer them to the best of your ability). That should never be forgotten. And that is why there is all the difference in the world between the demanding and the undemanding reader. The latter asks no questions—and gets no answers.

The four questions stated above summarize the whole obligation of a reader. They apply to anything worth reading—a book or an article or even an advertisement. Inspectional reading tends to provide more accurate answers to the first two questions than to the last two, but it nevertheless helps with those also. An analytical reading of a book has not been accomplished satisfactorily until you have answers to those last questions—until you have some idea of the book's truth, in whole or part, and of its significance, if only in your own scheme of things. The last question—What of it?—is probably the most important one in syntopical reading. Naturally, you will have to answer the first three questions before attempting the final one.

Knowing what the four questions are is not enough. You must remember to ask them as you read. The *habit* of doing that is the mark of a demanding reader. More than that, you must know how to answer them precisely and accurately. The trained ability to do that is the *art* of reading.

People go to sleep over good books not because they are unwilling to make the effort, but because they do not know how to make it. Good books are over your head; they would not be good for you if they were not. And books that are over your head weary you unless you can reach up to them and pull yourself up to their level. It is not the stretching that tires you, but the frustration of stretching unsuccessfully because you lack the skill to stretch effectively. To keep on reading actively, you must have not only the will to do so, but also the skill—the art that enables you to elevate yourself by mastering what at first sight seems to be beyond you.

How to Make a Book Your Own

If you have the habit of asking a book questions as you read, you are a better reader than if you do not. But, as we have indicated, merely asking questions is not enough. You have to try to answer them. And although that could be done, theoretically, in your mind only, it is much easier to do it with a pencil in your hand. The pencil then becomes the sign of your alertness while you read.

It is an old saying that you have to “read between the lines” to get the most out of anything. The rules of reading are a formal way of saying this. But we want to persuade you to “write between the lines,” too. Unless you do, you are not likely to do the most efficient kind of reading.

When you buy a book, you establish a property right in it, just as you do in clothes or furniture when you buy and pay for them. But the act of purchase is actually only the prelude to possession in the case of a book. Full ownership of a book only comes when you have made it a part of yourself, and the best way to make yourself a part of it—which comes to the same thing—is by writing in it.

Why is marking a book indispensable to reading it? First, it keeps you awake— not merely conscious, but wide awake. Second, reading, if it is active, is thinking, and thinking tends to express itself in words, spoken or written. The person who says he knows what he thinks but cannot express it usually does not know what he thinks. Third, writing your reactions down helps you to remember the thoughts of the author.

Reading a book should be a conversation between you and the author. Presumably he knows more about the subject than you do; if not, you probably should not be bothering with his book. But understanding is a two-way operation; the learner has to question himself and question the teacher. He even has to be willing to argue with the teacher, once he understands what the teacher is saying. Marking a book is literally an expression of your differences or your agreements with the author. It is the highest respect you can pay him.

There are all kinds of devices for marking a book intelligently and fruitfully. Here are some devices that can be used:

1. UNDERLINING—of major points; of important or forceful statements.
2. VERTICAL LINES AT THE MARGIN—to emphasise a statement already underlined or to point to a passage too long to be underlined.
3. STAR, ASTERISK, OR OTHER DOODAD AT THE MARGIN—to be used sparingly, to emphasise the ten or dozen most important statements or passages in the book. You may want to fold a corner of each page on which you make such marks or place a slip of paper between the pages. In either case, you will be able to take the book off the shelf at any time and, by opening it to the indicated page, refresh your recollection.
4. NUMBERS IN THE MARGIN—to indicate a sequence of points made by the author in developing an argument.
5. NUMBERS OF OTHER PAGES IN THE MARGIN—to indicate where else in the book the author makes the same points, or points relevant to or in contradiction of those here marked; to tie up the ideas in a book, which, though they may be separated by many pages, belong together. Many readers use the symbol “Cf ” to indicate the other page numbers; it means “compare” or “refer to.”
6. CIRCLING OF KEY WORDS OR PHRASES—This serves much the same function as underlining.
7. WRITING IN THE MARGIN, OR AT THE TOP OR BOTTOM OF THE PAGE—to record questions (and perhaps answers) which a passage raises in your mind; to reduce a complicated discussion to a simple statement; to record the sequence of major points right through the book. The endpapers at the back of the book can be used to make a personal index of the author’s points in the order of their appearance. To inveterate book-markers, the front endpapers are often the most important. Some people reserve them for a fancy bookplate. But that expresses only their financial ownership of the book. The front endpapers are better reserved for a record of your thinking. After finishing the book and making your personal index on the back endpapers, turn to the front and try to outline the book, not page by page or point by point (you have already done that at the back), but as an integrated structure, with a basic outline and an order of parts. That outline will be the measure of your understanding of the work; unlike a bookplate, it will express your intellectual ownership of the book.

The Three Kinds of Note-making

There are three quite different kinds of notes that you will make in your books as well as about them. Which kind you make depends upon the level at which you are reading.

When you give a book an inspectional reading, you may not have much time to make notes in it; inspectional reading, as we have observed, is always limited as to time. Nevertheless, you are asking important questions about a book when you read it at this level, and it would be desirable, even if it is not always possible, to record your answers when they are fresh in your mind.

The questions answered by inspectional reading are: first, what kind of book is it? second, what is it about as a whole? and third, what is the structural order of the

work whereby the author develops his conception or understanding of that general subject matter? You may and probably should make notes concerning your answers to these questions, especially if you know that it may be days or months before you will be able to return to the book to give it an analytical reading. The best place to make such notes is on the contents page, or perhaps on the title page, which are otherwise unused in the scheme we have outlined above.

The point to recognize is that these notes primarily concern the structure of the book, and not its substance—at least not in detail. *We therefore call this kind of note-making structural.*

In the course of an inspectional reading, especially of a long and difficult book, you may attain some insights into the author's ideas about his subject matter. Often, however, you will not; and certainly you should put off making any judgment of the accuracy or truth of the statements until you have read the book more carefully. Then, during an analytical reading, you will need to give answers to questions about the truth and significance of the book. The notes you make at this level of reading are, therefore, not structural but *conceptual*. They concern the author's concepts, and also your own, as they have been deepened or broadened by your reading of the book.

There is an obvious difference between structural and conceptual note-making. What kind of notes do you make when you are giving several books a syntopical reading—when you are reading more than one book on a single subject? Again, such notes will tend to be conceptual; and the notes on a page may refer you not only to other pages in that book, but also to pages in other books.

There is a step beyond even that, however, and a truly expert reader can take it when he is reading several books syntopically. That is to make notes about the *shape of the discussion*—the discussion that is engaged in by all of the authors, even if unbeknownst to them. For reasons that will become clear in Part Four, we prefer to call such notes *dialectical*. Since they are made concerning several books, not just one, they often have to be made on a separate sheet (or sheets) of paper. Here, a structure of concepts is implied

—an order of statements and questions about a single subject matter. We will return to this kind of note-making in Chapter 20.

Forming the Habit of Reading

Any art or skill is possessed by those who have formed the habit of operating according to its rules. This is the way the artist or craftsman in any field differs from those who lack his skill.

Now there is no other way of forming a habit of operation than by operating. That is what it means to say one learns to do by doing. The difference between your activity before and after you have formed a habit is a difference in facility and readiness. After practice, you can do the same thing much better than when you started. That is what it means to say practice makes perfect. What you do very imperfectly at first, you gradually come to do with the kind of almost automatic perfection that an instinctive performance has. You do something as if you were born to it, as if the activity were as natural to you as walking or eating. That is what it means to say that habit is second nature.

Knowing the rules of an art is not the same as having the habit. When we speak of a man as skilled in any way, we do not mean that he knows the rules of making or doing something, but that he possesses the habit of making or doing it. Of course, it is true that knowing the rules, more or less explicitly, is a condition of getting the skill. You cannot follow rules you do not know. Nor can you acquire an artistic habit—any craft or skill—without following rules. The art as something that can be taught consists of rules to be followed in operation. The art as something learned and possessed consists of the habit that results from operating according to the rules.

Incidentally, not everyone understands that being an artist consists in operating according to rules. People point to a highly original painter or sculptor and say, “He isn’t following rules. He’s doing something entirely original, something that has never been done before, something for which there are no rules.” But they fail to see what rules it is that the artist follows. There are no final, unbreakable rules, strictly speaking, for making a painting or sculpture. But there are rules for preparing canvas and mixing paints and applying them, and for molding clay or welding steel. Those rules the painter or sculptor must have followed, or else he could not have made the thing he has made. No matter how original his final production, no matter how little it seems to obey the “rules” of art as they have traditionally been understood, he must be skilled to produce it. And this is the art—the skill or craft—that we are talking about here.

From Many Rules to One Habit

Reading is like skiing. When done well, when done by an expert, both reading and skiing are graceful, harmonious activities. When done by a beginner, both are awkward, frustrating, and slow.

Learning to ski is one of the most humiliating experiences an adult can undergo (that is one reason to start young). After all, an adult has been walking for a long time; he knows where his feet are; he knows how to put one foot in front of the other in order to get somewhere. But as soon as he puts skis on his feet, it is as though he had to learn to walk all over again. He slips and slides, falls down, has trouble getting up, gets his skis crossed, tumbles again, and generally looks—and feels—like a fool.

Even the best instructor seems at first to be no help. The ease with which the instructor performs actions that he says are simple but that the student secretly believes are impossible is almost insulting. How can you remember everything the instructor says you have to remember? Bend your knees. Look down the hill. Keep your weight on the downhill ski. Keep your back straight, but nevertheless lean forward. The admonitions seem endless—how can you think about all that and still ski?

The point about skiing, of course, is that you should not be thinking about the separate acts that, together, make a smooth turn or series of linked turns—instead, you should merely be looking ahead of you down the hill, anticipating bumps and other skiers, enjoying the feel of the cold wind on your cheeks, smiling with pleasure at the fluid grace of your body as you speed down the mountain. In other words, you must learn to forget the separate acts in order to perform all of them, and indeed any of them, well. But in order to forget them as separate acts, you have to learn them first as separate acts. Only then can you put them together to become a good skier.

It is the same with reading. Probably you have been reading for a long time, too, and starting to learn all over again can be humiliating. But it is just as true of reading as it is of skiing that you cannot coalesce a lot of different acts into one complex, harmonious performance until you become expert at each of them. You cannot telescope the different parts of the job so that they run into one another and fuse intimately. Each separate act requires your full attention while you are doing it. After you have practiced the parts separately, you can not only do each with greater facility and less attention but can also gradually put them together into a smoothly running whole.

All of this is common knowledge about learning a complex skill. We say it here merely because we want you to realize that learning to read is at least as complex as learning to ski or to typewrite or to play tennis. If you can recall your patience in any other learning experience you have had, you will be more tolerant of instructors who will shortly enumerate a long list of rules for reading.

The person who has had one experience in acquiring a complex skill knows that he need not fear the array of rules that present themselves at the beginning of something new to be learned. He knows that he does not have to worry about how all the separate acts in which he must become separately proficient are going to work together.

The multiplicity of the rules indicates the complexity of the one habit to be formed, not a plurality of distinct habits. The parts coalesce and telescope as each reaches the stage of automatic execution. When all the subordinate acts can be done more or less automatically, you have formed the habit of the whole performance. Then you can think about tackling an expert run you have never skied before, or reading a book that you once thought was too difficult for you. At the beginning, the learner pays attention to himself and his skill in the separate acts. When the acts have lost their separateness in the skill of the whole performance, the learner can at last pay attention to the goal that the technique he has acquired enables him to reach.

We hope we have encouraged you by the things we have said in these pages. It is hard to learn to read well. Not only is reading, especially analytical reading, a very complex activity—much more complex than skiing—it is also much more of a mental activity. The beginning skier must think of physical acts that he can later forget and perform almost automatically. It is relatively easy to think of and be conscious of physical acts. It is much harder to think of mental acts, as the beginning analytical reader must do; in a sense, he is thinking about his own thoughts. Most of us are unaccustomed to doing this. Nevertheless, it can be done, and a person who does it cannot help learning to read much better. [1](#). These four questions, as stated, together with the discussion of them that follows, apply mainly to expository or nonfiction works. However, the questions, when adapted, apply to fiction and poetry as well. The adaptations required are discussed in Chapters 14 and 15.

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2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed
4. Read or Listen The Full Book Without Stopping
5. Read or listen 25min and 5min break
 - Read or Listen 20 pages an Hour according Mortimer Adler
6. Read or Listen between 1-50 times the book
7. Speed of Audiobook.
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed.
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
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3. Pay attention to what you can understand and do not be stopped by what you cannot immediately grasp. Go right on reading past the point where you have difficulties in understanding, and you will soon come to things you do understand. Concentrate on these.

The Third Level of Reading: Analytical Reading

Pigeonholing a Book

We said at the beginning of this book that the instruction in reading that it provides applies to anything you have to or want to read. However, in expounding the rules of analytical reading, as we will do in Part Two, we may seem to be ignoring that fact. We will usually, if not always, refer to the reading of whole books. Why is this so?

The answer is simple. Reading a whole book, and especially a long and difficult one, poses the severest problems any reader can face. Reading a short story is almost always easier than reading a novel; reading an article is almost always easier than reading a book on the same subject. If you can read an epic poem or a novel, you can read a lyric or a short story; if you can read an expository book—a history, a philosophical work, a scientific treatise—you can read an article or abstract in the same field.

Hence everything that we will say about reading books applies to reading other materials of the kinds indicated. You are to understand, when we refer to the reading of books, that the rules expounded refer to lesser and more easily understood materials, too. Sometimes the rules do not apply to the latter in quite the same way, or to the extent that they apply to whole books. Nevertheless, it will always be easy for you to adapt them so that they are applicable.

The Importance of Classifying Books

Analysis of Genre.

RULE 1. YOU MUST KNOW WHAT KIND OF BOOK YOU ARE READING, AND YOU SHOULD KNOW THIS AS EARLY IN THE PROCESS AS POSSIBLE, PREFERABLY BEFORE YOU BEGIN TO READ. Is This a Fiction Book or Non Fiction Book?

You must know, for instance, whether you are reading fiction—a novel, a play, an epic, a lyric—or whether it is an expository work of some sort. Almost every reader knows a work of fiction when he sees it. Or so it seems—and yet this is not always easy. Is *Portnoy's Complaint* a novel or a psychoanalytical study? Is *Naked Lunch* a fiction or a tract against drug abuse, similar to the books that used to recount the horrors of alcohol for the betterment of readers? Is *Gone with the Wind* a romance or a history of the South before and during the Civil War? Do *Main Street* and *The Grapes of Wrath* belong in the category of belles-lettres or are both of them sociological studies, the one concentrating on urban experiences, the other on agrarian life?

All of these, of course, are novels; all of them appeared on the fiction side of the best-seller lists. Yet the questions are not absurd. Just by their titles, it would be hard to tell in the case of *Main Street* and *Middletown* which was fiction and which was social science.

There is so much social science in some contemporary novels, and so much fiction in much of sociology, that it is hard to keep them apart. But there is another kind of science, too—physics and chemistry, for instance—in books like *The Andromeda Strain* or the novels of Robert Heinlein or Arthur C. Clarke. And a book like *The Universe and Dr. Einstein*, while clearly not fiction, is almost as “readable” as a novel, and probably more readable than some of the novels of, say, William Faulkner.

An expository book is one that conveys knowledge primarily, “knowledge” being construed broadly. Any book that consists primarily of opinions, theories, hypotheses, or speculations, for which the claim is made more or less explicitly that they are true in some sense, conveys knowledge in this meaning of knowledge and is an expository work. As with fiction, most people know an expository work when they see it. Here, however, the problem is not to distinguish nonfiction from fiction, but to recognize that there are various kinds of expository books. It is not merely a question of knowing which books are primarily instructive, but also which are instructive in a particular way. The kinds of information or enlightenment that a history and a philosophical work afford are not the same. The problems dealt with by a book on physics and one on morals are not the same, nor are the methods the writers employ in solving such different problems.

Thus this first rule of analytical reading, though it is applicable to all books, applies particularly to nonfictional, expository works. How do you go about following the rule, particularly its last clause?

As we have already suggested, you do so by first inspecting the book—giving it an inspectional reading. You read the title, the subtitle, the table of contents, and you at least glance at the preface or introduction by the author and at the index. If the book has a dust jacket, you look at the publisher’s blurb. These are the signal flags the author waves to let you know which way the wind is blowing. It is not his fault if you will not stop, look, and listen.

What You Can Learn from the Title of a Book

The numbers of readers who pay no attention to the signals is larger than you might expect. We have had this experience again and again with students. We have asked them what a book was about. We have asked them, in the most general terms, to tell us what sort of book it was. This is a good way, almost an indispensable way, to begin a discussion of a book. Nevertheless, it is often hard to get any kind of answer to the question.

Let us take a couple of examples of the kind of confusion that can occur. In 1859, Darwin published a very famous book. A century later the entire English-speaking world celebrated the publication of the book. It was discussed endlessly, and its influence was assessed by learned and not-so-learned commentators. The book was about the theory of evolution, and the word “species” was in the title. What was the title?

Probably you said *The Origin of Species*, in which case you were correct. But you might not have said that. You might have said that the title was *The Origin of the Species*. Recently, we asked some twenty-five reasonably well-read persons what the title of Darwin's book was and more than half said *The Origin of the Species*. The reason for the mistake is obvious; they supposed, never having read the book, that it had something to do with the development of the human species. In fact, it has little or nothing to do with that subject, which Darwin covered in a later book, *The Descent of Man*. *The Origin of Species* is about what its title says it is about—namely the proliferation in the natural world of a vast number of species of plants and animals from an originally much smaller number of species, owing mainly to the principle of natural selection. We mention this common error because many think they know the title of the book, although few have actually ever read the title carefully and thought about what it means.

Here is another example. In this case we will not ask you to remember the title, but to think about what it means. Gibbon wrote a famous, and famously long, book about the Roman Empire. He called it *The Decline and Fall of the Roman Empire*. Almost everybody who takes up the book recognizes that title; and most people, even without the book in their hand, know the title. Indeed, the phrase “decline and fall” has become proverbial. Nevertheless, when we asked the same twenty-five well-read people why the first chapter is called “The Extent and Military Force of the Empire in the Age of the Antonines,” they had no idea. They did not see that if the book as a whole was titled *Decline and Fall*, then it might be assumed that the narrative would begin with the high point of the Roman Empire, and continue through to the end. Unconsciously, they had translated “decline and fall” into “rise and fall.” They were puzzled because there was no discussion of the Roman Republic, which ended a century and a half before the Age of the Antonines. If they had read the title carefully they could have assumed that the Age of the Antonines was the high point of the Empire, even if they had not known it before. Reading the title, in other words, could have given them essential information about the book before they started to read it; but they had failed to do that, as most people fail to do even with an unfamiliar book.

One reason why titles and prefaces are ignored by many readers is that they do not think it important to classify the book they are reading. They do not follow this first rule of analytical reading. If they tried to follow it, they would be grateful to the author for helping them. Obviously, the author thinks it is important for the reader to know the kind of book he is being given. That is why he goes to the trouble of making it plain in the preface, and usually tries to make his title—or at least his subtitle—descriptive. Thus, Einstein and Infeld, in their preface to *The Evolution of Physics*, tell the reader that they expect him to know “that a scientific book, even though popular, must not be read in the same way as a novel.” They also construct an analytical table of contents to advise the reader in advance of the details of their treatment. In any event, the chapter headings listed in the front serve the purpose of amplifying the significance of the main title.

The reader who ignores all these things has only himself to blame if he is puzzled by the question, What kind of book is this? He is going to become more perplexed. If he cannot answer that question, and if he never asks it of himself, he is going to be unable to answer a lot of other questions about the book. Important as reading titles is, it is not

enough. The clearest titles in the world, the most explicit front matter, will not help you to classify a book unless you have the broad lines of classification already in your mind.

You will not know the sense in which Euclid's *Elements of Geometry* and William James' *Principles of Psychology* are books of the same sort if you do not know that psychology and geometry are both sciences—and, incidentally, if you do not know that “elements” and “principles” mean much the same thing in these two titles (though not in general), nor will you further be able to distinguish them as different unless you know there are different kinds of science. Similarly, in the case of Aristotle's *Politics* and Adam Smith's *The Wealth of Nations*, you can tell how these books are alike and different only if you know what a practical problem is, and what different kinds of practical problems there are.

Titles sometimes make the grouping of books easy. Anyone would know that Euclid's *Elements*, Descartes' *Geometry*, and Hilbert's *Foundations of Geometry* are three mathematical books, more or less closely related in subject matter. This is not always the case. It might not be so easy to tell from the titles that Augustine's *The City of God*, Hobbes' *Leviathan*, and Rousseau's *Social Contract* are political treatises, although a careful perusal of their chapter headings would reveal the problems that are common to these three books.

Again, however, to group books as being of the same kind is not enough; to follow this first rule of reading you must know *what that kind is*. The title will not tell you, nor all the rest of the front matter, nor even the whole book itself sometimes, unless you have some categories you can apply to classify books intelligently. In other words, this rule has to be made a little more intelligible if you are to follow it intelligently. It can only be made intelligible by drawing distinctions and thus creating categories that make sense and will stand up to the test of time.

We have already discussed a rough classification of books. The main distinction, we said, was between works of fiction, on the one hand, and works conveying knowledge, or expository works, on the other hand. Among expository works, we can further distinguish history from philosophy, and both from science and mathematics.

Now this is all very well as far as it goes. This is a classification scheme with fairly perspicuous categories, and most people could probably place most books in the right category if they thought about it. But not all books in all categories.

The trouble is that as yet we have no principles of classification. We will have more to say about these principles as we proceed in our discussion of the higher levels of reading. For the moment, we want to confine ourselves to one basic distinction, a distinction that applies across the board to all expository works. It is the distinction between theoretical and practical works.

Practical vs. Theoretical Books

Everyone uses the words “theoretical” and “practical,” but not everyone knows what they mean, perhaps least of all the hardheaded practical man who distrusts all theorists, especially if they are in the government. For such persons, “theoretical” means visionary or even mystical; “practical” means something that works, something that has an immediate cash return. There is an element of truth in this. The practical has to do with what works in some way, at once or in the long run. The theoretical concerns something to be seen or understood. If we polish the rough truth that is here being grasped, we come to the distinction between knowledge and action as the two ends a writer may have in mind.

But, you may say, in dealing with expository books, are we not dealing with books that convey knowledge? How does action come into it? The answer, of course, is that intelligent action depends on knowledge. Knowledge can be used in many ways, not only for controlling nature and inventing useful machines or instruments but also for directing human conduct and regulating man’s operations in various fields of skill. What we have in mind here is exemplified by the distinction between pure and applied science, or, as it is sometimes very inaccurately expressed, between science and technology.

Some books and some teachers are interested only in the knowledge itself that they have to communicate. This does not mean that they deny its utility, or that they insist that knowledge is good *only* for its own sake. They simply limit themselves to one kind of communication or teaching, and leave the other kind to other men. These others have an interest beyond knowledge for its own sake. They are concerned with the problems of human life that knowledge can help to solve. They communicate knowledge, too, but always with a view to and an emphasis upon its application.

To make knowledge practical we must convert it into rules of operation. We must pass from knowing *what is the case* to knowing *what to do about it if we wish to get somewhere*. This can be summarized in the distinction between knowing *that* and knowing *how*. Theoretical books teach you *that* something is the case. Practical books teach you *how* to do something you want to do or think you should do.

This book is practical, not theoretical. Any guidebook is a practical book. Any book that tells you either what you *should* do or *how* to do it is practical. Thus you see that the class of practical books includes all expositions of arts to be learned, all manuals of practice in any field, such as engineering or medicine or cooking, and all treatises that are conveniently classified as moral, such as books on economic, ethical, or political problems. We will later explain why this last group of books, properly called “normative,” constitutes a very special category of practical books.

Probably no one would question our calling expositions of arts to be learned and manuals or rule books, practical works. But the “practical” man to whom we have referred might object to the notion that a book on ethics, say, or one on economics, was practical. He might say that such a book was not practical because it was not true or would not work.

In fact, this is irrelevant to the point, although a book about economics that is not true is a bad book. Strictly speaking, any ethical work teaches us how to live our lives, tells us what we should do and not do, and often informs us of the rewards and punishments attached to doing and not doing it. Thus, whether or not we agree with its conclusions, any such work is practical. (Some modern sociological studies merely report the actual behavior of men, without judging it. These are neither ethical nor practical books. They are theoretical works—works of science.)

Similarly with a work on economics. Apart from reportorial, mathematical, or statistical studies of economic behavior, which are theoretical rather than practical, such works usually teach us how to organize our economic life, either as individuals or as societies or states, tell us what we should do and not do, and also inform us of the penalties involved if we do not do what we should. Again, we may disagree, but our disagreement does not make the book unpractical.

Immanuel Kant wrote two famous philosophical works, one called *The Critique of Pure Reason*, the other, *The Critique of Practical Reason*. The first is about what is and how we know it—not how *to* know it, but how we in fact *do* know it—as well as about what can and cannot be known. It is a theoretical book *par excellence*. *The Critique of Practical Reason* is about how men should conduct themselves and about what constitutes virtuous or right conduct. This book places great emphasis on duty as the basis of all right action, and that emphasis may seem repellent to many modern readers. They may even say it is “impractical” to believe that duty is any longer a useful ethical concept. What they mean, of course, is that Kant is wrong, in their opinion, in his basic approach. But that does not mean that his book is any less a practical work in the sense we are employing here.

Apart from manuals and moral treatises (in the broad sense) one other instance of practical writing should be mentioned. An oration—a political speech or moral exhortation—certainly tries to tell you what you should do or how you should feel about something. Anyone who writes practically about anything not only tries to advise you but also tries to persuade you to follow his advice. Hence there is an element of oratory or exhortation in every moral treatise. It is also present in books that try to teach an art, such as this one. Thus, in addition to trying to teach you to read better, we have tried, and will continue to try, to persuade you to make the effort to do so.

Although every practical book is somewhat oratorical and hortatory, it does not follow that oratory and exhortation are coextensive with the practical. There is a difference between a political harangue and a treatise on politics, between economic propaganda and an analysis of economic problems. The *Communist Manifesto* is a piece of oratory, but Marx's *Capital* is much more than that.

Sometimes you can detect that a book is practical by its title. If the title contains such phrases as “the art of ” or “how to,” you can spot it at once. If the title names fields that you know are practical, such as ethics or politics, engineering or business, and in many cases economics, law, or medicine, you can classify the book fairly readily.

Titles can tell you even more than that. John Locke wrote two books with similar titles: *An Essay Concerning Human Understanding* and *A Treatise Concerning the Origin, Extent, and End of Civil Government*. Which of these is theoretical, which practical?

From the titles alone we may conclude that the first is theoretical, because any analysis of understanding would be theoretical, and that the second is practical, because problems of government are themselves practical. But one could go beyond that, employing the techniques of inspectional reading that we have described.

Locke wrote an introduction to the book on understanding. There he expressed his intention as being to inquire into the “origin, certainty, and extent of human knowledge.” The phrasing resembles the title of the book on government, but with one important difference. Locke was concerned with the *certainty* or validity of knowledge in the one case, and with the *end* or purpose of government in the other. Questions about the validity of something are theoretical, whereas to raise questions about the end of anything, the purpose it serves, is practical.

In describing the art of inspectional reading, we noted that you should not ordinarily stop after reading the front matter of a book and perhaps its index. You should read passages in the book that appear to be of a summary nature. You should also read the beginning and end of the book and of its major parts.

This becomes necessary when, as is sometimes the case, it is impossible to classify a book from its title and other front matter. In that case, you have to depend on signs to be found in the main body of the text. By paying attention to the words and keeping the basic categories in mind, you should be able to classify a book without reading very far.

A practical book will soon betray its character by the frequent occurrence of such words as “should” and “ought,” “good” and “bad,” “ends” and “means.” The characteristic statement in a practical book is one that says that something should be done (or made); or that this is the right way of doing (or making) something; or that one thing is better than another as an end to be sought, or a means to be chosen. In contrast, a theoretical book keeps saying “is,” not “should” or “ought.” It tries to show that something is true, that these are the facts; not that things would be better if they were otherwise, and here is the way to make them better.

Before turning to theoretical books, let us caution you against supposing that the problem is as simple as telling whether you are drinking coffee or milk. We have merely suggested some signs whereby you can begin to make discriminations. The better you understand everything that is involved in the distinction between the theoretical and the practical, the better you will be able to use the signs.

For one thing, you will have to learn to mistrust them. You have to be suspicious in classifying books. We have noted that although economics is primarily and usually a practical matter, there are nevertheless books on economics that are purely theoretical. Similarly, although understanding is primarily and usually a theoretical matter, there are books (most of them are terrible) that purport to teach you “how to think.” You will also find

authors who do not know the difference between theory and practice, just as there are novelists who do not know the difference between fiction and sociology. You will find books that are partly of one sort and partly of another, such as Spinoza's *Ethics*. It remains, nevertheless, to your advantage as a reader to detect the way an author approaches his problem.

Kinds of Theoretical Books

The traditional subdivision of theoretical books classifies them as history, science, and philosophy. Everybody knows the differences here in a rough way. It is only when you try to refine the obvious, and give the distinctions greater precision, that you get into difficulties. For the moment, let us try to skirt that danger and let rough approximations suffice.

In the case of history, the title usually does the trick. If the word "history" does not appear in the title, the rest of the front matter is likely to inform us that this is a book about something that happened in the past—not necessarily in the far past, of course, because it may have happened only yesterday. The essence of history is narration. History is knowledge of particular events or things that not only existed in the past but also underwent a series of changes in the course of time. The historian narrates these happenings and often colors his narrative with comment on, or insight into, the significance of the events.

History is chronotopic. *Chronos* is the Greek word for time, *topos* the Greek word for place. History always deals with things that existed or events that occurred on a particular date and in a particular place. The word "chronotopic" can remind you of that.

Science is not concerned with the past as such. It treats of matters than can happen at *any* time or place. The scientist seeks laws or generalizations. He wants to find out how things happen for the most part or in every case, not, as the historian does, how some particular things happened at a given time and place in the past.

The title of a scientific work is usually less revealing than the title of a history book. The word "science" sometimes appears, but more often the name of the subject matter appears, such as psychology or geology or physics. Then we must know whether that subject matter belongs to the scientist, as geology clearly does, or to the philosopher, as metaphysics clearly does. The trouble comes with the cases that are not so clear, such as physics and psychology, which have been claimed, at various times, by both scientists and philosophers. There is even trouble with the very words "philosophy" and "science," for they have been variously used. Aristotle called his book on *Physics* a scientific treatise, although according to current usage we should regard it as philosophical; and Newton titled his great work *Mathematical Principles of Natural Philosophy*, though for us it is one of the masterpieces of science.

Philosophy is like science and unlike history in that it seeks general truths rather than an account of particular events, either in the near or distant past. But the philosopher does

not ask the same questions as the scientist, nor does he employ the same kind of method to answer them.

Since titles and subject-matter names are not likely to help us determine whether a book is philosophical or scientific, how can we tell? There is one criterion that we think always works, although you may have to read a certain amount of the book before you can apply it. If a theoretical book emphasizes things that lie outside the scope of your normal, routine, daily experience, it is a scientific work. If not, it is philosophical.

The distinction may be surprising. Let us illustrate it. (Remember that it applies only to books that are either science or philosophy, not to books that are neither.) Galileo's *Two New Sciences* requires you to imagine, or to repeat for yourself in a laboratory, certain experiments with inclined planes. Newton's *Opticks* refers to experiences in dark rooms with prisms, mirrors, and specially controlled rays of light. The special experience to which the author refers may not have been obtained by him in a laboratory. The facts that Darwin reported in *The Origin of Species* he observed in the course of many years of work in the field. They are facts that can be and have been rechecked by other observers making a similar effort. But they are not facts that can be checked in terms of the ordinary daily experience of the average man.

In contrast, a philosophical book appeals to no facts or observations that lie outside the experience of the ordinary man. A philosopher refers the reader to his own normal and common experience for the verification or support of anything the writer has to say. Thus, Locke's *Essay Concerning Human Understanding* is a philosophical work in psychology, whereas many of Freud's writings are scientific. Locke makes every point in terms of the experience all of us have of our own mental processes. Freud can make many of his points only by reporting what he observed under the clinical conditions of the psychoanalyst's office.

William James, another great psychologist, took an interesting middle course. He reports many examples of the special experience that only the careful, trained observer can know about, but he also frequently asks the reader to judge whether what is being said is not true from his own experience. Thus James' *Principles of Psychology* is both a scientific and a philosophical work, although it is primarily scientific.

The distinction proposed here is popularly recognized when we say that science is experimental or depends upon elaborate observational researches, whereas philosophy is merely armchair thinking. The contrast should not be invidious. There are certain problems, some of them very important, that can be solved in an armchair by a man who knows how to think about them in the light of common, human experience. There are other problems that no amount of the best armchair thinking can solve. What is needed to solve them is investigation of some sort—experiments in the laboratory or research in the field—extending experience beyond the normal, everyday routine. Special experience is required.

This does not mean that the philosopher is a pure thinker and the scientist merely an observer. Both have to observe and think, but they think about different sorts of

observations. And however they may have arrived at the conclusions that they want to prove, they prove them in different ways, the scientist by pointing to the results of his special experiences, the philosopher by pointing to experiences that are common to all.

This difference in method always reveals itself in philosophical and scientific books, and that is how you can tell which sort of book you are reading. If you note the sort of experience that is being referred to as a condition of understanding what is being said, you will know whether the book is scientific or philosophical.

It is important to know this because, apart from the different kinds of experiences that they depend on, scientists and philosophers do not think in exactly the same way. Their styles in arguing are different. You must be able to find the terms and propositions—here we are getting a little ahead of ourselves—that constitute these different sorts of argumentation.

The same is true of history. Historical statements are different from scientific and philosophical ones. A historian argues differently and interprets facts differently. Furthermore, the typical history book is narrative in form. A narrative is a narrative, whether it be fact or fiction. The historian must write poetically, which means he must obey the rules for telling a good story. Whatever other excellences Locke's *Essay on Human Understanding* or Newton's *Principia* may have, neither is a good story.

You may object that we are making too much of the classification of books, at least before one has read them. Is it really all that important?

We may be able to meet the objections by calling your attention to one obvious fact. If you walked into a classroom in which a teacher was lecturing or otherwise instructing students, you could tell very soon whether the class was one in history, science, or philosophy. There would be something in the way the teacher proceeded, the kind of words he used, the type of arguments he employed, the sort of problems he proposed, and the kind of responses he expected from his students, that would give him away as belonging to one department or another. And it would make a difference to you to know this, if you were going to try to listen intelligently to what went on.

In short, the methods of teaching different kinds of subject matter are different. Any teacher knows this. Because of the difference in method and subject matter, the philosopher usually finds it easier to teach students who have not been previously taught by his colleagues, whereas the scientist prefers the student whom his colleagues have already prepared. And so forth and so on.

Now, just as there is a difference in the art of teaching in different fields, so there is a reciprocal difference in the art of being taught. The activity of the student must somehow be responsive to the activity of the instructor. The relation between books and their readers is the same as that between teachers and their students. Hence, as books differ in the kinds of knowledge they have to communicate, they proceed to instruct us differently; and, if we are to follow them, we must learn to read each kind in an appropriate manner. Analyse the Book based on each Book Genre. Below are list of the Kind of Books.

Different Kind Of Books

1. Practical vs. Theoretical Books.

Everyone uses the words “theoretical” and “practical,” but not everyone knows what they mean, perhaps least of all the hardheaded practical man who distrusts all theorists, especially if they are in the government. For such persons, “Theoretical” means visionary or even mystical; “practical” means something that works, something that has an immediate cash return. There is an element of truth in this. The practical has to do with what works in some way, at once or in the long run.

- I. The theoretical concerns something to be seen or understood. If we polish the rough truth that is here being grasped, we come to the distinction between knowledge and action as the two ends a writer may have in mind. But, you may say, in dealing with expository books, are we not dealing with books that convey knowledge? How does action come into it? The answer, of course, is that intelligent action depends on knowledge. Knowledge can be used in many ways, not only for controlling nature and inventing useful machines or instruments but also for directing human conduct and regulating man’s operations in various fields of skill. What we have in mind here is exemplified by the distinction between pure and applied science, or, as it is sometimes very inaccurately expressed, between science and technology. Some books and some teachers are interested only in the knowledge itself that they have to communicate. This does not mean that they deny its utility, or that they insist that knowledge is good only for its own sake. They simply limit themselves to one kind of communication or teaching, and leave the other kind to other men. These others have an interest beyond knowledge for its own sake. They are concerned with the problems of human life that knowledge can help to solve. They communicate knowledge, too, but always with a view to and an emphasis upon its application. To make knowledge practical we must convert it into rules of operation. We must pass from knowing what is the case to knowing what to do about it if we wish to get somewhere. This can be summarized in the distinction between knowing that and knowing how. Theoretical books teach you that something is the case. Practical books teach you how to do something you want to do or think you should do.
- II. This book is practical, not theoretical. Any guidebook is a practical book. Any book that tells you either what you should do or how to do it is practical. Thus you see that the class of practical books includes all expositions of arts to be learned, all manuals of practice in any field, such as engineering or medicine or cooking, and all treatises that are conveniently classified as moral, such as books on economic, ethical, or

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is also present in books that try to teach an art, such as this one. Thus, in addition to trying to teach you to read better, we have tried, and will continue to try, to persuade you to make the effort to do so. Although every practical book is somewhat oratorical and hortatory, it does not follow that oratory and exhortation are coextensive with the practical. There is a difference between a political harangue and a treatise on politics, between economic propaganda and an analysis of economic problems. The Communist Manifesto is a piece of oratory, but Marx's *Capital* is much more than that. Sometimes you can detect that a book is practical by its title. If the title contains such phrases as "the art of " or "how to," you can spot it at once. If the title names fields that you know are practical, such as ethics or politics, engineering or business, and in many cases economics, law, or medicine, you can classify the book fairly readily. Titles can tell you even more than that. John Locke wrote two books with similar titles: *An Essay Concerning Human Understanding* and *A Treatise Concerning the Origin, Extent, and End of Civil Government*. Which of these is theoretical, which practical? From the titles alone we may conclude that the first is theoretical, because any analysis of understanding would be theoretical, and that the second is practical, because problems of government are themselves practical. But one could go beyond that, employing the techniques of inspectional reading that we have described. Locke wrote an introduction to the book on understanding. There he expressed his intention as being to inquire into the "origin, certainty, and extent of human knowledge." The phrasing resembles the title of the book on government, but with one important difference. Locke was concerned with the certainty or validity of knowledge in the one case, and with the end or purpose of government in the other. Questions about the validity of something are theoretical, whereas to raise questions about the end of anything, the purpose it serves, is practical. In describing the art of inspectional reading, we noted that you should not ordinarily stop after reading the front matter of a book and perhaps its index. You should read passages in the book that appear to be of a summary nature. You should also read the beginning and end of the book and of its major parts. This becomes necessary when, as is sometimes the case, it is impossible to classify a book from its title and other front matter. In that case, you have to depend on signs to be found in the main body of the text. By paying attention to the words and keeping the basic categories in mind, you should be able to classify a book without reading very far. A practical book will soon betray its character by the frequent occurrence of such words as "should" and "ought," "good" and "bad," "ends" and

“means.” The characteristic statement in a practical book is one that says that something should be done (or made); or that this is the right way of doing (or making) something; or that one thing is better than another as an end to be sought, or a means to be chosen. In contrast, a theoretical book keeps saying “is,” not “should” or “ought.” It tries to show that something is true, that these are the facts; not that things would be better if they were otherwise, and here is the way to make them better. Before turning to theoretical books, let us caution you against supposing that the problem is as simple as telling whether you are drinking coffee or milk. We have merely suggested some signs whereby you can begin to make discriminations. The better you understand everything that is involved in the distinction between the theoretical and the practical, the better you will be able to use the signs. For one thing, you will have to learn to mistrust them. You have to be suspicious in classifying books. We have noted that although economics is primarily and usually a practical matter, there are nevertheless books on economics that are purely theoretical. Similarly, although understanding is primarily and usually a theoretical matter, there are books (most of them are terrible) that purport to teach you “how to think.” You will also find authors who do not know the difference between theory and practice, just as there are novelists who do not know the difference between fiction and sociology. You will find books that are partly of one sort and partly of another, such as Spinoza’s *Ethics*. It remains, nevertheless, to your advantage as a reader to detect the way an author approaches his problem.

2. Kinds of Theoretical Books.

The traditional subdivision of theoretical books classifies them as history, science, and philosophy. Everybody knows the differences here in a rough way. It is only when you try to refine the obvious, and give the distinctions greater precision, that you get into difficulties. For the moment, let us try to skirt that danger and let rough approximations suffice. In the case of history, the title usually does the trick. If the word “history” does not appear in the title, the rest of the front matter is likely to inform us that this is a book about something that happened in the past—not necessarily in the far past, of course, because it may have happened only yesterday. The essence of history is narration. History is knowledge of particular events or things that not only existed in the past but also underwent a series of changes in the course of time. The historian narrates these happenings and often colors his narrative with comment on, or insight into, the significance of the events. History is chronotopic. Chronos is the Greek word for time, topos the Greek word for place. History always deals with things that existed or events that occurred on a particular date and in a particular place. The word “chronotopic” can remind you of that. Science is not concerned with the past as such. It treats of matters than can happen at any time or place. The scientist seeks laws or generalizations. He wants to find out how things happen for the most part or in every case, not, as the historian does, how some particular things happened at a given time and place in the past. The title of a scientific work is usually less revealing than the title of a history book. The word “science” sometimes appears, but more often the name of the subject matter appears, such as psychology or geology or physics. Then we must know whether that subject matter belongs to the scientist, as geology clearly does, or to the philosopher, as metaphysics clearly does. The trouble comes with the cases that are not so clear, such as physics and psychology, which have been claimed, at various times, by both scientists and philosophers. There is even trouble with the very words “philosophy” and “science,” for they have been variously used. Aristotle called his book on Physics a scientific treatise, although according to current usage we should regard it as philosophical; and Newton titled his great work Mathematical Principles of Natural Philosophy, though for us it is one of the masterpieces of science. Philosophy is like science and unlike history in that it seeks general truths rather than an account of particular events, either in the near or distant past. But the philosopher does not ask the same questions as the scientist, nor does he employ the same kind of method to answer them.

Since titles and subject-matter names are not likely to help us determine whether a book is philosophical or scientific, how can we tell? There is one criterion that we think always

works, although you may have to read a certain amount of the book before you can apply it. If a theoretical book emphasizes things that lie outside the scope of your normal, routine, daily experience, it is a scientific work. If not, it is philosophical. The distinction may be surprising. Let us illustrate it. (Remember that it applies only to books that are either science or philosophy, not to books that are neither.) Galileo's *Two New Sciences* requires you to imagine, or to repeat for yourself in a laboratory, certain experiments with inclined planes. Newton's *Opticks* refers to experiences in dark rooms with prisms, mirrors, and specially controlled rays of light. The special experience to which the author refers may not have been obtained by him in a laboratory. The facts that Darwin reported in *The Origin of Species* he observed in the course of many years of work in the field. They are facts that can be and have been rechecked by other observers making a similar effort. But they are not facts that can be checked in terms of the ordinary daily experience of the average man. In contrast, a philosophical book appeals to no facts or observations that lie outside the experience of the ordinary man. A philosopher refers the reader to his own normal and common experience for the verification or support of anything the writer has to say. Thus, Locke's *Essay Concerning Human Understanding* is a philosophical work in psychology, whereas many of Freud's writings are scientific. Locke makes every point in terms of the experience all of us have of our own mental processes. Freud can make many of his points only by reporting what he observed under the clinical conditions of the psychoanalyst's office. William James, another great psychologist, took an interesting middle course. He reports many examples of the special experience that only the careful, trained observer can know about, but he also frequently asks the reader to judge whether what is being said is not true from his own experience. Thus James' *Principles of Psychology* is both a scientific and a philosophical work, although it is primarily scientific. The distinction proposed here is popularly recognized when we say that science is experimental or depends upon elaborate observational researches, whereas philosophy is merely armchair thinking. The contrast should not be invidious. There are certain problems, some of them very important, that can be solved in an armchair by a man who knows how to think about them in the light of common, human experience. There are other problems that no amount of the best armchair thinking can solve. What is needed to solve them is investigation of some sort— experiments in the laboratory or research in the field—extending experience beyond the normal, everyday routine. Special experience is required. This does not mean that the philosopher is a pure thinker and the scientist merely an observer. Both have to observe and think, but they think about different sorts of observations. And however they may have arrived at the conclusions that they want to

prove, they prove them in different ways, the scientist by pointing to the results of his special experiences, the philosopher by pointing to experiences that are common to all. This difference in method always reveals itself in philosophical and scientific books, and that is how you can tell which sort of book you are reading. If you note the sort of experience that is being referred to as a condition of understanding what is being said, you will know whether the book is scientific or philosophical. It is important to know this because, apart from the different kinds of experiences that they depend on, scientists and philosophers do not think in exactly the same way. Their styles in arguing are different. You must be able to find the terms and propositions—here we are getting a little ahead of ourselves—that constitute these different sorts of argumentation. The same is true of history. Historical statements are different from scientific and philosophical ones. A historian argues differently and interprets facts differently. Furthermore, the typical history book is narrative in form. A narrative is a narrative, whether it be fact or fiction. The historian must write poetically, which means he must obey the rules for telling a good story. Whatever other excellences Locke's *Essay on Human Understanding* or Newton's *Principia* may have, neither is a good story. You may object that we are making too much of the classification of books, at least before one has read them. Is it really all that important?

We may be able to meet the objections by calling your attention to one obvious fact. If you walked into a classroom in which a teacher was lecturing or otherwise instructing students, you could tell very soon whether the class was one in history, science, or philosophy. There would be something in the way the teacher proceeded, the kind of words he used, the type of arguments he employed, the sort of problems he proposed, and the kind of responses he expected from his students, that would give him away as belonging to one department or another. And it would make a difference to you to know this, if you were going to try to listen intelligently to what went on. In short, the methods of teaching different kinds of subject matter are different. Any teacher knows this. Because of the difference in method and subject matter, the philosopher usually finds it easier to teach students who have not been previously taught by his colleagues, whereas the scientist prefers the student whom his colleagues have already prepared. And so forth and so on. Now, just as there is a difference in the art of teaching in different fields, so there is a reciprocal difference in the art of being taught. The activity of the student must somehow be responsive to the activity of the instructor. The relation between books and their readers is the same as that between teachers and their students. Hence, as books differ in the

kinds of knowledge they have to communicate, they proceed to instruct us differently; and, if we are to follow them, we must learn to read each kind in an appropriate manner.

3. Historical Books

“History,” like “poetry,” is a word of many meanings. In order for this chapter to be useful to you, we must come to terms with you about the word—that is, explain how we will be using it.

First of all, there is the difference between history as fact and history as a written record of the facts. We are obviously, here, employing the term in the latter sense, since in our sense of “read” you cannot read facts. But there are many kinds of written record that are called historical. A collection of documents pertaining to a certain event or period could be called a history of it. A transcription of an oral interview with a participant, or a collection of such transcriptions, could similarly be called a history of the event in which he or they participated. A work having quite a different intention, such as a personal diary or collection of letters, could be construed as being a history of the time. The word could be applied, and indeed has been applied, to almost every kind of writing that originated in a time period, or in the context of an event, in which the reader was interested. The sense in which we use the word “history” in what follows is both narrower and broader than any of those. It is narrower because we want to restrict ourselves to essentially narrative accounts, presented in a more or less formal manner, of a period or event or series of events in the past. This is a traditional use of the term, and we do not apologize for it. Again, as with our definition of lyric poetry, we think you will agree with us that this is the ordinary meaning of the term, and we want to stick to the ordinary here. But our meaning is also broader than many of the definitions of the term that are current today. We think, although not all historians agree with us, that the essence of history is narration, that the last five letters of the word—“story”—help us to understand the basic meaning. Even a collection of documents, as a collection, tells a story. That story may not be explicit—that is, the historian may try not to arrange the documents in any “meaningful” order. But it is implicit in them, whether they are ordered or not. Otherwise, we think, the collection would not be called a history of its time. It is not important, however, whether all historians agree with us in our notion of what history is. There is a great deal of history of the kind we are discussing, and you will want to or have to read at least some of it. We will try to aid you in that task.

The Elusiveness of Historical Facts

Probably you have been a member of a jury, listening to the testimony about a simple matter of fact, such as an automobile accident. Or you may have been on a blue ribbon jury, and have had to decide whether one person killed another or not. If you have done either, you know how difficult it is to reconstruct the past, even a single event in the past, from the memories of persons who actually saw it happen. A court concerns itself with events that have happened fairly recently and in the presence of living witnesses. In addition, there are stringent rules of evidence. A witness cannot suppose anything, he cannot guess or hypothecate or estimate (except under very carefully controlled conditions). And of course he is not supposed to lie. With all the careful rules of evidence, and cross-examination besides, have you ever been absolutely sure, as a member of a jury, that you really knew what happened? The law assumes that you will not be absolutely sure. It assumes that there will always be some doubt in a juror's mind. As a matter of practice, in order that trials may be decided one way or the other, it says that the doubt must be "reasonable" if it is to be allowed to affect your judgment. The doubt must be, in other words, sufficient to trouble your conscience. A historian is concerned with events that occurred, most of them, a long time ago. All the witnesses to the events are usually dead. What evidence they give is not given in a courtroom—that is, it is not governed by stringent and careful rules. Such witnesses as there are often guess, hypothecate, estimate, assume, and suppose. We cannot see their faces in order to judge whether they are lying (if we ever really can know that about anybody). They are not cross-examined. And there is no guarantee whatever that they know what they are talking about. If, then, it is difficult to be sure that one knows about the truth of a relatively simple matter, such as is decided by a jury in a court of law, how much more difficult it is to know what really happened in history. A historical fact, though we may have a feeling of trust and solidity about the word, is one of the most elusive things in the world. Of course, about some kinds of historical fact we can be pretty certain. America was involved in a Civil War that began with the firing on Fort Sumter, on April 12, 1861, and ended with the surrender of General Lee to General Grant at Appomattox Court House, on April 9, 1865. Everyone agrees about those dates. It is not likely (though it is not totally impossible) that every American calendar was incorrect at that time. But how much have we learned if we know exactly when the Civil War started and when it ended? Indeed, those dates have been disputed—not on the grounds that the calendars were wrong, but that the war really started with the election of Lincoln in the fall of 1860 and ended with his assassination five days after Lee's surrender. Others have claimed that the war started even earlier—as much as five or ten

or twenty years before 1861—and we know that it was still actually being fought in outlying parts of the United States, to which word had not yet come of the Northern triumph, as late as May, June, and July, 1865. And there are those, too, who feel that the Civil War is not over yet, that it will never be over until black Americans are completely free and equal, or until the South manages to secede from the Union, or until the right of the federal government to control all the states is finally established and accepted by every American everywhere. At least we do know, one might say, that whether or not the firing on Fort Sumter started the Civil War, it did occur on April 12, 1861. That is true—within the limits of possibility we referred to before. But why was Sumter fired on? That is an obvious next question. And could war still have been avoided after the attack? If it had been, would we care that such and such an assault occurred on such and such a spring day more than a century ago? If we did not care—and we do not care about many attacks on forts that have doubtless occurred, but about which we know nothing whatever—would the firing on Sumter still be a significant historical fact?

Theories of History

We class history, the story of the past, more often under fiction than under science— if it must be affiliated with one or the other. If not, if history, that is, is allowed to rest somewhere in between the two main divisions of the kinds of books, then it is usually admitted that history is closer to fiction than to science. This does not mean that a historian makes up his facts, like a poet or story teller. However, we might get into trouble if we insisted too strongly that a writer of fiction makes up his facts. He creates a world, as we have said. But this new world is not totally different from our own—indeed, it had better not be—and a poet is an ordinary man, with ordinary senses by and through which he has learned. He does not see things that we cannot see (he may see better or in a slightly different way). His characters use words that we use (otherwise we could not believe in them). It is only in dreams that human beings create really strange new worlds—yet even in the most fantastic dream the events and creatures of the imagination are made up out of elements of everyday experience. They are merely put together in strange new ways. A good historian does not, of course, make up the past. He considers himself responsibly bound by some concept or criterion of accuracy or facts. Nevertheless, it is important to remember that the historian must always make up something. He must either find a general pattern in, or impose one on, events; or he must suppose that he knows why the persons in his story did the things they did. He may have a general theory or philosophy, such as that Providence rules human affairs, and make his history fit that. Or he may

abjure any such pattern, imposed as it were from the outside or above, and instead insist that he is merely reporting the real events that have occurred. But in that case he is likely to be forced to assign causes for events and motivations for actions. It is essential to recognize which way the historian you are reading is operating. The only way to avoid taking either one or the other position is to assume that men do not do things for a purpose, or that the purpose, if it exists, is undiscoverable—in other words, that there is no pattern to history at all. Tolstoy had such a theory about history. He was not a historian, of course; he was a novelist. But many historians have held the same view, particularly in modern times. The causes of every human action, Tolstoy thought, were so manifold, so complex, and so deeply hidden in unconscious motivations that it is impossible to know why anything ever happened. Because theories of history differ, and because a historian's theory affects his account of events, it is necessary to read more than one account of the history of an event or period if we want to understand it. Indeed, this is the first rule of reading history. And it is all the more important if the event in which we are interested has practical significance for us. It is probably of practical significance to all Americans that they know something about the history of the Civil War. We still live in the backwash of that great and sorry conflict; we live in a world it helped to make. But we cannot hope to understand it if we look at it through the eyes of only one man, or one side, or one faction of modern academic historians. The other day we opened a new Civil War history and noted that its author offered it as "an impartial, objective history of the Civil War from the point of view of the South." The author appeared to be serious. Maybe he was; maybe such a thing is possible. At any rate, we would admit that every narrative history has to be written from some point of view. But to get at the truth, we ought to look at it from more than one viewpoint.

The Universal in History

We are not always able to read more than one history of an event. When we are not, we must admit that we do not have much chance of learning the truth of the matter in question—of learning what really happened. However, that is not the only reason to read history. It might be claimed that only the professional historian, the man who is writing a history himself, is required to cross-examine his sources by exhaustively checking one against the other. He must leave no stone unturned if he is to know what he ought to know about his subject. We, as lay readers of history, stand somewhere between the professional historian, on the one hand, and the irresponsible amateur, on the other hand, who reads history only for amusement. Let us take the example of Thucydides. You may be aware that he wrote the only major contemporary history of the Peloponnesian War at the end of the fifth century B.C. In a sense, there is nothing to check his work against. What, then, can we expect to learn from it? Greece is now a tiny country; a war that occurred there twenty-five centuries ago can have little real effect on our life today. Everyone who fought in it is long dead, and the specific things for which they fought are long dead, too. The victories are now meaningless, and the defeats without pain. The cities that were taken and lost have crumbled into dust. Indeed, if we stop to think of it, almost all that remains of the Peloponnesian War is Thucydides' account of it. Yet that account is still important. For Thucydides' story—we might as well use that word—has had an influence on the subsequent history of man. Leaders in later eras read Thucydides. When they found themselves in situations that even faintly approximated that of the tragically divided Greek city-states, they compared their own position to that of Athens or Sparta. They used Thucydides as an excuse and a justification, and even as a pattern of conduct. The result was that by ever so little, perhaps, but perceptibly, the history of the world was changed by the view held of a small portion of it by Thucydides in the fifth century B.C. Thus we read Thucydides not because he described perfectly what happened before he wrote his book, but because he to a certain extent determined what happened after. And we read him, strange as this may seem, to know what is happening now. "Poetry is more philosophical than history," wrote Aristotle. By this he meant that poetry is more general, more universal. A good poem is true not only in its own time and place, but in all times and places. It has meaning and force for all men. History is not quite so universal as that. It is tied to events in a way that poetry is not. But any good history is also universal. Thucydides himself said that he was writing his history so that men of the future would not have to repeat the mistakes he had seen made and from which he had suffered personally and through the agony of his country. He described the kinds of human mistakes that would have meaning

to men other than himself, to men other than Greeks. Yet some of the very same errors that the Athenians and the Spartans made 2,500 years ago, or at least very similar ones, are being made now, as they have been made over and over again since Thucydides' time. If your view of history is limited, if you go to it to discover only what really happened, you will not learn the main thing that Thucydides, or indeed any good historian, has to teach. If you read Thucydides well, you may even decide to give up trying to discover what really happened in the past.

History is the story of what led up to now. It is the present that interests us—that and the future. The future will be partly determined by the present. Thus, you can learn something about the future, too, from a historian, even from one who like Thucydides lived more than two thousand years ago. Let us sum up these two suggestions for reading history. The first is: if you can, read more than one history of an event or period that interests you. The second is: read a history not only to learn what really happened at a particular time and place in the past, but also to learn the way men act in all times and places, especially now.

4. Biography.

A biography is a story about a real person. This mixed patrimony causes it to have a mixed character.

Some biographers would object to this description. But ordinarily, at least, a biography is a narrative account of the life, the history, of a man or woman or of a group of people; thus, a biography poses many of the same problems as a history. The reader must ask the same sort of questions—what is the author's purpose? What are his criteria of truth?—as well, of course, as asking the questions we must ask of any book.

There are several kinds of biographies. The *definitive* biography is intended to be the final, exhaustive, scholarly work on the life of someone important enough to deserve a definitive biography. Definitive biographies cannot be written about living persons. They are seldom written until several non-definitive biographies have first appeared, all of them often somewhat inadequate. All sources are gone through, all letters read, and a great deal of contemporary history examined by the author. Since the ability to gather the materials is somewhat different from the talent for shaping them into a good book, definitive biographies are not always easy reading. This is too bad. A scholarly book does not have to be dull. One of the greatest of all biographies is Boswell's *Life of Johnson*, and it is continuously fascinating. It is certainly definitive (though other biographies of Dr. Johnson have since appeared), but it is also uniquely interesting.

A definitive biography is a slice of history—the history of a man and of his times, as seen through his eyes. It should be read as history. An *authorised* biography is not the same thing at all. Such works are usually commissioned by the heirs or friends of some important person, and they are carefully written so that the errors the person made and the triumphs he achieved are seen in the best light possible. They can sometimes be very good indeed, because the author has the advantage—not as a rule accorded to other writers—of being allowed access to all pertinent material by those who control it. But, of course, an authorised biography cannot be trusted in the same way that a definitive biography can be. Instead of reading it simply as history, the reader should understand that it may be biased—that this is the way the reader is expected to think of the book's subject; this is the way his friends and associates want him to be known to the world.

The authorised biography is a kind of history, but it is history with a difference. We may be curious to know what interested persons want the public to know about someone's private life, but we should not expect to know what the private life really was. The reading of an authorised biography will thus often tell us much about the time in which it was written, about its customs and manners, about those actions and attitudes that were acceptable—and, by implication and with a little extrapolation, about those that were not. But we should not hope to discover the real life of a human being any more than we would hope to know the real story of a war if we read the communiqués of only one side. To get at the truth we must read all the communiqués, ask people who were there, and use our own minds to make sense out of the muddle. A definitive biography has already done this work; in the case of an authorised biography (and most biographies of living persons are of this sort), there is still much to do.

There remain those biographies that are neither definitive nor authorised. Perhaps we may call them ordinary biographies. In such works, we expect the author to be accurate, to know his facts. We want above all to be given the feeling that we are viewing the life of a real person in another time and place. Human beings are curious, and especially curious about other human beings.

Such books, although not trustworthy in the way definitive biographies are, are often very good reading. The world would be the poorer without Izaak Walton's *Lives* of his friends, the poets John Donne and George Herbert, for example (Walton is of course better known for his *The Compleat Angler*); or John Tyndall's account of his friend Michael Faraday in *Faraday the Discoverer*.

Some biographies are didactic. They have a moral purpose. Not many of this sort are written any more, but they used to be common. (They are still written for children, of course.) Plutarch's *Lives of the Noble Grecians and Romans* is such a work. Plutarch told the stories of great men of the Greek and Roman past in order to help his contemporaries to be great also, and to help them avoid the errors into which the great so often fall—or so he felt. The *Lives* is a marvellous book; but, although many of the accounts are the only ones we have of their subjects, we do not read it so much for its biographical information as for its view of life in general. Its subjects are interesting people, good and bad, but never indifferent. Plutarch realised this himself. His original intention in writing had been to instruct others, he said, but in the course of the work he discovered that more and more it was he himself who was deriving profit and stimulation from “lodging these men one after the other in his house.”

Incidentally, Plutarch's is another historical work that has exercised a profound influence on subsequent history. For example, just as Plutarch shows Alexander the Great modelling his own life on that of Achilles (whose life he learned about from Homer), so many later conquerors have tried to model their lives on that of Plutarch's Alexander.

5. Autobiography

Autobiographies present some different and interesting problems. First of all, it is questionable whether anyone has ever written a true autobiography. If it is difficult to know the life of anyone else, it is even more difficult to know one's own. And, of course, all autobiographies have to be written about lives that are not yet complete.

The temptation to tell either less or more than the truth (the latter may be more common), when there is no one to contradict you, is almost irresistible. Everybody has some secrets he cannot bear to divulge; everybody also has some illusions about himself, which it is almost impossible for him to regard as illusions. However, although it is not possible to write a wholly true autobiography, neither is it possible to write one that contains no truth at all. Just as no man can be a perfect liar, so every autobiography tells us something about its author, if only that there are things that he wants to conceal.

It is customary to say that the *Confessions* of Rousseau, or some other book written about the same time (about the middle of the eighteenth century), is the first real autobiography. This is to overlook Augustine's *Confessions*, for example, and Montaigne's *Essays*; but the error is more serious than that. In fact, much of what anyone writes on any subject is autobiographical. There is a great deal of Plato in the *Republic*, of Milton in *Paradise Lost*, of Goethe in *Faust*—though we may not be able to put our finger on it exactly. If we are interested in humanity, we will tend, within reasonable limits, to read any book partly with an eye to discovering the character of its author.

This should never be the primary consideration, and it leads, when it is overdone, to the so-called pathetic fallacy. But we should remember that words do not write themselves—the ones we read have been found and written down by a living man. Plato and Aristotle said some similar, and some dissimilar, things; but even if they had agreed completely, they could not have written the same books, for they were different men. We may even discover something of St. Thomas Aquinas in such an apparently unrevealing work as the *Summa Theologica*.

Thus it matters very little that *formal* autobiography is a relatively new literary genre. No one has ever been able to keep himself entirely out of his book. "I have no more made my book," said Montaigne, "than my book has made me; a book co-substantial with its author, concerned with my own self, an integral part of my life." And he added, "Everyone recognizes me in my book, and my book in me." This is true, and not only of Montaigne. "This is no book," says Whitman of his *Leaves of Grass*. "Who touches this touches a man."

Are there any additional hints for reading biographies and autobiographies? Here is one that is important. Despite the fact that such books, and especially the autobiographies, reveal much about their authors, we should not spend so much time trying to discover a writer's secrets that we do not find out what he says plainly. Apart from this, given the fact that such books are often more poetical than discursive or philosophical, and that they are special kinds of history, there is perhaps little more to add. You should remember, of course, that if you wish to know the truth about a person's life, you should read as many

biographies of him as you can find, including his own account of his life, if he wrote one. Read biography as history and as the cause of history; take all autobiographies with a grain of salt; and never forget that you must not argue with a book until you fully understand what it is saying. As to the question, What of it?, we would only say this: biography, like history, can be a cause of practical, moral action. A biography can be inspiring. It is the story of a life, usually a more or less successful one—and we too have lives to lead.

6. Current Events

We have said that our exposition of the art of analytical reading applies to everything you have to read, not just to books. Now we want to qualify that statement a little. Analytical reading is not always necessary. There are many things that we read that do not require the kind of effort and skill that is called for at this third level of reading ability. Nevertheless, although the rules of reading do not all always have to be applied, the four questions must always be asked of anything you read. That means, of course, that they must be asked when you are faced with the kind of things to which most of us devote much of our reading time: newspapers, magazines, books about current events, and the like.

After all, history did not stop a thousand years ago, or a hundred. The world goes on, and men and women continue to write about what is happening and how things are changing. Perhaps no modern history is as great as Thucydides' work; posterity will have to be the judge of that. But we do have an obligation, as human beings and as citizens, to try to understand the world around us.

The problem comes down to knowing what is actually happening now. We have chosen the word "actually" in the last sentence intentionally. The French word for newsreel is *actualités*; the whole concept of current events literature is somehow the same as that of the "news." How do we get the news, and how do we know that what we get is true?

You can see at once that we are faced with the same problem that is posed by history itself. We cannot be sure that we are getting at the facts—we cannot be sure that we know what is happening now any more than we can be sure about what happened in the past. And yet we must try to know, so far as that is possible.

If we could be everywhere at once, overhear all conversations on earth, look into the heart of every living person, we might be able to make a stab at the truth of current events. Being human and hence limited, we must fall back on the services of reporters. Reporters are persons who are supposed to know what is happening in a small area. They report it in newspaper stories, in magazines, or in books. What we can know depends on them.

Ideally, a reporter, of whatever kind, is a clear glass in which reality is reflected—or through which it shines. But the human mind is not a clear glass. It is not a good reflector, and when reality shines through it, the mind is not a very good filter. It separates out what it considers to be unreality, untruth. That is proper, of course; a reporter should not report what he thinks is false. But he may be mistaken.

Thus the most important thing to know, when reading any report of current happenings, is *who is writing the report*. What is involved here is not so much an acquaintance with the reporter himself as with the *kind* of mind he has. The various sorts of filter-reporters fall into groups. To understand what kind of filter our reporter's mind is, we must ask a series of questions about it. This amounts to asking a series of questions about any material dealing with current events. The questions are these:

1. What does the author want to prove?
2. Whom does he want to convince?
3. What special knowledge does he assume?
4. What special language does he use?
5. Does he really know what he is talking about?

For the most part it is safe to assume that all current events books want to prove something. Often it is easy enough to discover what this is. The blurb often states the main contention or thesis of such books. If it does not appear there, it may be stated by the author in a preface.

Having asked what the book is trying to prove, you should next ask whom the author is trying to convince. Is the book intended for those “in the know”—and are you in that category? Is it for that small group of persons who can do something, and quickly, about the situation the author describes? Or is it for everyone? If you do not belong to the audience for which the book is intended, you may not want to read it.

You must next discover what special knowledge the author assumes that you have. The word “knowledge” is intended here to cover a lot of ground. “Opinion” or “prejudice” might have been a better choice. Many authors write only for readers who agree with them. If you disagree sharply with a reporter’s assumptions, you may only be irritated if you try to read his book.

The assumptions that an author makes, and that he assumes you share, are sometimes very difficult to discover. In *The Seventeenth Century Background*, Basil Willey has this to say:

. . . it is almost insuperably difficult to become critically conscious of one’s own habitual assumptions; “doctrines felt as facts” can only be seen to be doctrines, and not facts, after great efforts of thought, and usually only with the aid of a first-rate metaphysician.

He goes on to suggest that it is easier to discover the “doctrines felt as facts” of an age different from our own, and that is what he attempts to do in his book. In reading books about our own time, however, we do not have the advantage of distance. Thus we must try to see through the filter not only of the author-reporter’s mind, but also of our own.

Next, you must ask if there is a special language that the author uses. This is particularly important in reading magazines and newspapers, but it also applies to all books about current history. Certain words provoke special responses from us, responses that they might not provoke from other readers a century hence. An example of such a word is “Communism” or “Communist.” We should try to control these responses, or at least know when they occur.

Finally, you must consider the last of the five questions, which is probably the hardest to answer. Does the reporter whose work you are reading himself know the facts? Is he privy to the perhaps secret thoughts and decisions of the persons about whom he is writing? Does he know all that he should know in order to give a fair and balanced account of the situation?

What we are suggesting, in other words, is that the possible bias of the author-reporter is not the only thing that has to be considered. We have heard a good deal lately about the “management of the news”; it is important to realize that this applies not only to us, as members of the public, but also to reporters who are supposed to be “in the know.” They may not be. With the best good will in the world, with every intention of providing us with the truth of the matter, a reporter may still be “uninformed” with regard to secret actions, treaties, and so forth. He himself may be aware of this, or he may not. In the latter case, of course, the situation is especially perilous for his reader.

You will note that these five questions are really only variations on the questions we have said you must ask of any expository book. Knowing an author’s special language, for example, is nothing more than coming to terms with him. But because current books and other material about the contemporary world pose special problems for us as readers, we have stated the questions in a different way.

Perhaps it is most useful to sum up the difference in a warning rather than a set of rules for reading books of this kind. The warning is this: *Caveat lector*—“Let the reader beware.” Readers do not have to be wary when reading Aristotle, or Dante, or Shakespeare. But the author of any contemporary book may have—though he does not necessarily have—an interest in your understanding it in a certain way. Or if he does not, the sources of his information may have such an interest. You should know that interest, and take it into account in whatever you read.

A Note on Digests

There is another consequence of our basic distinction—the distinction between reading for information and reading for understanding—that underlies everything we have said about reading. And this is that sometimes we have to read for information about understanding—to find out how others have interpreted the facts. Let us try to explain what this means.

For the most part, we read newspapers and magazines, and even advertising matter, for the information they contain. The amount of such material is vast, so vast that no one today has time to read more than a small fraction of it. Necessity has been the mother of a number of good inventions in the field of such reading. The news magazines, for instance, such as *Time* and *Newsweek*, perform an invaluable function for most of us by *reading* the news and reducing it to its essential elements of information. The men who write these magazines are primarily readers. They have developed the art of reading for information to a point far beyond the average reader's competence.

The same is true of a publication like *Reader's Digest*, which professes to bring us in condensed form much that is worth our attention in current general magazines to the compact scope of a single, small volume. Of course, the very best articles, like the best books, cannot be condensed without loss. If the essays of Montaigne, for example, were appearing in a current periodical, we would scarcely be satisfied to read a digest of them. A summary, in this case, would function well only if it impelled us to read the original. For the average article, however, a condensation is usually adequate, and often even better than the original, because the average article is mainly informational. The skill that produces *Reader's Digest* and the scores of similar periodicals is, first of all, a skill in reading, and only then one of writing simply and clearly. It does for us what few of us have the technique—even if we had the time—to do for ourselves. It cuts the core of solid information out of pages and pages of less substantial stuff.

But, after all, we still have to read the periodicals that accomplish these digests of current news and information. If we wish to be informed, we cannot avoid the task of reading, no matter how good the digests are. And the task of reading them is, in the last analysis, the same task as that which is performed by the editors of these magazines on the original material that they make available in more compact form. They have saved us labor, so far as the extent of our reading is concerned, but they have not saved us and cannot entirely save us the trouble of reading. In a sense, the function they perform profits us only if we can read their digests of information as well as they have done the prior reading in order to give us the digests.

And that involves reading for understanding as well as information. Obviously, the more condensed a digest is, the more selection has occurred. We may not have to worry about this very much if 1,000 pages are cut down to 900, say; but if 1,000 pages are cut to ten, or even one, then the question of what has been left out becomes critical. Hence the greater the condensation, the more important it is that we know something of the character of the condenser; the same *caveat* we mentioned before applies here with even greater force. Ultimately, perhaps, this comes down to reading between the lines of an expert

condensation. You cannot refer to the original to find out what was left out; you must somehow infer this from the condensation itself. Reading digests, therefore, is sometimes the most demanding and difficult reading that you can do.

7. Science and Mathematics

The title of this chapter may be misleading. We do not propose to give you advice about how to read every kind of science and mathematics. We will confine ourselves to discussing only two kinds: the great scientific and mathematical classics of our tradition, on the one hand, and modern scientific popularisation, on the other hand. What we say will often be applicable to the reading of specialised monographs on abstruse and limited subjects, but we cannot help you to read those. There are two reasons for this. One is, simply, that we are not qualified to do it.

The other is this. Until approximately the end of the nineteenth century, the major scientific books were written for a lay audience. Their authors—men like Galileo, and Newton, and Darwin—were not averse to being read by specialists in their fields; indeed, they wanted to reach such readers. But there was as yet no institutionalised specialisation in those days, days which Albert Einstein called “the happy childhood of science.” Intelligent and well-read persons were expected to read scientific books as well as history and philosophy; there were no hard and fast distinctions, no boundaries that could not be crossed. There was also none of the disregard for the general or lay reader that is manifest in contemporary scientific writing. Most modern scientists do not care what lay readers think, and so they do not even try to reach them.

Today, science tends to be written by experts for experts. A serious communication on a scientific subject assumes so much specialised knowledge on the part of the reader that it usually cannot be read at all by anyone not learned in the field. There are obvious advantages to this approach, not least that it serves to advance science more quickly. Experts talking to each other about their expertise can arrive very quickly at the frontiers of it—they can see the problems at once and begin to try to solve them. But the cost is equally obvious. You—the ordinary intelligent reader whom we are addressing in this book—are left quite out of the picture.

In fact, this situation, although it is more extreme in science than elsewhere, obtains in many other fields as well. Nowadays, philosophers seldom write for anyone except other philosophers; economists write for economists; and even historians are beginning to find that the kind of shorthand, monographic communication to other experts that has long been dominant in science is a more convenient way of getting ideas across than the more traditional narrative work written for everyone.

What does the general reader do in these circumstances? He cannot become expert in all fields. He must fall back, therefore, on scientific popularisation. Some of these are good, and some are bad. But it is not only important to know the difference; it is also important to be able to read the good ones with understanding.

Understanding the Scientific Enterprise

One of the fastest growing academic disciplines is the history of science. We have seen marked changes in this area within the past few years. It was not so long ago that “serious” scientists looked down upon historians of science. The latter were thought of as men who studied the history of a subject because they were not capable of expanding its frontiers. The attitude of scientists to historians of science could be summed up in that famous remark of George Bernard Shaw’s: “Those who can, do; those who can’t, teach.”

Expressions of this attitude are seldom heard nowadays. Departments of the history of science have become respectable, and excellent scientists study and write about the history of their subject. An example is what has been called the “Newton industry.” At the present time, intensive and extensive research is being undertaken in many countries on the work and strange personality of Sir Isaac Newton. Half a dozen books have been recently published or announced. The reason is that scientists are more concerned than ever before about the nature of the scientific enterprise itself.

Thus we have no hesitation in recommending that you try to read at least some of the great scientific classics of our tradition. In fact, there is really no excuse for not *trying* to read them. None of them is impossibly difficult, not even a book like Newton’s *Mathematical Principles of Natural Philosophy*, if you are willing to make the effort.

The most helpful advice we can give you is this. You are required by one of the rules for reading expository works to state, as clearly as you can, the problem that the author has tried to solve. This rule of analytical reading is relevant to all expository works, but *it is particularly relevant to works in the fields of science and mathematics*.

There is another way of saying this. As a layman, you do not read the classical scientific books to become knowledgeable in their subject matters in a contemporary sense. Instead, you read them to understand the history and philosophy of science. That, indeed, is the layman’s responsibility with regard to science. The major way in which you can discharge it is to become aware of the problems that the great scientists were trying to solve—aware of the problems, and aware, also, of the background of the problems.

To follow the strands of scientific development, to trace the ways in which facts, assumptions, principles, and proofs are interrelated, is to engage in the activity of the human reason where it has probably operated with the most success. That is enough by itself, perhaps, to justify the historical study of science. In addition, such study will serve to dispel, in some measure, the apparent unintelligibility of science. Most important of all, it is an activity of the mind that is essential to education, the central aim of which has always been recognized, from Socrates’ day down to our own, as the freeing of the mind through the discipline of wonder.

Suggestions for Reading Classical Scientific Books

By a scientific book, we mean the report of findings or conclusions in some field of research, whether carried on experimentally in a laboratory or by observations of nature in the raw. The scientific problem is always to describe the phenomena as accurately as possible, and to trace the interconnections between different kinds of phenomena.

In the great works of science, there is no oratory or propaganda, though there may be bias in the sense of initial presuppositions. You detect this, and take account of it, by distinguishing what the author *assumes* from what he *establishes* through argument. The more “objective” a scientific author is, the more he will explicitly ask you to take this or that for granted. Scientific objectivity is not the *absence of initial bias*. It is attained by *frank confession of it*.

The leading terms in a scientific work are usually expressed by uncommon or technical words. They are relatively easy to spot, and through them you can readily grasp the propositions. The main propositions are always general ones. Science thus is not chronotopic. Just the opposite; a scientist, unlike a historian, tries to get away from locality in time and place. He tries to say how things are generally, how things generally behave.

There are likely to be two main difficulties in reading a scientific book. One is with respect to the arguments. Science is primarily inductive; that is, its primary arguments are those that establish a general proposition by reference to observable evidence—a single case created by an experiment, or a vast array of cases collected by patient investigation. There are other arguments, of the sort that are called deductive. These are arguments in which a proposition is proved by other propositions already somehow established. So far as proof is concerned, science does not differ much from philosophy. But the inductive argument is characteristic of science.

This first difficulty arises because, in order to understand the inductive arguments in a scientific book, you must be able to follow the evidence that the scientist reports as their basis. Unfortunately, this is not always possible with nothing but the book in hand. If the book itself fails to enlighten him, the reader has only one recourse, which is to get the necessary special experience for himself at first hand. He may have to witness a laboratory demonstration. He may have to look at and handle pieces of apparatus similar to those referred to in the book. He may have to go to a museum and observe specimens or models.

Anyone who desires to acquire an understanding of the history of science must not only read the classical texts, but must also become acquainted, through direct experience, with the crucial experiments in that history. There are classical experiments as well as classical books. The scientific classics become more intelligible to those who have seen with their own eyes and done with their own hands what a great scientist describes as the procedure by which he reached his insights.

This does not mean that you cannot make a start without going through all the steps described. Take a book like Lavoisier’s *Elements of Chemistry*, for instance. Published in

1789, the work is no longer considered to be useful as a textbook in chemistry, and indeed a student would be unwise to study it for the purpose of passing even a high school examination in the subject. Nevertheless, its method was revolutionary at the time, and its conception of a chemical element is still, on the whole, the one that we have in modern times. Now the point is that you do not have to read the book through, and in detail, to receive these impressions of it. The Preface, for example, with its emphasis on the importance of method in science, is enlightening. "Every branch of physical science," wrote Lavoisier, must consist of three things: the series of facts which are the objects of the science, the ideas which represent these facts, and the words by which these facts are expressed. . . . And, as ideas are preserved and communicated by means of words, it necessarily follows that we cannot improve the language of any science without at the same time improving the science itself; neither can we, on the other hand, improve a science without improving the language or nomenclature which belongs to it.

This was exactly what Lavoisier did. He improved chemistry by improving its language, just as Newton, a century before, had improved physics by systematizing and ordering *its* language—in the process, as you may recall, developing the differential and integral calculus.

Mention of the calculus leads us to consider the second main difficulty in reading scientific books. And that is the problem of mathematics.

Facing the Problem of Mathematics

Many people are frightened of mathematics and think they cannot read it at all. No one is quite sure why this is so. Some psychologists think there is such a thing as "symbol blindness"—the inability to set aside one's dependence on the concrete and to follow the controlled shifting of symbols. There may be something to this, except, of course, that words shift, too, and their shifts, being more or less uncontrolled, are perhaps even more difficult to follow. Others believe that the trouble lies in the teaching of mathematics. If so, we can be gratified that much recent research has been devoted to the question of how to teach it better.

The problem is partly this. We are not told, or not told early enough so that it sinks in, that mathematics is a language, and that we can learn it like any other, including our own. We have to learn our own language twice, first when we learn to speak it, second when we learn to read it. Fortunately, mathematics has to be learned only once, since it is almost wholly a written language.

As we have already observed, learning a new written language always involves us in problems of elementary reading. When we underwent our initial reading instruction in elementary school, our problem was to learn to recognize certain arbitrary symbols when they appeared on a page, and to memorize certain relations among these symbols. Even the best readers continue to read, at least occasionally, at the elementary level: for example, whenever we come upon a word that we do not know and have to look up in the dictionary. If we are puzzled by the syntax of a sentence, we are also working at the

elementary level. Only when we have solved these problems can we go on to read at higher levels.

Since mathematics is a language, it has its own vocabulary, grammar, and syntax, and these have to be learned by the beginning reader. Certain symbols and relationships between symbols have to be memorized. The problem is different, because the language is different, but it is no more difficult, *theoretically*, than learning to read English or French or German. At the elementary level, in fact, it may even be easier.

Any language is a medium of communication among men on subjects that the communicants can mutually comprehend. The subjects of ordinary discourse are mainly emotional facts and relations. Such subjects are not *entirely* comprehensible by any two different persons. But two different persons *can* comprehend a third thing that is outside of and emotionally separated from both of them, such as an electrical circuit, an isosceles triangle, or a syllogism. It is mainly when we invest these things with emotional connotations that we have trouble understanding them. Mathematics allows us to avoid this. There are no emotional connotations of mathematical terms, propositions, and equations when these are properly used.

We are also not told, at least not early enough, how beautiful and how intellectually satisfying mathematics can be. It is probably not too late for anyone to see this if he will go to a little trouble. You might start with Euclid, whose *Elements of Geometry* is one of the most lucid and beautiful works of any kind that has ever been written.

Let us consider, for example, the first five propositions in Book I of the *Elements*. (If a copy of the book is available, you should look at it.) Propositions in elementary geometry are of two kinds: (1) the statement of problems in the construction of figures, and (2) theorems about the relations between figures or their parts. Construction problems require that something be done, theorems require that something be proved. At the end of a Euclidean construction problem, you will find the letters Q.E.F., which stand for *Quod erat faciendum*, "(Being) what it was required to do." At the end of a Euclidean theorem, you will find the letters Q.E.D., which stand for *Quod erat demonstrandum*, "(Being) what it was required to prove."

The first three propositions in Book I of the *Elements* are all problems of construction. Why is this? One answer is that the constructions are needed in the proofs of the theorems. This is not apparent in the first four propositions, but we can see it in the fifth proposition, which is a theorem. It states that in an isosceles triangle (a triangle with two equal sides) the base angles are equal. This involves the use of Proposition 3, for a shorter line is cut off from a longer line. Since Proposition 3, in turn, depends on the use of the construction in Proposition 2, while Proposition 2 involves Proposition 1, we see that these three constructions are needed for the sake of Proposition 5.

Constructions can also be interpreted as serving another purpose. They bear an obvious similarity to postulates; both constructions and postulates assert that geometrical operations can be performed. In the case of the postulates, the possibility is *assumed*; in the case of the propositions, it is *proved*. The proof, of course, involves the use of the

postulates. Thus, we might wonder, for example, whether there is really any such thing as an equilateral triangle, which is defined in Definition 20. Without troubling ourselves here about the thorny question of the existence of mathematical objects, we can at least see that Proposition 1 shows that, from the *assumption* that there are such things as straight lines and circles, it *follows* that there are such things as equilateral triangles.

Let us return to Proposition 5, the theorem about the equality of the base angles of an isosceles triangle. When the conclusion has been reached, in a series of steps involving reference to previous propositions and to the postulates, the proposition has been proved. It has then been shown that *if something is true* (namely, the hypothesis that we have an isosceles triangle), and if some additional things are valid (the definitions, postulates, and prior propositions), *then something else is also true*, namely, the conclusion. The proposition asserts this *if-then* relationship. It does not assert the truth of the hypothesis, nor does it assert the truth of the conclusion, except when the hypothesis is true. Nor is this connection between hypothesis and conclusion seen to be true until the proposition is proved. It is precisely the truth of this connection that is proved, and nothing else.

Is it an exaggeration to say that this is beautiful? We do not think so. What we have here is a *really logical exposition* of a *really limited problem*. There is something very attractive about both the clarity of the exposition and the limited nature of the problem. Ordinary discourse, even very good philosophical discourse, finds it difficult to limit its problems in this way. And the use of logic in the case of philosophical problems is hardly ever as clear as this.

Consider the difference between the argument of Proposition 5, as outlined here, and even the simplest of syllogisms, such as the following:

All animals are mortal;
All men are animals;
Therefore, all men are mortal.

There is something satisfying about that, too. We can treat it as though it were a piece of mathematical reasoning. Assuming that there are such things as animals and men, and that animals are mortal, then the conclusion follows with the same certainty as the one about the angles of the triangle. But the trouble is that there really are animals and men; we are assuming something about real things, something that may or may not be true. We have to examine our assumptions in a way that we do not have to do in mathematics. Euclid's proposition does not suffer from this. It does not really matter to him whether there are such things as isosceles triangles. *If* there are, he is saying, and *if* they are defined in such and such a way, *then* it follows absolutely that their base angles are equal. There can be no doubt about this whatever—now and forever.

Handling the Mathematics in Scientific Books

This digression on Euclid has led us a little out of our way. We were observing that the presence of mathematics in scientific books is one of the main obstacles to reading them. There are a couple of things to say about that.

First, you can probably read at least elementary mathematics better than you think. We have already suggested that you should begin with Euclid, and we are confident that if you spent several evenings with the *Elements* you would overcome much of your fear of the subject. Having done some work on Euclid, you might proceed to glance at the works of other classical Greek mathematicians— Archimedes, Apollonius, Nicomachus. They are not really very difficult, and besides, you can skip.

That leads to the second point we want to make. If your intention is to read *a mathematical book in and for itself*, you must read it, of course, from beginning to end—and with a pencil in your hand, for writing in the margins and even on a scratch pad is more necessary here than in the case of any other kinds of books. But your intention may not be that, but instead to read *a scientific work that has mathematics in it*. In this case, skipping is often the better part of valor.

Take Newton's *Principia* for an example. The book contains many propositions, both construction problems and theorems, but it is not necessary to read all of them in detail, especially the first time through. Read the statement of the proposition, and glance down the proof to get an idea of how it is done; read the statements of the so-called lemmas and corollaries; and read the so-called scholiums, which are essentially discussions of the relations between propositions and of their relations to the work as a whole. You will begin to see that whole if you do this, and so to discover how the system that Newton is constructing is built—what comes first and what second, and how the parts fit together. Go through the whole work in this way, avoiding the diagrams if they trouble you (as they do many readers), merely glancing at much of the interstitial matter, but being sure to find and read the passages where Newton is making his main points. One of these comes at the very end of the work, at the close of Book III, which is titled "The System of the World." This *General Scholium*, as Newton called it, not only sums up what has gone before but also states the great problem of almost all subsequent physics.

Newton's *Optics* is another scientific classic that you might want to try to read. There is actually very little mathematics in it, although at first glance that does not appear to be so because the pages are sprinkled with diagrams. But these diagrams are merely illustrations describing Newton's experiments with holes for the sun to shine through into a dark room, with prisms to intercept the sunbeam, and with pieces of white paper placed so that the various colors of the beam can shine on them. You can quite easily repeat some of these experiments yourself, and this is fun to do, for the colors are beautiful, and the descriptions are eminently clear. You will want to read, in addition to the descriptions of the experiments, the statements of the various theorems or propositions, and the discussions that occur at the end of each of the three Books, where Newton sums up his discoveries

and suggests their consequences. The end of Book III is famous, for it contains some statements by Newton about the scientific enterprise itself that are well worth reading.

Mathematics is very often employed by scientific writers, mainly because it has the qualities of preciseness, clarity, and limitedness that we have described. Usually you can understand something of the matter without going very deeply into the mathematics, as in the case of Newton. Oddly enough, however, even if mathematics is absolutely terrifying to you, its absence from certain works may cause you even more trouble. A case in point is Galileo's *Two New Sciences*, his famous treatise on the strength of materials and on motion. This work is particularly difficult for modern readers because it is *not* primarily mathematical; instead, it is presented in the form of a dialogue. The dialogue form, though appropriate to the stage and useful in philosophy when employed by such a master as Plato, is not really appropriate to science. It is therefore hard to discover what Galileo is saying, although when you do you will discover that he is stating some revolutionary things.

Not all of the scientific classics, of course, employ mathematics or even need to employ it. The works of Hippocrates, the founder of Greek medicine, are not mathematical. You might well read them to discover Hippocrates' view of medicine —namely, that it is the art of keeping people well, rather than that of curing them when they are sick. That is unfortunately an uncommon idea nowadays. Nor is William Harvey's discourse on the circulation of the blood mathematical, or William Gilbert's book on magnets. They can be read without too much difficulty if you always keep in mind that your primary obligation is *not to become competent in the subject matter but instead to understand the problem*.

A Note on Popular Science

In a sense, there is little more to say about reading scientific popularisation. By definition, these are works—either books or articles—written for a wide audience, not just for specialists. Thus, if you have managed to read some of the classics of the scientific tradition, you should not have much trouble with them. This is because, although they are about science, they generally skirt or avoid the two main problems that confront the reader of an original contribution in science. First, *they contain relatively few descriptions of experiments* (instead, they merely report the results of experiments). Second, *they contain relatively little mathematics* (unless they are popular books about mathematics itself).

Popular scientific articles are usually easier to read than popular scientific books, although not always. Sometimes such articles are very good—for example, articles found in *Scientific American*, a monthly magazine, or *Science*, a somewhat more technical weekly publication. Of course, these publications, no matter how good they are or how carefully and responsibly edited, pose the problem that was discussed at the end of the last chapter. In reading them, we are at the mercy of reporters who filter the information for us. If they are good reporters, we are fortunate. If they are not, we have almost no recourse.

Scientific popularisation are never easy reading in the sense that a story is or seems to be. Even a three-page article on DNA containing no reports of experiments and no diagrams or mathematical formulas demands considerable effort on the part of the reader. You cannot read it for understanding without keeping your mind awake. Thus, the requirement that you read actively is more important here than almost anywhere else. Identify the subject matter. Discover the relation between the whole and its parts. Come to terms and plot the propositions and arguments. Work at achieving understanding before you begin to criticize or to assess significance.

These rules, by now, are all familiar. But they apply here with particular force.

Short articles are usually primarily informational, and as such they require less active thinking on your part. You must make an effort to understand, to follow the account provided by the author, but you often do not have to go beyond that. In the case of such excellent popular books as Whitehead's *Introduction to Mathematics*, Lincoln Barnett's *The Universe and Dr. Einstein*, and Barry Commoner's *The Closing Circle*, something more is required. This is particularly true of a book like Commoner's, on a subject—the environmental crisis—of special interest and importance to all of us today. The writing is compact and requires constant attention. But the book as a whole has implications that the careful reader will not miss. Although it is not a practical work, in the sense described above in Chapter 13, its theoretical conclusions have important consequences. The mere mention of the book's subject matter—the environmental crisis—suggests this. The environment in question is our own; if it is undergoing a crisis of some sort, then it inevitably follows, even if the author had not said so—though in fact he has—that we are also involved in the crisis. The thing to do in a crisis is (usually) to act in a certain way, or to stop acting in a certain way. Thus Commoner's book, though essentially theoretical, has a significance that goes beyond the theoretical and into the realm of the practical.

This is not to suggest that Commoner's work is important and the books by Whitehead and Barnett unimportant. When *The Universe and Dr. Einstein* was written, as a theoretical account (written for a popular audience) of the history of researches into the atom, people were widely aware of the perils inherent in atomic physics, as represented mainly but not exclusively by the recently discovered atomic bomb. Thus that theoretical book also had practical consequences. But even if people are today not so worried about the imminence of an atomic or nuclear war, there is still what may be called a practical necessity to read this theoretical book, or one like it. The reason is that atomic and nuclear physics is one of the great achievements of our age. It promises great things for man, at the same time that it poses great perils. An informed and concerned reader should know everything he can about the subject.

A slightly different urgency is exerted by Whitehead's *Introduction to Mathematics*. Mathematics is one of the major modern mysteries. Perhaps it is the leading one, occupying a place in our society similar to the religious mysteries of another age. If we want to know something about what our age is all about, we should have some understanding of what mathematics is, and of how the mathematician operates and thinks. Whitehead's book, although it does not go very deeply into the more abstruse branches of the subject, is remarkably eloquent about the principles of mathematical reasoning. If it does nothing else, it shows the attentive reader that the mathematician is an ordinary man, not a magician. And that discovery, too, is important for any reader who desires to expand his horizons beyond the immediate here and now of thought and experience.

8. Philosophy

Children ask magnificent questions. “Why are people?” “What makes the cat tick?” “What’s the world’s first name?” “Did God have a reason for creating the earth?” Out of the mouths of babes comes, if not wisdom, at least the search for it. Philosophy, according to Aristotle, begins in wonder. It certainly begins in childhood, even if for most of us it stops there, too.

The child is a natural questioner. It is not the number of questions he asks but their character that distinguishes him from the adult. Adults do not lose the curiosity that seems to be a native human trait, but their curiosity deteriorates in quality. They want to know whether something is so, not why. But children’s questions are not limited to the sort that can be answered by an encyclopaedia.

What happens between the nursery and college to turn the flow of questions off, or, rather, to turn it into the duller channels of adult curiosity about matters of fact? A mind not agitated by good questions cannot appreciate the significance of even the best answers. It is easy enough to learn the answers. But to develop actively inquisitive minds, alive with real questions, profound questions—that is another story.

Why should we have to try to develop such minds, when children are born with them? Somewhere along the line, adults must fail somehow to sustain the infant’s curiosity at its original depth. School itself, perhaps, dulls the mind—by the dead weight of rote learning, much of which may be necessary. The failure is probably even more the parents’ fault. We so often tell a child there is no answer, even when one is available, or demand that he ask no more questions. We thinly conceal our irritation when baffled by the apparently unanswerable query. All this discourages the child. He may get the impression that it is impolite to be too inquisitive. Human inquisitiveness is never killed; but it is soon debased to the sort of questions asked by most college students, who, like the adults they are soon to become, ask only for information.

We have no solution for this problem; we are certainly not so brash as to think we can tell you how to answer the profound and wondrous questions that children put. But we do want you to recognize that one of the most remarkable things about the great philosophical books is that they ask the same sort of profound questions that children ask. The ability to retain the child’s view of the world, with at the same time a mature understanding of what it means to retain it, is extremely rare—and a person who has these qualities is likely to be able to contribute something really important to our thinking.

We are not required to think as children in order to understand existence. Children certainly do not, and cannot, understand it—if, indeed, anyone can. But we must be able to see as children see, to wonder as they wonder, to ask as they ask. The complexities of adult life get in the way of the truth. The great philosophers have always been able to clear away the complexities and see simple distinctions— simple once they are stated, vastly difficult before. If we are to follow them we too must be childishly simple in our questions—and maturely wise in our replies.

Modern Philosophy and the Great Tradition

For the sake of brevity in what follows, let us call questions about what is and happens in the world, or about what men ought to do or seek, “first-order questions.” We should recognise, then, that there are also “second-order questions” that can be asked: questions about our first-order knowledge, questions about the content of our thinking when we try to answer first-order questions, questions about the ways in which we express such thoughts in language.

This distinction between first-order and second-order questions is useful, because it helps to explain what has happened to philosophy in recent years. The majority of professional philosophers at the present day no longer believe that first-order questions can be answered by philosophers. Most professional philosophers today devote their attention exclusively to second-order questions, very often to questions having to do with the language in which thought is expressed.

That is all to the good, for it is never harmful to be critical. The trouble is the wholesale giving up of first-order philosophical questions, which are the ones that are most likely to interest lay readers. In fact, philosophy today, like contemporary science or mathematics, is no longer being written for lay readers. Second-order questions are, almost by definition, ones of narrow appeal; and professional philosophers, like scientists, are not interested in the views of anyone but other experts.

This makes modern philosophy very hard to read for non-philosophers—as difficult, indeed, as science for non-scientists. We cannot in this book give you any advice about how to read modern philosophy as long as it is concerned exclusively with second-order questions. However, there are philosophical books that you can read, and that we believe you should read. These books ask the kinds of questions that we have called first-order ones. It is not accidental that they were also written primarily for a lay audience rather than exclusively for other philosophers.

Up to about 1930, or perhaps even a little later, philosophical books were written for the general reader. Philosophers hoped to be read by their peers, but they also wanted to be read by ordinary, intelligent men and women. Since the questions that they asked and tried to answer were of concern to everyone, they thought that everyone should know what they thought.

All of the great classical works in philosophy, from Plato onward, were written from this point of view. These books are accessible to the lay reader; you can succeed in reading them if you wish to. Everything that we have to say in this chapter is intended to help you do that.

On Philosophical Method

It is important to understand what philosophical method consists in—at least insofar as philosophy is conceived as asking and trying to answer *first-order questions*. Suppose that you are a philosopher who is troubled by one of the childishly simple questions we have mentioned—the question, for instance, about the properties of everything that exists, or the question about the nature and causes of change. How do you proceed?

If your question were scientific, you would know that to answer it you would have to perform some kind of special research, either by way of developing an experiment to test your answer, or by way of observing a wide range of phenomena. If your question were historical, you would know that you would also have to perform research, although of a different kind. But there is no experiment that will tell you what all existing things have in common, precisely in respect to having existence. There are no special kinds of phenomena that you can observe, no documents that you can seek out and read, in order to find out what change is or why things change. All you can do is reflect upon the question. There is, in short, nothing to do but think.

You are not thinking in a total vacuum, of course. Philosophy, when it is good, is not “pure” speculation—thinking divorced from experience. Ideas cannot be put together just any way. There are stringent tests of the validity of answers to philosophical questions. But such tests are based on common experience alone—on the experience that you already have because you are a human being, not a philosopher. You are as well acquainted through common experience with the phenomena of change as anybody else; everything in the world about you manifests mutability. As far as the mere experience of change goes, you are in as good a position to think about its nature and causes as the greatest philosophers. What distinguishes them is that they thought about it extremely well: they formulated the most penetrating questions that could be asked about it, and they undertook to develop carefully and clearly worked-out answers. By what means? Not by investigation. Not by having or trying to get more experience than the rest of us have. Rather, by thinking more profoundly about the experience than the rest of us have.

Understanding this is not enough. We must also realize that not all of the questions that philosophers have asked and tried to answer are truly philosophical. They themselves were not always aware of this, and their ignorance or mistake in this crucial respect can cause unperceptive readers considerable difficulty. To avoid such difficulties, it is necessary to be able to distinguish the truly philosophical questions from the other questions that a philosopher may deal with, but that he should have waived and left for later scientific investigation to answer. The philosopher was misled by failing to see that such questions can be answered by scientific investigation, though he probably could not have known this at the time of his writing.

An example of this is the question that ancient philosophers asked about the difference between the matter of terrestrial and celestial bodies. To their observation, unaided by telescopes, it appeared to be the case that the heavenly bodies changed only in place; they did not appear to come into being or to pass away, like plants and animals;

nor did they appear to change in size or quality. Because celestial bodies were subject to one kind of change only—local motion— whereas all terrestrial bodies change in other respects as well, the ancients concluded that they had to be composed of a different kind of matter. They did not surmise, nor could they probably have surmised, that with the invention of the telescope, the heavenly bodies would give us knowledge of their mutability beyond anything we can know through common experience. Hence they took as a question that they thought it proper for philosophers to answer one that should have been reserved for later scientific investigation. Such investigation began with Galileo's use of the telescope and his discovery of the moons of Jupiter; this led to the revolutionary assertion by Kepler that the matter of the heavenly bodies is exactly the same as the matter of bodies on earth; and this in turn laid the groundwork for Newton's formulation of a celestial mechanics in which the same laws of motion apply without qualification to all bodies wherever they are in the physical universe.

On the whole, apart from the confusions that may result, the misinformation or lack of information about scientific matters that mars the work of the classical philosophers is irrelevant. The reason is that it is philosophical questions, not scientific or historical ones, that we are interested in when we read a philosophical work. And, at the risk of repeating ourselves, we must emphasise that there is no other way than thinking to answer such questions. If we could build a telescope or microscope to examine the properties of existence, we should do so, of course. But no such instruments are possible.

We do not want to give the impression that it is only philosophers who make mistakes of the sort we are discussing here. Suppose a scientist becomes troubled by

the question about the kind of life a man ought to lead. This is a question in normative philosophy, and the only way to answer it is by thinking about it. But the scientist may not realize that, and instead suppose that some kind of experiment or research will give him an answer. He may decide to ask 1,000 persons what kind of life they would like to lead, and base his answer to the question on their answers. But it should be obvious that his answer, in that case, would be as irrelevant as Aristotle's speculations about the matter of the celestial bodies.

On Philosophical Styles

Although there is only one philosophical method, there are at least five styles of exposition that have been employed by the great philosophers of the Western tradition. The student or reader of philosophy should be able to distinguish between them and know the advantages and disadvantages of each.

1. **THE PHILOSOPHICAL DIALOGUE:** The first philosophical style of exposition, first in time if not in effectiveness, is the one adopted by Plato in his *Dialogues*. The style is conversational, even colloquial; a number of men discuss a subject with Socrates (or, in the later dialogues, with a speaker known as The Athenian Stranger); often, after a certain amount of fumbling, Socrates embarks on a series of questions and comments that help to elucidate the subject. In the hands of a master like Plato, this style is heuristic, that is, it allows the reader, indeed leads him, to discover things for himself. When the style is enriched by the high drama—some would say the high comedy—of the story of Socrates, it becomes enormously powerful.

“A master like Plato,” we said—but there is no one “like” Plato. Other philosophers have attempted dialogues—for example, Cicero and Berkeley—but with little success. Their dialogues are flat, dull, almost unreadable. It is a measure of the greatness of Plato that he was able to write philosophical dialogues that, for wit, charm, and profundity are the equal of any books ever produced by anyone, on any subject. Yet it may be a sign of the inappropriateness of this style of philosophizing that no one except Plato has ever been able to handle it effectively.

That Plato did so, goes without saying. All Western philosophy, Whitehead once remarked, is but “a footnote to Plato”; and the later Greeks themselves had a saying: “Everywhere I go in my head, I meet Plato coming back.” Those statements, however, should not be misunderstood. Plato himself had apparently no philosophical system, no doctrine—unless it was that there is no doctrine, that we should simply keep talking. And asking questions. For Plato, and Socrates before him, did indeed manage to raise most of the important questions that subsequent philosophers have felt it necessary to deal with.

2. **THE PHILOSOPHICAL TREATISE OR ESSAY:** Aristotle was Plato’s best pupil; he studied under him for twenty years. He is said to have also written dialogues, but none of these survives entirely. What does survive are curiously difficult essays or treatises on a number of different subjects. Aristotle was obviously a clear thinker, but the difficulty of the surviving works has led scholars to suggest that they were originally notes for lectures or books—either Aristotle’s own notes, or notes taken down by a student who heard the master speak. We may never know the truth of the matter, but in any event the Aristotelean treatise was a new style in philosophy.

The subjects covered by Aristotle in his treatises, and the various styles adopted by him in presenting his findings, also helped to establish the branches and approaches of philosophy in the succeeding centuries. There are, first of all, the so-called popular works—mostly dialogues, of which only fragments have come down to us. Then there are the documentary collections. The major one that we know about was a collection of 158 separate constitutions of Greek states. Only one of these survives, the constitution of Athens, which was recovered from a papyrus in 1890. Finally, there are the major treatises, some of which, like the *Physics* and *Metaphysics*, or the *Ethics*, *Politics*, and *Poetics*, are purely philosophical works, theoretical or normative; some of which, like the book *On the Soul*, are mixtures of philosophical theory and early scientific investigation; and some of which, like the biological treatises, are mainly scientific works in the field of natural history.

Immanuel Kant, although he was probably more influenced by Plato in a philosophical sense, adopted Aristotle's style of exposition. His treatises are finished works of art, unlike Aristotle's in this respect. They state the main problem first, go through the subject matter in a thorough and business-like way, and treat special problems by the way or at the last. The clarity of both Kant and Aristotle may be said to consist in the order that they impose on a subject. We see a philosophical beginning, middle, and end. We also, particularly in the case of Aristotle, are provided with accounts of the views and objections of others, both philosophers and ordinary men. Thus, in one sense the style of the treatise is similar to the style of the dialogue. But the element of drama is missing from the Kantian or Aristotelean treatise; a philosophical view is developed through straightforward exposition rather than through the conflict of positions and opinions, as in Plato.

3. **THE MEETING OF OBJECTIONS:** The philosophical style developed in the Middle Ages and perfected by St. Thomas Aquinas in his *Summa Theologica* has likenesses to both of those already discussed. Plato, we have pointed out, raises most of the persistent philosophical problems; and Socrates, as we might have observed, asks in the course of the dialogues the kind of simple but profound questions that children ask. And Aristotle, as we have also pointed out, recognizes the objections of other philosophers and replies to them.

Aquinas' style is a combination of question-raising and objection-meeting. The *Summa* is divided into parts, treatises, questions, and articles. The form of all the articles is the same. A question is posed; the opposite (wrong) answer to it is given; arguments are adduced in support of that wrong answer; these are countered first by an authoritative text (often a quotation from Scripture); and finally, Aquinas introduces his own answer or solution

with the words “I answer that.” Having given his own view of the matter, he then replies to each of the arguments for the wrong answer.

The neatness and order of this style are appealing to men with orderly minds, but that is not the most important feature of the Thomistic way of philosophizing. Rather, it is Aquinas’ explicit recognition of conflicts, his reporting of different views, and his attempt to meet all possible objections to his own solutions. The idea that the truth somehow evolves out of opposition and conflict was a common medieval one. Philosophers in Aquinas’ time accepted as a matter of course that they should be prepared to defend their views in open, public disputes, which were often attended by crowds of students and other interested persons. The civilization of the Middle Ages was essentially oral, partly because books were few and hard to come by. A proposition was not accepted as true unless it could meet the test of open discussion; the philosopher was not a solitary thinker, but instead faced his opponents in the intellectual market place (as Socrates might have said). Thus, the *Summa Theologica* is imbued with the spirit of debate and discussion.

4. **THE SYSTEMIZATION OF PHILOSOPHY:** In the seventeenth century, a fourth style of philosophical exposition was developed by two notable philosophers, Descartes and Spinoza. Fascinated by the promised success of mathematics in organizing man’s knowledge of nature, they attempted to organize philosophy itself in a way akin to the organization of mathematics.

Descartes was a great mathematician and, although perhaps wrong on some points, a redoubtable philosopher. What he tried to do, essentially, was to clothe philosophy in mathematical dress—to give it the certainty and formal structure that Euclid, two thousand years before, had given geometry. Descartes was not wholly unsuccessful in this, and his demand for clarity and distinctness in thinking was to some extent justified in the chaotic intellectual climate of his time. He also wrote philosophical treatises in a more or less traditional form, including a set of replies to objections to his views.

Spinoza carried the conception even farther. His *Ethics* is written in strict mathematical form, with propositions, proofs, corollaries, lemmas, scholiums, and the like. However, the subject matter of metaphysics and of morals is not very satisfactorily handled in this manner, which is more appropriate for geometry and other mathematical subjects than for philosophical ones. A sign of this is that when reading Spinoza you can skip a great deal, in exactly the same way that you can skip in Newton. You cannot skip anything in Kant or Aristotle, because the line of reasoning is continuous; and you cannot skip anything in Plato, any more than you would skip a part of a play or poem.

Probably there are no absolute rules of rhetoric. Nevertheless, it is questionable whether it is possible to write a satisfactory philosophical work in mathematical form, as Spinoza tried to do, or a satisfactory scientific work

in dialogue form, as Galileo tried to do. The fact is that both of these men failed to some extent to communicate what they wished to communicate, and it seems likely that the form they chose was a major reason for the failure.

5. **THE APHORISTIC STYLE:** There is one other style of philosophical exposition that deserves mention, although it is probably not as important as the other four. This is the aphoristic style adopted by Nietzsche in such works as *Thus Spake Zarathustra* and by certain modern French philosophers. The popularity of this style during the past century is perhaps owing to the great interest, among Western readers, in the wisdom books of the East, which are written in an aphoristic style. This style may also owe something to the example of Pascal's *Pensées*. But of course Pascal did not intend to leave his great work in the form of short, enigmatic statements; he died before he could finish writing out the book in essay form.

The great advantage of the aphoristic form in philosophy is that it is heuristic; the reader has the impression that more is being said than is actually said, for he does much of the work of thinking—of making connections between statements and of constructing arguments for positions—himself. At the same time, however, this is the great disadvantage of the style, which is really not expositional at all. The author is like a hit-and-run driver; he touches on a subject, he suggests a truth or insight about it, and then runs off to another subject without properly defending what he has said. Thus, although the aphoristic style is enjoyable for those who are poetically inclined, it is irritating for serious philosophers who would rather try to follow and criticize an author's line of thought.

As far as we know, there is no other important style of philosophical exposition that has been employed in our Western tradition. (A work like Lucretius' *On the Nature of Things* is not an exception. It was originally in verse; but as far as its style goes, it is no different from other philosophical essays; and in any event we ordinarily read it nowadays in prose translations.) This means that all of the great philosophers have employed one or the other of these five styles; sometimes, of course, a philosopher tries more than one. The treatise or essay is probably the most common form, both in the past and in the present. It can range all the way from highly formal and difficult works like those of Kant, to popular philosophical essays or letters. Dialogues are notoriously hard to write, and the geometrical style is enormously difficult both to write and to read. The aphoristic style is highly unsatisfactory from a philosophical point of view. The Thomistic style has not been used very much in recent times. Perhaps it would not be acceptable to modern readers, but that seems a shame, considering all its advantages.

Hints for Reading Philosophy

It is perhaps clear from the discussion so far that the most important thing to discover in reading any philosophical work is the question or questions it tries to answer. The questions may be stated explicitly, or they may be implicit to a certain extent. In either case, you must try to find out what they are.

How the author answers these questions will be deeply affected by his controlling principles. These may be stated, too, but that is not always the case. We have already quoted Basil Willey on the difficulty—and the importance—of discovering the hidden and unstated assumptions of an author, to say nothing of our own. This goes for any book. It applies to works in philosophy with particular force.

The great philosophers cannot be charged with having tried to hide their assumptions dishonestly, or with having been unclear in their definitions and postulations. It is precisely the mark of a great philosopher that he makes these things clearer than other writers can. Nevertheless, every great philosopher has certain controlling principles that underlie his work. These are easy enough to see if he states them in the book you are reading. But he may not have done so, reserving their treatment for another book. Or he may never treat them explicitly, but instead allow them to pervade every one of his works.

It is difficult to give examples of such controlling principles. Any that we might proffer would probably be disputed by philosophers, and we do not here have space to defend our choices. Nevertheless, we could mention the controlling idea of Plato that conversation about philosophical subjects is perhaps the most important of all human activities. Now this idea is seldom explicitly stated in the dialogues, although Socrates may be saying it when, in the *Apology*, he asserts that the unexamined life is not worth living, and Plato mentions it in the *Seventh Letter*. The point is that Plato expresses this view in a number of other places, though not in so many words—for example, in the *Protagoras*, where the audience is shown as disapproving of Protagoras' unwillingness to continue talking to Socrates. Another example is that of Cephalus, in Book I of the *Republic*, who happens to have other business to attend to and so departs. Plato seems to be saying here, though not explicitly, that it is a betrayal of man's deepest nature to refuse to join, for whatever reason, in the search for truth. But, as we have noted, this is not ordinarily cited as one of Plato's "ideas," because it is seldom explicitly discussed in his works.

We can find other examples in Aristotle. In the first place, it is always important to recognize, in reading any Aristotelean work, that things said in other works are relevant to the discussion. Thus the basic principles of logic, expounded in the *Organon*, are assumed in the *Physics*. In the second place, owing partly to the fact that the treatises are not finished works of art, their controlling principles are not always stated with satisfactory clarity. The *Ethics* is about many things: happiness, habit, virtue, pleasure, and so forth—the list could be very long. But the controlling insight is discovered only by the very careful reader. This is the insight that happiness is the *whole* of the good, not the *highest* good, for in that case it would be only one good among others. Recognizing this, we see that happiness does not consist in self-perfection, or the goods of self-improvement, even

though these constitute the highest among partial goods. Happiness, as Aristotle says, is the quality of a *whole* life, and he means “whole” not only in a temporal sense but also in terms of all the aspects from which a life can be viewed. The happy man is one, as we might say nowadays, who puts it all together—and keeps it there throughout his life. This insight is controlling in the sense that it affects almost all of the other ideas and insights in the *Ethics*, but it is not stated nearly as explicitly as it might be.

One more example. Kant’s mature thought is often known as critical philosophy. He himself contrasted “criticism” to “dogmatism,” which he imputed to many previous philosophers. By “dogmatism” he meant the presumption that the human intellect can arrive at the most important truths by pure thinking, without being aware of its own limitations. What is first required, according to Kant, is a critical survey and assessment of the mind’s resources and powers. Thus, the limitation of the mind is a controlling principle in Kant in a way that it is not in any philosopher who precedes him in time. But while this is perfectly clear because explicitly stated in the *Critique of Pure Reason*, it is not stated, because it is assumed, in the *Critique of Judgment*, Kant’s major work in aesthetics. Nevertheless, it is controlling there as well.

This is all we can say about finding the controlling principles in a philosophical book, because we are not sure that we can tell you how to discover them. Sometimes it takes years to do this, and many readings and rereadings. Nevertheless, it is the ideal goal of a good and thorough reading, and you should keep in mind that it is ultimately what you must try to do if you are to understand your author. Despite the difficulty of discovering these controlling principles, however, we do not recommend that you take the shortcut of reading books about the philosophers, their lives and opinions. The discovery you come to on your own will be much more valuable than someone else’s ideas.

Once you have found an author’s controlling principles, you will want to decide whether he adheres to them throughout his work. Unfortunately, philosophers, even the best of them, often do not do so. Consistency, Emerson said, “is the hobgoblin of little minds.” That is a very carefree statement, but although it is probably wise to remember it, there is no doubt, either, that inconsistency in a philosopher is a serious problem. If a philosopher is inconsistent, you have to decide which of two sets of propositions he really means—the first principles, as he states them; or the conclusions, which do not in fact follow from the principles as stated. Or you may decide that neither is valid.

The reading of philosophical works has special aspects that relate to the difference between philosophy and science. We are here considering only theoretical works in philosophy, such as metaphysical treatises or books about the philosophy of nature.

The philosophical problem is to explain, not to describe, as science does, the nature of things. Philosophy asks about more than the connections of phenomena. It seeks to penetrate to the ultimate causes and conditions that underlie them. Such problems are satisfactorily explored only when the answers to them are supported by clear arguments and analysis.

The major effort of the reader, therefore, must be with respect to the terms and the initial propositions. Although the philosopher, like the scientist, has a technical terminology, the words that express his terms are usually taken from common speech, but used in a very special sense. This demands special care from the reader. If he does not overcome the tendency to use familiar words in a familiar way, he will probably make gibberish and nonsense of the book.

The basic terms of philosophical discussions are, of course, abstract. But so are those of science. No general knowledge is expressible except in abstract terms. There is nothing particularly difficult about abstractions. We use them every day of our lives and in every sort of conversation. However, the words “abstract” and “concrete” seem to trouble many persons.

Whenever you talk generally about anything, you are using abstractions. What you perceive through your senses is always concrete and particular. What you think with your mind is always abstract and general. To understand an “abstract word” is to have the idea it expresses. “Having an idea” is just another way of saying that you understand some general aspect of the things you experience concretely. You cannot see or touch or even imagine the general aspect thus referred to. If you could, there would be no difference between the senses and the mind. People who try to imagine what ideas refer to befuddle themselves, and end up with a hopeless feeling about all abstractions.

Just as inductive arguments should be the reader’s main focus in the case of scientific books, so here, in the case of philosophy, you must pay closest attention to the philosopher’s principles. They may be either things he asks you to assume with him, or matters that he calls self-evident. There is no trouble about assumptions. Make them to see what follows, even if you yourself have contrary presuppositions. It is a good mental exercise to pretend that you believe something you really do not believe. And the clearer you are about your own prejudgments, the more likely you will be not to misjudge those made by others.

It is the other sort of principles that may cause trouble. Few philosophical books fail to state some propositions that the author regards as self-evident. Such propositions are drawn directly from experience rather than proved by other propositions.

The thing to remember is that the experience from which they are drawn, as we have noted more than once, is, unlike the scientist’s special experience, the common experience of mankind. The philosopher does no work in laboratories, no research in the field. Hence to understand and test a philosopher’s leading principles you do not need the extrinsic aid of special experience, obtained by methodical investigation. He refers you to your own common sense and daily observation of the world in which you live.

In other words, the method according to which you should read a philosophical book is very similar to the method according to which it is written. A philosopher, faced with a problem, can do nothing but think about it. A reader, faced with a philosophical book, can do nothing but read it—which means, as we know, thinking about it. There are no other aids except the mind itself.

But this essential loneliness of reader and book is precisely the situation that we imagined at the beginning of our long discussion of the rules of analytical reading. Thus you can see why we say that the rules of reading, as we have stated and explained them, apply more directly to the reading of philosophical books than to the reading of any other kind.

On Making Up Your Own Mind

A good theoretical work in philosophy is as free from oratory and propaganda as a good scientific treatise. You do not have to be concerned about the “personality” of the author, or investigate his social and economic background. There is utility, however, in reading the works of other great philosophers who have dealt with the same problems as your author. The philosophers have carried on a long conversation with each other in the history of thought. You had better listen in on it before you make up your mind about what any of them says.

The fact that philosophers disagree should not trouble you, for two reasons. First, the fact of disagreement, if it is persistent, may point to a great unsolved and, perhaps, insoluble problem. It is good to know where the true mysteries are. Second, the disagreements of others are relatively unimportant. Your responsibility is only to make up your own mind. In the presence of the long conversation that the philosophers have carried on through their books, you must judge what is true and

what is false. When you have read a philosophical book well—and that means reading other philosophers on the same subject, too—you are in a position to judge.

It is, indeed, the most distinctive mark of philosophical questions that everyone must answer them for himself. Taking the opinions of others is not solving them, but evading them. And your answers must be solidly grounded, with arguments to back them up. This means, above all, that you cannot depend on the testimony of experts, as you may have to do in the case of science.

The reason is that the questions philosophers ask are simply more important than the questions asked by anyone else. Except children.

9. Theology

There are two kinds of theology, natural theology and dogmatic theology. Natural theology is a branch of philosophy; it is the last chapter, as it were, in metaphysics. If you ask, for example, whether causation is an endless process, whether everything is caused, you may find yourself, if you answer in the affirmative, involved in an infinite regress. Therefore you may have to posit some originating cause that is not itself caused. Aristotle called this uncaused cause an unmoved mover. You could give it other names—you could even say that it was merely another name for God—but the point is that you would have arrived at the conception by the unaided effort—the natural working—of your mind.

Dogmatic theology differs from philosophy in that its first principles are articles of faith adhered to by the communicants of some religion. A work of dogmatic theology always depends upon dogmas and the authority of a church that proclaims them.

If you are not of the faith, if you do not belong to the church, you can nevertheless read such a theological book *well* by treating its dogmas with the same respect you treat the assumptions of a mathematician. But you must always keep in mind that an article of faith is not something that the faithful *assume*. Faith, for those who have it, is the most certain form of knowledge, not a tentative opinion.

Understanding this seems to be difficult for many readers today. Typically, they make either or both of two mistakes in dealing with dogmatic theology. The first mistake is to refuse to accept, even temporarily, the articles of faith that are the first principles of the author. As a result, the reader continues to struggle with these first principles, never really paying attention to the book itself. The second mistake is to assume that, because the first principles are dogmatic, the arguments based on them, the reasoning that they support, and the conclusions to which they lead are all dogmatic in the same way. It is true enough, of course, if certain principles are accepted, and the reasoning that is based on them is cogent, that the conclusions must then be accepted too—at least to the extent that the principles are. But if the reasoning is defective, the most acceptable first principles will lead to invalid conclusions.

We are speaking here, as you can see, of the difficulties that face a non-believing reader of a theological work. His task is to accept the first principles as true while he is reading the book, and then to read it with all the care that any good expository work deserves. The faithful reader of a work that is essential to his faith has other difficulties to face. However, these problems are not confined to reading theology.

How to Read “Canonical” Books

There is one very interesting kind of book, one kind of reading, that has not yet been discussed. We use the term “canonical” to refer to such books; in an older tradition we might have called them “sacred” or “holy,” but those words no longer apply to all such works, though they still apply to some of them.

A prime example is the Holy Bible, when it is read not as literature but instead as the revealed Word of God. For orthodox Marxists, however, the works of Marx must be read in much the same way as the Bible must be read by orthodox Jews or Christians. And Mao Tse-tung’s Little Red Book has an equally canonical character for a “faithful” Chinese Communist.

The notion of a canonical book can be extended beyond these obvious examples. Consider any institution—a church, a political party, a society—that among other things (1) is a teaching institution, (2) has a body of doctrine to teach, and (3) has a faithful and obedient membership. The members of any such organization read *reverentially*. They do not—even cannot—question the authorized or right reading of the books that to them are canonical. The faithful are debarred by their faith from finding error in the “sacred” text, to say nothing of finding nonsense there.

Orthodox Jews read the Old Testament in this way; Christians, the New Testament; Muslims, the Koran; orthodox Marxists, the works of Marx and Lenin and, depending on the political climate, those of Stalin; orthodox Freudian psychoanalysts, the works of Freud; U.S. Army officers, the infantry manual. And you can think of many more examples by yourself.

In fact, almost all of us, even if we have not quite reached it, have approached the situation in which we must read canonically. A fledgling lawyer, intent on passing the bar exams, must read certain texts in a certain way in order to attain a perfect score. So with doctors and other professionals; and indeed so with all of us when, as students, we were required at the peril of “failure” to read a text according to our professor’s interpretation of it. (Of course, not all professors fail their students for disagreeing with them!)

The characteristics of this kind of reading are perhaps summed up in the word “orthodox,” which is almost always applicable. The word comes from two Greek roots, meaning “right opinion.” These are books for which there is *one and only one right reading*; any other reading or interpretation is fraught with peril, from the loss of an “A” to the damnation of one’s soul. This characteristic carries with it an obligation. The faithful reader of a canonical book *is obliged to make sense out of it* and to find it true in one or another sense of “true.” If he cannot do this by himself, *he is obliged to go to someone who can*. This may be a priest or a rabbi, or it may be his superior in the party hierarchy, or it may be his professor. In any case, he is obliged to accept the resolution of his problem that is offered him. He reads essentially without freedom; but in return for this he gains a kind of satisfaction that is possibly never obtained when reading other books.

Here, in fact, we must stop. The problem of reading the Holy Book—if you have faith that it is the Word of God—is the most difficult problem in the whole field of reading. There have been more books written about how to read Scripture than about all other aspects of the art of reading together. The Word of God is obviously the most difficult writing men can read; but it is also, if you believe it *is* the Word of God, the most important to read. The effort of the faithful has been duly proportionate to the difficulty of the task. It would be true to say that, in the European tradition at least, the Bible is *the* book in more senses than one. It has been not only the most widely read, but also the most carefully read, book of all.

10. Social Science

The concepts and terminology of the social sciences pervade almost everything we read today.

Modern journalism, for example, does not limit itself to reporting facts, except in the kind of shorthand, “who-what-why-when-where” news story that one finds on the front page of a newspaper. Journalists, much more commonly, enmesh the facts in interpretation, commentary, analysis of the news. These interpretations and comments draw on the concepts and terminology of the social sciences.

These concepts and this terminology are also reflected in the vast number of current books and articles that may be grouped together under the heading of social criticism. We are confronted with a continuous flow of literature on such subjects as race problems, crime, law enforcement, poverty, education, welfare, war and peace, good and bad government. Much of this literature borrows its ideology and language from the social sciences.

The literature of social science is not confined to nonfiction. There is also a large and important category of contemporary writing that might be termed social-science fiction. Here the aim is to create artificial models of society that allow us, for example, to explore the social consequences of technological innovation. The organization of social power, the kinds of property and ownership, and the distribution of wealth are variously described, deplored, or lauded in novels, plays, stories, moving pictures, television shows. Insofar as they do this they may be said to have social significance or to contain “relevant messages.” At the same time they draw on and disseminate elements of the social sciences.

Furthermore, there is hardly any social, economic, or political problem that has not been tackled by specialists in these fields, either on their own or by invitation from officials who are actively coping with these problems. Specialists in the social sciences help to formulate the problems and are called upon to help in dealing with them.

Far from the least important factor in the growing pervasiveness of the social sciences is their introduction at the high school level and in the junior and community colleges. In fact, student enrollments in social science courses are running far ahead of enrollments in the more traditional literature and language courses. And enrollments in social science courses greatly exceed those in courses dealing with the “pure” sciences.

What Is Social Science?

We have been talking of social science as if it were a single entity. That is hardly the case.

Which, in fact, are the social sciences? One way to answer the question is to see what departments and disciplines universities group under this name. Social science divisions usually include departments of anthropology, economics, politics, and sociology. Why do they not ordinarily include as well schools of law, education, business, social service, and public administration, all of which draw on the concepts and methods of the social sciences for their development? The reason commonly given for the separation of these schools from the social science divisions is that the main purpose of such schools is to train for professional work outside of the university, while the previously mentioned departments are more exclusively dedicated to the pursuit of systematic knowledge of human society, an activity that usually goes on within the university.

There is presently a trend in universities toward the establishment of centers and institutes for interdisciplinary studies. These centers cut across the conventional social science departments and professional schools, and include studies in the theories and methods of statistics, demography, psephology (the science of elections and polling), policy-and decision-making, recruitment and treatment of personnel, public administration, human ecology, and many more. Such centers are producing studies and reports that incorporate findings of a dozen or more of these specialties. Considerable sophistication is required even to discern the various strands of these efforts, let alone judge the validity of the findings and conclusions.

What about psychology? Those social scientists who interpret their field strictly tend to exclude psychology on the grounds that it concerns itself with individual and personal characteristics, while the social sciences proper focus on cultural, institutional, and environmental factors. Those who are less strict, while conceding that physiological psychology should be subsumed under the biological sciences, hold that psychology, both normal and abnormal, should be regarded as a social science on the grounds of the inseparability of the individual from his social environment.

Psychology, incidentally, is a prime example of a social science area that is currently enjoying great popularity among students. It is possible that enrollments in psychology across the country are larger than in any other subject. And the literature of psychology, at every level from the most technical to the most popular, is enormous.

What of the behavioral sciences? Where do they fit into the social science picture? As originally used, the term behavioral science included sociology and anthropology and the behavioral aspects of biology, economics, geography, law, psychology and psychiatry, and political science. The accent on behavior served to emphasize observable, measurable behavior capable of being systematically investigated and of producing verifiable findings. Recently, the term behavioral sciences has come to be used almost as a synonym of the term social sciences, but many purists object to this usage.

Finally, what about history? It is acknowledged that the social sciences draw on the study of history for data and for exemplifications of their generalisations. However, although history, viewed as accounts of particular events and persons, may be scientific in the minimal sense of constituting systematic knowledge, it is not a science in the sense that of itself it yields systematic knowledge of patterns or laws of behaviour and development.

Is it possible, then, to define what we mean by social science? We think so, at least for the purposes of this chapter. Such fields as anthropology, economics, politics, and sociology constitute a kind of central core of social science, which almost all social scientists would include in any definition. In addition, we think it would be conceded by most social scientists that much, though not all, of the literature of such fields as law, education, and public administration, and some of the literature of such fields as business and social service, together with a considerable portion of psychological literature, falls within the confines of a reasonable definition. We will assume that such a definition, although admittedly imprecise, is clear to you in what follows.

The Apparent Ease of Reading Social Science

A great deal of social science writing seems like the easiest possible material to read. The data are often drawn from experiences familiar to the reader—in this respect, social science is like poetry or philosophy—and the style of exposition is usually narrative, already familiar to the reader through his reading of fiction and history.

In addition, we have all become familiar with the jargon of social science and use it often. Such terms as culture (cross, counter, and sub), in-group, alienation, status, input/output, infra-structure, ethnic, behavioural, consensus, and scores like them, tend to appear in almost every conversation and in almost everything we read.

Consider the word “society” itself. What a chameleon-like word it is, what a host of adjectives can be placed in front of it, while throughout it continues to convey the broad notion of people living together rather than in isolation. We hear of the aberrant society, the abortive society, the acquiescent society, the acquisitive society, the affluent society, and we can continue on through the alphabet until we arrive at the zymotic society, which is one that is in a continuous state of ferment, not unlike our own.

“Social,” as an adjective, is also a word of many and familiar meanings. There is social power, social pressure, and social promise—and then, of course, there are the ubiquitous social problems. The last phrase, indeed, is a fine example of the specious ease that is involved in both the reading and the writing of social science literature. We would be willing to wager that in the last few months, if not the last few weeks, you have read and even possibly written the phrase “political, economic, and social problems.” When you read or wrote it, you were probably clear as to what was meant by political and economic problems. But what did you, or the author, mean by social problems?

The jargon and metaphors of much social science writing, together with the deep feeling that often imbues it, make for deceptively easy reading. The references are to matters that are readily familiar to the reader; indeed, he reads or hears about them almost daily. Furthermore, his attitudes and feelings regarding them are usually firmly developed. Philosophy, too, deals with the world as we commonly know it, but we are not ordinarily “committed” on philosophical questions. But on matters with which social science deals, we are likely to have strong opinions.

Difficulties of Reading Social Science

Paradoxically, the very factors we have discussed, the factors which make social science seem easy to read, also make it difficult to read. Consider the last factor mentioned, for instance—the commitment that you as a reader are likely to have to some view of the matter your author is considering. Many readers fear that it would be disloyal to their commitment to stand apart and impersonally question what they are reading. Yet this is necessary whenever you read analytically. Such a stance is implied by the rules of reading, at least by the rules of structural outlining and interpretation. If you are going to answer the first two questions that should be asked of anything you read, you must, as it were, check your opinions at the door. You cannot understand a book if you refuse to hear what it is saying.

The very familiarity of the terms and propositions in social science writing is also an obstacle to understanding. Many social scientists recognize this themselves. They object vigorously to the use of more or less technical terms and concepts in popular journalism and other writings. An example of such a concept is that of the Gross National Product (GNP). In serious economic writing, the concept is employed in a relatively limited sense. But many reporters and columnists, some social scientists say, make the concept do too much work. They use it too widely, without really understanding what it means. Obviously, if the writer of something you are reading is confused about his use of a key term, you, as reader, must be so, too.

Let us try to make this point clear by drawing a distinction between the social sciences, on the one hand, and the so-called hard sciences—physics, chemistry, and the like—on the other hand. We have observed that the author of a scientific book (taking “scientific” in the latter sense) makes clear what he assumes and what he desires to prove, and also makes sure that his terms and propositions are easy to spot. Since coming to terms and finding the propositions is a main part of reading any expository work, this means that much of the work is done for you in the case of such books. You may still have difficulty with the mathematical form of presentation; and if you do not have a firm grasp of the arguments and of the experimental or observational basis of the conclusions, you will find it hard to criticize the book—that is, to answer the questions, Is it true? and What of it? Nevertheless, there is an important sense in which the reading of this kind of scientific books is easier than the reading of most other kinds of expository works.

Another way to say what it is that the hard scientist does is to say that he “stipulates his usage”—that is, he informs you what terms are essential to his argument and how he is going to use them. Such stipulations usually occur at the beginning of the book, in the form of definitions, postulates, axioms, and so forth.

Since stipulation of usage is characteristic of these fields, it has been said that they are like games or have a “game structure.” Stipulation of usage is like establishing the rules of a game. If you want to play poker, you do not dispute the rule that three of a kind is a better hand than two pairs; if you want to play bridge, you do not argue with the convention that a queen takes a jack (in the same suit), or that the highest trump takes any other card (in a suit contract). Similarly, you do not dispute a hard scientist’s stipulations in reading his book. You accept them, and go on from there.

Until quite recently, at least, stipulation of usage was not as common in the social sciences as it is in the hard sciences. One reason for this is that the social sciences were typically not mathematicized. Another is that stipulation of usage in the social or behavioral sciences is *harder to do*. It is one thing to define a circle or an isosceles triangle; it is quite another to define an economic depression or mental health. Even if a social scientist attempts to define such terms, his readers are inclined to question his usage. As a result, the social scientist must continue to struggle with his own terms throughout his work—and his struggle creates problems for his reader.

The most important source of difficulty in reading social science derives from the fact that this field of literature is a mixed, rather than a pure, kind of expository writing. We have seen how history is a mixture of fiction and science, and how we must read it with that in mind. We are familiar with this kind of mixture; we have had a great deal of experience with it. The situation in social science is quite different. Much social science is a mixture of science, philosophy, and history, often with some fiction thrown in for good measure.

If social science were always the same kind of mixture, we could become familiar with it as we have with history. But this is far from the case. The mixture itself shifts from book to book, and the reader is confronted with the task of identifying the various strands that go to make up what he is reading. These strands may change in the course of a single book as well as in different books. It is no easy job to separate them out.

You will recall that the first step the analytical reader has to take is to answer the question, What kind of book is this? In the case of fiction, that question is relatively easy to answer. In the case of science and philosophy, it is also relatively easy; and even if history is a mixed form, at least the reader ordinarily knows that he is reading history. But the various strands that go to make up social science—sometimes interwoven in this pattern, sometimes in that, sometimes in still another—make the question very hard to answer when we are reading a work in any of the fields involved. The problem, in fact, *is precisely as difficult as the problem of defining social science*.

Nevertheless, the analytical reader must somehow manage to answer the question. It is not only his first task, but also his most important. If he is able to say what strands go to make up the book he is reading, he will have moved a good way toward understanding it.

Outlining a work in social science poses no special problems, but coming to terms with the author, as we have already suggested, may be extremely difficult, owing to the relative inability of the author to stipulate his usage. Nevertheless, some common understanding of the key terms is usually possible. From terms we move to propositions and arguments, and here again there is no special problem if the book is a good one. But the last question, What of it?, requires considerable restraint on the part of the reader. It is here that the situation we described earlier may occur—namely, the situation in which the reader says, “I cannot fault the author’s conclusions, but I nevertheless disagree with them.” This comes about, of course, because of the prejudgments that the reader is likely to have concerning the author’s approach and his conclusions.

Reading Social Science Literature

More than once in the course of this chapter we have employed the phrase “social science literature” instead of “social science book.” The reason is that it is customary in social science to read several books about a subject rather than one book for its own sake. This is not only because social science is a relatively new field with as yet but few classic texts. It is also because when reading social science, we often have our eye primarily on *a particular matter or problem*, rather than on *a particular author or book*. We are interested in law enforcement, for example, and we read half a dozen works on the subject. Or our interest may concern race relations, or education, or taxation, or the problems of local government. Typically, there is no single, authoritative work on any of these subjects, and we must therefore read several. One sign of this is that social science authors themselves, in order to keep up with the times, must constantly bring out new, revised editions of their works; and new works supersede older ones and rapidly render them obsolete.

To some extent, a similar situation obtains in philosophy, as we have already observed. Fully to understand a philosopher, you should make some attempt to read the philosophers your author himself has read, the philosophers who have influenced him. To some extent it is also true in history, where we suggested that, if you want to discover the truth of the past, you had better read several books about it rather than one. But in those cases the likelihood that you would find one major, authoritative work was much greater. In social science that is not so common, and so the necessity of reading several works rather than one is much more urgent.

The rules of analytical reading are not in themselves applicable to the reading of several works on the same subject. They apply to each of the works that is read, of course, and if you want to read any of them well you have to observe them. But new rules of reading are required as we pass from the third level of reading (analytical reading), to the fourth (syntopical reading). We are now prepared to tackle that fourth level, having come to see, because of this characteristic of social science, the need for it.

Pointing this out makes it clear why we relegated the discussion of the social sciences to the last chapter in Part Three. It should now be clear why we organised the discussion in the way we did. We began with the reading of practical books, which are different from all others because of the special obligation to act that the reader is under if he agrees with and accepts what he is reading. We then treated fiction and poetry, which pose special problems that are unlike those of expository books. Finally, we dealt with three types of theoretical, expository writing—science and mathematics, philosophy, and social science. Social science came last because of the need to read it syntopically.

11. How to Read Imaginative, Films Literature

1. **Open How To read Fiction Books and then Imaginative Folder. Choose and decide the Book. Listen and Apply one of the chosen Books:**
 - A. **Literature & Composition_ Reading - Writing - Thinking.**
 - B. **Literature_ An Introduction to Fiction, Poetry, and Drama_Includes 1995 Mla Guidelines.**
 - C. **How To Read A Film.**
 - D. **How to Read a Film_ Movies, Media, and Beyond.**
 - E. **How to Read Novels Like a Professor_ A Jaunty Exploration of the World's Favorite Literary Form.**
 - F. **Reading Like a Writer_ A Guide for People Who Love Books and for Those Who Want to Write Them.**
 - G. **The Language of Composition_ Reading, Writing.**

So far, this book has been concerned with only half the reading that most people do. Even that is too liberal an estimate. Probably the greater part of anybody's reading time is spent on newspapers and magazines, and on things that have to be read in connection with one's job. And so far as books are concerned, most of us read more fiction than nonfiction. Furthermore, of the nonfiction books, the most popular are those that, like newspapers and magazines, deal journalistically with matters of contemporary interest.

We have not deceived you about the rules set forth in the preceding chapters. Before undertaking to discuss them in detail, we explained that we would have to limit ourselves to the business of reading serious nonfiction books. To have expounded the rules for reading imaginative and expository literature *at the same time* would have been confusing. But now we cannot ignore the other types of reading any longer.

Before embarking on the task, we want to emphasize one rather strange paradox. The problem of knowing how to read imaginative literature is inherently much more difficult than the problem of knowing how to read expository books. Nevertheless, it seems to be a fact that such skill is more widely possessed than the art of reading science and philosophy, politics, economics, and history. How can this be true?

It may be, of course, that people deceive themselves about their ability to read novels intelligently. From our teaching experience, we know how tongue-tied people become when asked to say what they liked about a novel. That they enjoyed it is perfectly clear to them, but they cannot give much of an account of their enjoyment or tell what the book contained that caused them pleasure. This might indicate that people can be good readers of fiction without being good critics. We suspect this is, at best, a half-truth. A critical reading of anything depends upon the fullness of one's apprehension. Those who cannot

say what they like about a novel probably have not read it below its most obvious surfaces. However, there is more to the paradox than that. Imaginative literature primarily pleases rather than teaches. It is much easier to be pleased than taught, but much harder to know *why* one is pleased. Beauty is harder to analyze than truth.

To make this point clear would require an extensive analysis of aesthetic appreciation. We cannot undertake that here. We can, however, give you some advice about how to read imaginative literature. We will proceed, first, by the *way of negation*, stating the obvious “don’ts” instead of the constructive rules. Next, we will proceed by the *way of analogy*, briefly translating the rules for reading nonfiction into their equivalents for reading fiction. Finally, in the next chapter, we will proceed to examine the problems of reading specific types of imaginative literature, namely, novels, plays, and lyric poems.

How Not to Read Imaginative Literature

In order to proceed by the way of negation, it is first of all necessary to grasp the basic differences between expository and imaginative literature. These differences will explain why we cannot read a novel as if it were a philosophical argument, or a lyric as if it were a mathematical demonstration.

The most obvious difference, already mentioned, relates to the purposes of the two kinds of writing. Expository books *try to convey knowledge*—knowledge about experiences that the reader has had or could have. Imaginative ones *try to communicate an experience itself*—one that the reader can have or share *only* by reading—and if they succeed, they give the reader something to be enjoyed. Because of their diverse intentions, the two sorts of work appeal differently to the intellect and the imagination.

We *experience* things through the exercise of our senses and imagination. To *know* anything we must use our powers of judgment and reasoning, which are intellectual. This does not mean that we can think without using our imagination, or that sense experience is ever wholly divorced from rational insight or reflection. The matter is only one of emphasis. Fiction appeals primarily to the imagination. That is one reason for calling it imaginative literature, in contrast to science and philosophy which are intellectual.

This fact about imaginative literature leads to what is probably the most important of the negative injunctions we want to suggest. *Don’t try to resist the effect that a work of imaginative literature has on you.*

We have discussed at length the importance of reading actively. This is true of all books, but it is true in quite different ways of expository works and of poetry. The reader of the former should be like a bird of prey, constantly alert, always ready to pounce. The kind of activity that is appropriate in reading poetry and fiction is not the same. It is a sort of passive action, if we may be allowed the expression, or, better, active passion. We must act in such a way, when reading a story, that we let it act on us. We must allow it to move

us, we must let it do whatever work it wants to do on us. We must somehow make ourselves open to it.

We owe much to the expository literature—the philosophy, science, mathematics — that has shaped the real world in which we live. But we could not live in this world if we were not able, from time to time, to get away from it. We do not mean that imaginative literature is always, or essentially, escapist. In the ordinary sense of that term, the idea is contemptible. If we must escape from reality, it should be to a deeper, or greater, reality. This is the reality of our inner life, of our own unique vision of the world. To discover this reality makes us happy; the experience is deeply *satisfying* to some part of ourselves we do not ordinarily touch. In any event, the rules of reading a great work of literary art should have as an end or goal just such a profound experience. The rules should clear away all that stops us from feeling as deeply as we possibly can.

The basic difference between expository and imaginative literature leads to another difference. Because of their radically diverse aims, these two kinds of writing necessarily use language differently. The imaginative writer tries to maximise the latent ambiguities of words, in order thereby to gain all the richness and force that is inherent in their multiple meanings. He uses metaphors as the units of his construction just as the logical writer uses words sharpened to a single meaning. What Dante said of *The Divine Comedy*, that it must be read as having several distinct though related meanings, generally applies to poetry and fiction. The logic of expository writing aims at an ideal of unambiguous explicitness. Nothing should be left between the lines. Everything that is relevant and statable should be said as explicitly and clearly as possible. In contrast, imaginative writing relies as much upon what is implied as upon what is said. The multiplication of metaphors puts almost more content between the lines than in the words that compose them. The whole poem or story says something that none of its words say or can say.

From this fact we obtain another negative injunction. *Don't look for terms, propositions, and arguments in imaginative literature.* Such things are logical, not poetic, devices. "In poetry and in drama," the poet Mark Van Doren once observed, "statement is one of the obscurer mediums." What a lyric poem "states," for instance, cannot be found in any of its sentences. And the whole, comprising all its words in their relations to and reactions upon each other, says something that can never be confined within the straitjacket of propositions. (However, imaginative literature contains elements that are *analogous* to terms, propositions, and arguments, and we will discuss them in a moment.)

Of course, we can learn from imaginative literature, from poems and stories and especially, perhaps, plays—but not in the same way as we are taught by scientific and philosophical books. We learn from experience—the experience that we have in the course of our daily lives. So, too, we can learn from the vicarious, or artistically created, experiences that fiction produces in our imagination. In this sense, poems and stories teach as well as please. But the sense in which science and philosophy teach us is different. Expository works do not provide us with novel experiences. They comment on such experiences as we already have or can get. That is why it seems right to say that expository books teach primarily, while imaginative books teach only derivatively, by

creating experiences from which we can learn. In order to learn from such books, we have to do our own thinking about experience; in order to learn from scientists and philosophers, we must first try to understand the thinking they have done.

Finally, one last negative rule. *Don't criticise fiction by the standards of truth and consistency that properly apply to communication of knowledge.* The "truth" of a good story is its verisimilitude, its intrinsic probability or plausibility. It must be a likely story, but it need not describe the facts of life or society in a manner that is verifiable by experiment or research. Centuries ago, Aristotle remarked that "the standard of correctness is not the same in poetry as in politics," or in physics or psychology for that matter. Technical inaccuracies about anatomy or errors in geography or history should be criticized when the book in which they occur offers itself as a treatise on those subjects. But misstatements of fact do not mar a story if its teller succeeds in surrounding them with plausibility. When we read history, we want the truth in some sense, and we have a right to complain if we do not get it. When we read a novel we want a story that must be true only in the sense that it *could have happened* in the world of characters and events that the novelist has created, and re-created in us.

What do we do with a philosophical book, once we have read it and understood it? We test it—against the common experience that was its original inspiration, and that is its only excuse for being. We say, is this true? Have we felt this? Have we always thought this without realizing it? Is this obvious now, though it was not previously? Complicated as the author's theory or explanation may be, is it actually simpler than the chaotic ideas and opinions we had about this subject before?

If we can answer most of these questions in the affirmative, then we are bound by the community of understanding that is between ourselves and the author. When we understand and do not disagree, we must say, "This is our common sense of the matter. We have tested your theory and found it correct."

Not so with poetry. We cannot test *Othello*, say, against our own experience, unless we too are Moors and wedded to Venetian ladies whom we suspect of treachery. But even if this were so, Othello is not every Moor, and Desdemona is not every Venetian lady; and most such couples would have the good fortune not to know an Iago. In fact, all but one would be so fortunate; Othello, the character as well as the play, is unique.

General Rules for Reading Imaginative Literature

To make the "don'ts" discussed in the last section more helpful, they must be supplemented by constructive suggestions. These suggestions can be developed by analogy from the rules of reading expository works.

There are, as we have seen, three groups of such rules. The first group consists of rules for discovering the unity and part-whole structure; the second consists of rules for identifying and interpreting the book's component terms, propositions, and arguments; the

third consists of rules for criticizing the author's doctrine so that we can reach intelligent agreement or disagreement with him. We called these three groups of rules structural, interpretive, and critical. By analogy, we can find similar sets of rules to guide us in reading poems, novels, and plays.

First, we can translate the structural rules—the rules of outlining—into their fictional analogues as follows.

(1) You must classify a work of imaginative literature according to its kind. A lyric tells its story primarily in terms of a single emotional experience, whereas novels and plays have much more complicated plots, involving many characters, their actions and their reactions upon one another, as well as the emotions they suffer in the process. Everyone knows, furthermore, that a play differs from a novel by reason of the fact that it narrates entirely by means of actions and speeches.

(There are some interesting exceptions to this, which we will mention later.) The playwright can never speak in his own person, as the novelist can, and frequently does, in the course of a novel. All of these differences in manner of writing call for differences in the reader's receptivity. Therefore, you should recognise at once the kind of fiction you are reading.

(2) You must grasp the unity of the whole work. Whether you have done this or not can be tested by whether you are able to express that unity in a sentence or two. The unity of an expository work resides ultimately in the main problem that it tries to solve. Hence its unity can be stated by the formulation of this question, or by the propositions that answer it. The unity of fiction is also connected with the problem the author has faced, but we have seen that that problem is the attempt to convey a concrete experience, and so *the unity of a story is always in its plot*. You have not grasped the whole story until you can summarize its plot in a brief narration—not a proposition or an argument. Therein lies its unity.

Note that there is no real contradiction here between what we have just said about the unity of plot and what we said about the uniqueness of the language of a fictional work. Even a lyric has a "plot" in the sense in which we are using the term here. But the plot is not the concrete experience that is re-created in the reader by the work, be it lyric, play, or novel; it is only the framework of it, or perhaps the occasion of it. It stands for the unity of the work, which is properly in the experience itself, just as the logical summation of the meaning of an expository work stands for the argument of the whole.

(3) You must not only reduce the whole to its simplest unity, but you must also discover how that whole is constructed out of all its parts. The parts of an expository book are concerned with parts of the whole problem, the partial solutions contributing to the solution of the whole. The parts of fiction are the various steps that the author takes to develop his plot—the details of characterisation and incident. The way in which the parts are arranged differs in the two cases. In science and philosophy, they must be ordered logically. In a story, the parts must somehow fit into a temporal scheme, a progress from a beginning through the middle to its end. To know the structure of a narrative, you must know where it begins—which is not necessarily on the first page, of course—what it goes through, and where it comes out at. You must know the various crises that lead up to the climax, where and how the climax occurs, and what happens in the aftermath. (By

“aftermath” we do not mean what happens after the story is over. Nobody can know that. We mean only what happens, within the narrative, after the climax has occurred.)

An important consequence follows from the points we have just made. The parts or sub-wholes of an expository book are more likely to be independently readable than the parts of fiction. Euclid published his *Elements* in thirteen parts, or books, as he called them, and the first of them can be read by itself. That is more or less the case with every well-organized expository book. Its sections or chapters, taken separately or in subgroups, make sense. But the chapters of a novel, the acts of a play, or the verses of a lyric often become relatively meaningless when wrenched from the whole.

Second, what are the interpretive rules for reading fiction? Our prior consideration of the difference between a poetic and a logical use of language prepares us to make a translation of the rules that direct us to find the terms, the propositions, and the arguments. We know we should not do that, but we must do something analogous to it.

(1) The elements of fiction are its episodes and incidents, its characters, and their thoughts, speeches, feelings, and actions. Each of these is an element in the world the author creates. By manipulating these elements, the author tells his story. They are like the terms in logical discourse. Just as you must come to terms with an expository writer, so here you must become acquainted with the details of incident and characterization. You have not grasped a story until you are familiar with its characters, until you have lived through its events.

(2) Terms are connected in propositions. The elements of fiction are connected by the total scene or background against which they stand out in relief. The imaginative writer, we have seen, creates a world in which his characters “live, move, and have their being.” The fictional analogue of the rule that directs you to find the author’s propositions can, therefore, be stated as follows: become at home in this imaginary world; know it as if you were an observer on the scene; become a member of its population, willing to befriend its characters, and able to participate in its happenings by sympathetic insight, as you would do in the actions and sufferings of a friend. If you can do this, the elements of fiction will cease to be so many isolated pawns moved about mechanically on a chessboard. You will have found the connections that vitalize them into members of a living society.

(3) If there is any motion in an expository book, it is the movement of the argument, a logical transition from evidences and reasons to the conclusions they support. In the reading of such books, it is necessary to follow the argument. Hence, after you have discovered its terms and propositions, you are called upon to analyze its reasoning. There is an analogous last step in the interpretive reading of fiction. You have become acquainted with the characters. You have joined them in the imaginary world wherein they dwell, consented to the laws of their society, breathed its air, tasted its food, traveled its highways. Now you must follow them through their adventures. The scene or background, the social setting, is (like the proposition) a kind of *static* connection of the elements of fiction. The unraveling of the plot (like the arguments or reasoning) is the dynamic

connection. Aristotle said that plot is the soul of a story. It is its life. To read a story well you must have your finger on the pulse of the narrative, be sensitive to its very beat.

Before leaving these fictional equivalents for the interpretive rules of reading, we must caution you not to examine the analogy too closely. An analogy of this sort is like a metaphor that will disintegrate if you press it too hard. The three steps we have suggested outline the way in which one becomes progressively aware of the artistic achievement of an imaginative writer. Far from spoiling your enjoyment of a novel or play, they should enable you to enrich your pleasure by knowing intimately the sources of your delight. You will not only know *what* you like but also *why* you like it.

One other caution: the foregoing rules apply mainly to novels and plays. To the extent that lyric poems have some narrative line, they apply to lyrics also. But the rules do not cease to apply to non-narrative lyrics, although the connection is much less close. A lyric is the representation of a concrete experience, just like a long story, and it attempts to re-create that experience in the reader. There is a beginning, middle, and end of even the shortest lyric, just as there is a temporal sequence in any experience, no matter how brief and fleeting. And though the cast of characters may be very small in a short lyric, there is always at least one character—namely, the speaker of the poem.

Third, and last, what are the critical rules for reading fiction? You may remember that we distinguished, in the case of expository works, between the general maxims governing criticism and a number of particular points—specific critical remarks. With respect to the general maxims, the analogy can be sufficiently drawn by one translation. Where, in the case of expository works, the advice was not to criticize a book—not to say you agree or disagree—until you can first say you understand, so here the maxim is: *don't criticize imaginative writing until you fully appreciate what the author has tried to make you experience*.

There is an important corollary to this. The good reader of a story does not question the world that the author creates—the world that is re-created in himself. “We must grant the artist his subject, his idea, his *donné*,” said Henry James in *The Art of Fiction*; “our criticism is applied only to what he makes of it.” That is, we must merely appreciate the fact that a writer sets his story in, say, Paris, and not object that it would have been better to set it in Minneapolis; but we have a right to criticize what he does with his Parisians and with the city itself.

In other words, we must remember the obvious fact that we do not agree or disagree with fiction. We either like it or we do not. Our critical judgment in the case of expository books concerns their *truth*, whereas in criticizing belles-lettres, as the word itself suggests, we consider chiefly their *beauty*. The beauty of any work of art is related to the pleasure it gives us when we know it well.

Let us restate the maxims, then, in the following manner. Before you express your likes and dislikes, you must first be sure that you have made an honest effort to appreciate the work. By appreciation, we mean having the experience that the author tried to produce

for you by working on your emotions and imagination. Thus, you cannot *appreciate* a novel by reading it passively (indeed, as we have remarked, you must read it passionately) any more than you can *understand* a philosophical book that way. To achieve appreciation, as to achieve understanding, you must read actively, and that means performing all the acts of analytical reading that we have briefly outlined.

After you have completed such a reading, you are competent to judge. Your first judgment will naturally be one of taste. You will say not only *that* you like or dislike the book, but also *why*. The reasons you give will, of course, have some critical relevance to the book itself, but in their first expression they are more likely to be about you—your preferences and prejudices—than about the book. Hence, to complete the task of criticism, you must objectify your reactions by pointing to those things in the book that caused them. You must pass from saying what *you* like or dislike and why, to saying what is good or bad about the *book* and why.

The better you can reflectively discern the causes of your pleasure in reading fiction or poetry, the nearer you will come to knowing the artistic virtues in the literary work itself. You will thus gradually develop a standard of criticism. And you will probably find a large company of men and women of similar taste to share your critical judgments. You may even discover, what we think is true, that good taste in literature is acquired by anyone who learns to read.

12. Suggestions for Reading Stories, Plays, and Poems

- 1. Open How To read Fiction Books and Stories, Plays and Poems Folder. Choose and decide the Book. Listen and Apply one of the chosen Books:**
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The parallel rules for reading imaginative literature that were discussed in the last chapter were general ones, applying across the board to all kinds of imaginative literature—novels and stories, whether in prose or verse (including epics); plays, whether tragedies or comedies or something in between; and lyric poems, of whatever length or complexity.

These rules, being general, must be adapted somewhat when they are applied to the different kinds of imaginative literature. In this chapter we want to suggest the adaptations that are required. We will have something particular to say about the reading of stories, plays, and lyric poems, and we will also include notes on the special problems presented by the reading of epic poems and the great Greek tragedies.

Before proceeding to those matters, however, it is desirable to make some remarks about the last of the four questions that the active and demanding reader must ask of any book, when that question is asked of a work of imaginative literature.

You will recall that the first three questions are: first, What is the book about as a whole?; second, What is being said in detail, and how?; and third, Is the book true, in whole or part? The application of these three questions to imaginative literature was covered in the last chapter. The first question is answered when you are able to describe the unity of the plot of a story, play, or poem—"plot" being construed broadly to include the action or movement of a lyric poem as well as of a story. The second question is answered when you are able to discern the role that the various characters play, and recount, in your own words, the key incidents and events in which they are involved. And the third question is answered when you are able to give a reasoned judgment about the poetical truth of the work. Is it a likely story? Does the work satisfy your heart and your mind? Do you appreciate the beauty of the work? In each case, can you say why?

The fourth question is, What of it? In the case of expository books, an answer to this question implies some kind of action on your part. "Action," here, does not always mean going out and doing something. We have suggested that that kind of action is an obligation for the reader when he agrees with a practical work—that is, agrees with the ends proposed—and accepts as appropriate the means by which the author says they can be attained. Action in this sense is not obligatory when the expository work is theoretical. There, mental action alone is required. But if you are convinced that such a book is true, in whole or part, then you must agree with its conclusions, and if they imply some adjustment of your views of the subject, then you are more or less required to make those adjustments.

Now it is important to recognize that, in the case of a work of imaginative literature, this fourth and final question must be interpreted quite differently. In a sense, the question is irrelevant to the reading of stories and poems. Strictly speaking, no action whatever is called for on your part when you have read a novel, play, or poem well—that is, analytically. You have discharged all of your responsibilities as a reader when you have applied the parallel rules of analytical reading to such works, and answered the first three questions.

We say "strictly speaking," because it is obvious that imaginative works have often led readers to act in various ways. Sometimes a story is a better way of getting a point across—be it a political, economic, or moral point—than an expository work making the same point. George Orwell's *Animal Farm* and his *1984* are both powerful attacks on totalitarianism. Aldous Huxley's *Brave New World* is an eloquent diatribe against the tyranny of technological progress. Alexander Solzhenitsyn's *The First Circle* tells us more about the petty cruelty and inhumanity of the Soviet bureaucracy than a hundred factual studies and reports. Such works have been banned and censored many times in the history of mankind, and the reason for that is clear. As E. B. White once remarked, "A despot doesn't fear eloquent writers preaching freedom—he fears a drunken poet who may crack a joke that will take hold."

Nevertheless, such practical consequences of the reading of stories and poems are not of the essence of the matter. Imaginative writings *can* lead to action, but they do not *have to*. They belong in the realm of fine art.

A work of fine art is “fine” not because it is “refined” or “finished,” but because it is an end (*finis*, Latin, means end) in itself. It does not move toward some result beyond itself. It is, as Emerson said of beauty, its own excuse for being.

Therefore, when it comes to applying this last question to works of imaginative literature, you should do so with caution. If you feel impelled because of a book you have read to go out and do something, ask yourself whether the work contains some implied statement that has produced this feeling. Poetry, properly speaking, is not the realm of statement, although many stories and poems have statements in them, more or less deeply buried. And it is quite right to take heed of them, and to react to them. But you should remember that you are then taking heed of and reacting to something other than the story or poem itself. That subsists in its own right. To read it well, all you have to do is experience it.

13. How to Read Stories

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The first piece of advice we would like to give you for reading a story is this: Read it quickly and with total immersion. Ideally, a story should be read at one sitting, although this is rarely possible for busy people with long novels. Nevertheless, the ideal should be approximated by compressing the reading of a good story into as short a time as feasible. Otherwise you will forget what happened, the unity of the plot will escape you, and you will be lost.

Some readers, when they really like a novel, want to savor it, to pause over it, to draw out the reading of it for as long as they can. But in this case they are probably not so much reading the book as satisfying their more or less unconscious feelings about the events and the characters. We will return to that in a moment.

Read quickly, we suggest, and with total immersion. We have indicated the importance of letting an imaginative book work on you. That is what we mean by the latter phrase. Let the characters into your mind and heart; suspend your disbelief, if such it is, about the events. Do not disapprove of something a character does before you understand why he does it—if then. Try as hard as you can to live in his world, not in yours; there, the things he does may be quite understandable. And do not judge the world as a whole until you are sure that you have “lived” in it to the extent of your ability.

Following this rule will allow you to answer the first question you should ask about any book—What is it about, as a whole? Unless you read it quickly you will fail to see the unity of the story. Unless you read intensely you will fail to see the details.

The terms of a story, as we have observed, are its characters and incidents. You must become acquainted with them, and be able to sort them out. But here a word of warning. To take *War and Peace* as an example, many readers start this great novel and are overwhelmed by the vast number of characters to whom they are introduced, especially since they all have strange-sounding names. They soon give up on the book in the belief that they will never be able to sort out all the complicated relationships, to know who is who. This is true of any big novel—and if a novel is really good, we want it to be as big as possible.

It does not always occur to such fainthearted readers that exactly the same thing happens to them when they move to a new town or part of a town, when they go to a new school or job, or even when they arrive at a party. They do not give up in those circumstances; they know that after a short while individuals will begin to be visible in the mass, friends will emerge from the faceless crowd of fellow-workers, fellow-students, or fellow-guests. We may not remember the names of everyone we met at a party, but we will recall the name of the man we talked to for an hour, or the girl with whom we made a date for the next evening, or the mother whose child goes to the same school as ours. The same thing happens in a novel. We should not expect to remember every character; many of them are merely background persons, who are there only to set off the actions of the main characters. However, by the time we have finished *War and Peace* or any big novel, we know who is important, and we do not forget. Pierre, Andrew, Natasha, Princess Mary, Nicholas—the names are likely to come immediately to memory, although it may have been years since we read Tolstoy’s book.

We also, despite the plethora of incidents, soon learn *what* is important. Authors generally give a good deal of help in this respect; they do not want the reader to miss what is essential to the unfolding of the plot, so they flag it in various ways. But our point is that you should not be anxious if all is not clear from the beginning. Actually, it should *not* be clear then. A story is like life itself; in life, we do not expect to understand events as they occur, at least with total clarity, but looking back on them, we do understand. So the reader of a story, looking back on it after he has finished it, understands the relation of events and the order of actions.

All of this comes down to the same point: you must finish a story in order to be able to say that you have read it well. Paradoxically, however, a story ceases to be like life on its last page. Life goes on, but the story does not. Its characters have no vitality outside the book, and your imagination of what happens to them before the first page and after the last is only as good as the next reader's. Actually, all such speculations are meaningless. Preludes to *Hamlet* have been written, but they are ridiculous. We should not ask what happens to Pierre and Natasha after *War and Peace* ends. We are satisfied with Shakespeare's and Tolstoy's creations partly because they are limited in time. We need no more.

The great majority of books that are read are stories of one kind or another. People who cannot read listen to stories. We even make them up for ourselves. Fiction seems to be a necessity for human beings. Why is this?

One reason why fiction is a human necessity is that it satisfies many unconscious as well as conscious needs. It would be important if it only touched the conscious mind, as expository writing does. But fiction is important, too, because it also touches the unconscious.

On the simplest level—and a discussion of this subject could be very complex— we like or dislike certain kinds of people more than others, without always being sure why. If, in a novel, such people are rewarded or punished, we may have stronger feelings, either pro or con, about the book than it merits artistically.

For example, we are often pleased when a character in a novel inherits money, or otherwise comes into good fortune. However, this tends to be true only if the character is "sympathetic"—meaning that we can identify with him or her. We do not admit to ourselves that we would like to inherit the money, we merely say that we like the book.

Perhaps we would all like to love more richly than we do. Many novels are about love—most are, perhaps—and it gives us pleasure to identify with the loving characters. They are free, and we are not. But we may not want to admit this; for to do so might make us feel, consciously, that our own loves are inadequate.

Again, almost everyone has some unconscious sadism and masochism in his makeup. These are often satisfied in novels, where we can identify with either the conqueror or victim, or even with both. In each case, we are prone to say simply that we like "that kind of book"—without specifying or really knowing why.

Finally, we suspect that life as we know it is unjust. Why do good people suffer, and bad ones prosper? We do not know, we cannot know, but the fact causes great anxiety in everyone. In stories, this chaotic and unpleasant situation is adjusted, and that is extremely satisfying to us.

In stories—in novels and narrative poems and plays—justice usually does exist. People get what they deserve; the author, who is like a god to his characters, sees to it that they are rewarded or punished according to their true merit. In a good story, in a satisfying one, this is usually so, at least. One of the most irritating things about a bad story is that the people in it seem to be punished or rewarded with no rhyme or reason.

The great storyteller makes no mistakes. He is able to convince us that justice—poetic justice, we call it—has been done.

This is true even of high tragedy. There, terrible things happen to good men, but we see that the hero, even if he does not wholly deserve his fate, at least comes to understand it. And we have a profound desire to share his understanding. If we only *knew*—then we could withstand whatever the world has in store for us. “I Want to Know Why” is the title of a story by Sherwood Anderson. It could be the title of many stories. The tragic hero does learn why, though often, of course, only after the ruin of his life. We can share his insight without sharing his suffering.

Thus, in criticizing fiction we must be careful to distinguish those books that satisfy our own particular unconscious needs—the ones that make us say, “I like this book, although I don’t really know why”—from those that satisfy the deep unconscious needs of almost everybody. The latter are undoubtedly the great stories, the ones that live on and on for generations and centuries. As long as man is man, they will go on satisfying him, giving him something that he needs to have—a belief in justice and understanding and the allaying of anxiety. We do not know, we cannot be sure, that the real world is good. But the world of a great story *is* somehow good. We want to live there as often and as long as we can.

A Note About Epics

Perhaps the most honored but probably the least read books in the great tradition of the Western World are the major epic poems, particularly the *Iliad* and *Odyssey* of Homer, Virgil's *Aeneid*, Dante's *Divine Comedy*, and Milton's *Paradise Lost*. This paradox requires some comment.

Judging by the very small number that have been completed successfully in the past 2,500 years, a long epic poem is apparently the most difficult thing a man can write. This is not for want of trying; hundreds of epics have been begun, and some—for example, Wordsworth's *Prelude* and Byron's *Don Juan*—have grown to extensive proportions without ever really being finished. So honor is due the poet who sticks to the task and completes it. Greater honor is due him if he produces a work that has the qualities of the five just mentioned. But they are certainly not easy to read.

This is not only because they are written in verse—for in every case except that of *Paradise Lost*, prose translations are available to us. The difficulty seems rather to lie in their elevation, in their approach to their subject matter. Any of these major epics exerts enormous demands on the reader—demands of attention, of involvement, and of imagination. The effort required to read them is very great indeed.

Most of us are not aware of the loss we suffer by not making that effort. For the rewards to be gained from a good reading—an analytical reading, as we should say—of these epics are at least as great as those to be gained from the reading of any other books, certainly any other works of fiction. Unfortunately, however, these rewards are not gained by readers who do less than a good job on these books.

We hope that you will take a stab at reading these five great epic poems, and that you will manage to get through all of them. We are certain you will not be disappointed if you do. And you will be able to enjoy a further satisfaction. Homer, Virgil, Dante, and Milton—they are the authors that every good poet, to say nothing of other writers, has read. Along with the Bible, they constitute the backbone of any serious reading program.

14. How to Read Plays

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A play is fiction, a story, and insofar as that is true, it should be read like a story. Perhaps the reader has to be more active in creating the background, the world in which the characters live and move, for there is no description in plays such as abounds in novels. But the problems are essentially similar.

However, there is one important difference. When you read a play, you are not reading a *complete* work. The complete play (the work that the author intended you to apprehend) is only apprehended when it is acted on a stage. Like music, which must be heard, a play lacks a physical dimension when we read it in a book. The reader must supply that dimension.

The only way to do that is to make a pretense of seeing it acted. Therefore, once you have discovered what the play is about, as a whole and in detail, and once you have answered the other questions you must ask about any story, then try *directing* the play.

Imagine that you have half a dozen good actors before you, awaiting your commands. Tell them how to say this line, how to play that scene. Explain the importance of these few words, and how that action is the climax of the work. You will have a lot of fun, and you will learn a lot about the play.

An example will show what we mean. In *Hamlet*, Act II, Scene ii, Polonius announces to the king and queen that Hamlet is insane because of his love for Ophelia, who has spurned the prince's advances. The king and queen are doubtful, whereupon Polonius proposes that the king and he hide behind an arras, in order to overhear a conversation between Hamlet and Ophelia. This proposal occurs in Act II, Scene ii, at lines 160–170; immediately thereafter Hamlet enters, reading. His speeches to Polonius are enigmatic; as Polonius says, “though this be madness, yet there is method in’t!” Later on, early in Act III, Hamlet enters and delivers the famous soliloquy, beginning “To be or not to be,” and then is interrupted by catching sight of Ophelia. He speaks to her quite reasonably for a time, but suddenly he cries: “Ha, ha! are you honest?” (III, i, line 103). Now the question is, has Hamlet overheard Polonius say earlier that he and the king planned to spy on him? And did he perhaps also hear Polonius say that he would “loose my daughter to him”? If so Hamlet's conversations with both Polonius and Ophelia would mean one thing; if he did not overhear the plotting, they would mean another. Shakespeare left no stage directions; the reader (or director) must decide for himself. Your own decision will be central to your understanding of the play.

Many of Shakespeare's plays require this kind of activity on the part of the reader. Our point is that it is always desirable, no matter how explicit the playwright was in telling us exactly what we should expect to see. (We cannot question what we are to hear, since the play's words are before us.) Probably you have not read a play really well until you have pretended to put it on the stage in this way. At best, you have given it only a partial reading.

Earlier, we suggested that there were interesting exceptions to the rule that the playwright cannot speak directly to the reader as the author of a novel can and often does. (Fielding, in *Tom Jones*, is an example of this direct addressing of the reader in one great novel.) Two of these exceptions are separated by nearly twenty-five centuries of time. Aristophanes, the ancient Greek comic playwright, wrote the only examples of what is called Old Comedy that survive. From time to time in an Aristophanic play, and always at least once, the leading actor would step out of character, perhaps move forward toward the audience, and deliver a political speech that had nothing whatever to do with the action of the drama. It is felt that these speeches were expressions of the author's personal feelings. This is occasionally done nowadays—no useful artistic device is ever really lost—but perhaps not as effectively as Aristophanes did it.

The other example is that of Shaw, who not only expected his plays to be acted but also hoped that they would be read. He published them all, at least one (*Heartbreak House*) before it was ever acted, and accompanied the publication with long prefaces in which he explained the meaning of the plays and told his readers how to understand them. (He also included very extensive stage directions in the published versions.) To read a

Shavian play without reading the preface Shaw wrote for it is to turn one's back intentionally on an important aid to understanding. Again, other modern playwrights have imitated Shaw in this device, but never as effectively as he did.

One other bit of advice may be helpful, particularly in reading Shakespeare. We have already suggested the importance of reading the plays through, as nearly as possible at one sitting, in order to get a feel for the whole. But, since the plays are mostly in verse, and since the verse is more or less opaque in places because of changes in the language that have occurred since 1600, it is often desirable to read a puzzling passage out loud. Read slowly, as if an audience were listening, and with "expression"—that is, try to make the words meaningful to you as you read them. This simple device will clear up many difficulties. Only after it has failed should you turn to the glossary or notes.

A Note About Tragedy

Most plays are not worth reading. This, we think, is because they *are* incomplete. They were not meant to be read—they were meant to be acted. There are many great expository works, and many great novels, stories, and lyric poems, but there are only a few great plays. However, those few—the tragedies of Aeschylus, Sophocles, and Euripides, the plays of Shakespeare, Molière's comedies, the works of a very few moderns—are very great indeed, for they contain within them some of the deepest and richest insights men have ever expressed in words.

Among these, Greek tragedy is probably the toughest nut to crack for beginning readers. For one thing, in the ancient world three tragedies were presented at one time, the three often dealing with a common theme, but except in one case (the *Oresteia* of Aeschylus) only single plays (or acts) survive. For another, it is almost impossible to stage the plays mentally, since we know almost nothing about how the Greek directors did it. For still another, the plays often are based on stories that were well known to their audiences but are known to us only through the plays. It is one thing to know the story of Oedipus, for example, as well as we know the story of George Washington and the Cherry Tree, and thus to view Sophocles' masterpiece as a commentary on a familiar tale; and it is quite another to see *Oedipus Rex* as the primary story and try to imagine the familiar tale that provided the background.

Nevertheless, the plays are so powerful that they triumph over even these obstacles, as well as others. It is important to read them well, for they not only can tell us much about life as we still live it, but they also form a kind of literary framework for many other plays written much later—for example, Racine's and O'Neill's. We have two bits of advice that may help.

The first is to remember that the essence of tragedy is time, or rather the lack of it. There is no problem in any Greek tragedy that could not have been solved if there had been enough time, but there is never enough. Decisions, choices have to be made in a moment, there is no time to think and weigh the consequences; and, since even tragic

heroes are fallible—especially fallible, perhaps—the decisions are wrong. It is easy for us to see what should have been done, but would we have been able to see in time? That is the question that you should always ask in reading any Greek tragedy.

The second bit of advice is this. One thing we do know about the staging of Greek plays is that the tragic actors wore buskins on their feet that elevated them several inches above the ground. (They also wore masks.) But the members of the chorus did not wear buskins, though they sometimes wore masks. The comparison between the size of the tragic protagonists, on the one hand, and the members of the chorus, on the other hand, was thus highly significant. Therefore you should always imagine, when you read the words of the chorus, that the words are spoken by persons of your own stature; while the words spoken by the protagonists proceed from the mouths of giants, from personages who did not only seem, but actually were, larger than life.

15. How to Read Lyric Poetry.

- 1. Open How To read Fiction Books and Stories, Plays and Poems Folder. Choose and decide the Book. Listen and Apply one of the chosen Books:**
- 2. Listen and Apply The Following Books on Stories, Plays, Poetry from Stories, Plays and Poems:**
 - A. How to read Poetry and understand Poetry.**
 - B. How To Read and Why.**
 - C. How to Read Poetry Like a Professor_ A Quippy and Sonorous Guide to Verse.**
 - D. How to Read World Literature (How to Study Literature).**
 - E. Literature_ An Introduction to Fiction, Poetry, and Drama_Includes 1995 Mla Guidelines.**
 - F. POETRY THE BASICS How do I read a poem_ Do I really understand poetry.**
 - G. Poetry For Dummies.**
 - H. Poetry for Students.**
 - I. Poetry for Students.**
 - J. Poetry the Basics.**
 - K. The Art of Poetry_ How to Read a Poem.**
 - L. Poetry Handbook.**
 - M. Theory into Poetry.**
 - N. Understanding Poetry_ An Anthology for College Students.**
 - O. Writing Poetry.**

The simplest definition of poetry (in the somewhat limited sense implied by the title of this section) is that it is what poets write. That seems obvious enough, and yet there are those who would dispute the definition. Poetry, they hold, is a kind of spontaneous overflowing of the personality, which may be expressed in written words but may also take the form of physical action, or more or less musical sound, or even just feeling. There is something to this, of course, and poets have always recognised it. It is a very old notion that the poet reaches down deep into himself to produce his poems, that their place of origin is a mysterious "well of creation" within the mind or soul. In this sense of the term, poetry can be made by anyone at any time, in a kind of solitary sensitivity session. But although we admit that there is a kernel of truth in this definition, the meaning of the term that we will be employing in what follows is much narrower. Whatever may be the origin of the poetic impulse, poetry, for us, consists of words, and what is more, of words that are arranged in a more or less orderly and disciplined way.

Other definitions of the term that similarly contain a kernel of truth are that poetry (again, primarily lyric poetry) is not truly poetry unless it praises, or unless it rouses to action (usually revolutionary), or unless it is written in rhyme, or unless it employs a specialized language that is called “poetic diction.” In that sentence we have intentionally mixed together some very modern and some very antiquated notions. Our point is that all of these definitions, and a dozen more that we might mention, are too narrow, just as the definition discussed in the last paragraph was too broad (for us).

Between such very broad and such very narrow definitions lies a central core that most people, if they were feeling reasonable about the matter, would admit was poetry. If we tried to state precisely what the central core consisted in, we would probably get into trouble, and so we will not try. Nevertheless, we are certain that you know what we mean. We are certain that nine times out of ten, or perhaps even ninety-nine times out of a hundred, you would agree with us that X was a poem and Y was not. And that is fully sufficient for our purposes in the following pages.

Many people believe that they cannot read lyric poetry—especially modern poetry. They think that it is often difficult, obscure, complex, and that it demands so much attention, so much work on their part, that it is not worthwhile. We would say two things. First, lyric poetry, even modern poetry, does not always demand as much work as you may think if you go about reading it in the right way. Second, it is often worth whatever effort you are willing to spend.

We do not mean that you should not work on a poem. A good poem can be worked at, re-read, and thought about over and over for the rest of your life. You will never stop finding new things in it, new pleasures and delights, and also new ideas about yourself and the world. We mean that the initial task of bringing a poem close enough to you to work on it is not as hard as you may have believed.

The first rule to follow in reading a lyric is to read it through without stopping, whether you think you understand it or not. This is the same rule that we have suggested for many different kinds of books, but it is more important for a poem than it is for a philosophical or scientific treatise, and even for a novel or play.

In fact, the trouble so many people seem to have in reading poems, especially the difficult modern ones, stems from their unawareness of this first rule of reading them. When faced by a poem of T. S. Eliot or Dylan Thomas or some other “obscure” modern, they plunge in with a will, but are brought up short by the first line or stanza. They do not understand it immediately and in its entirety, and they think they should. They puzzle over the words, try to unwind the complicated skein of the syntax, and soon give up, concluding that, as they suspected, modern poetry is just too difficult for them.

It is not only modern lyrics that are difficult. Many of the best poems in the language are complicated and involved in their language and thought. Besides, many apparently simple poems have immense complexity under the surface.

But any good lyric poem has a unity. Unless we read all of it, and all at once, we cannot comprehend its unity. We cannot discover, except possibly by accident, the basic feeling or experience that underlies it. In particular, the essence of a poem is almost never to be found in its first line, or even in its first stanza. It is to be found only in the whole, and not conclusively in any part.

The second rule for reading lyrics is this: Read the poem through again—but read it *out loud*. We have suggested this before, in the case of poetic dramas like Shakespeare's. There it was helpful; here it is essential. You will find, as you read the poem out loud, that the very act of speaking the words forces you to understand them better. You cannot glide over a misunderstood phrase or line quite so easily if you are speaking it. Your ear is offended by a misplaced emphasis that your eyes might miss. And the rhythm of the poem, and its rhymes, if it has them, will help you to understand by making you place the emphasis where it belongs. Finally, you will be able to open yourself to the poem, and let it work on you, as it should.

In the reading of lyrics, these first two suggestions are more important than anything else. We think that if readers who believe they cannot read poems would obey these rules first, they would have little difficulty afterwards. For once you have apprehended a poem in its unity, even if this apprehension is vague, you can begin to ask it questions. And as with expository works, that is the secret of understanding.

The questions you ask of an expository work are grammatical and logical. The questions you ask of a lyric are usually rhetorical, though they may also be syntactical. You do not come to terms with a poem; but you must discover the key words. You discover them not primarily by an act of grammatical discernment, however, but by an act of rhetorical discernment. Why do certain words pop out of the poem and stare you in the face? Is it because the rhythm marks them? Or the rhyme? Or are the words repeated? Do several stanzas seem to be about the same ideas; if so, do these ideas form any kind of sequence? Anything of this sort that you can discover will help your understanding.

In most good lyrics there is some kind of conflict. Sometimes two antagonists— either individual people, or images, or ideas—are named, and then the conflict between them is described. If so, this is easy to discover. But often the conflict is only implied and not stated. For example, a large number of great lyric poems—perhaps even the majority of them—are about the conflict between love and time, between life and death, between the beauty of transient things and the triumph of eternity. But these words may not be mentioned in the poem itself.

It has been said that almost all of Shakespeare's sonnets are about the ravages of what he calls "Devouring time." It is clear that some of them are, for he explicitly says so again and again.

*When I have seen by
Time's fell hand
defaced The rich-proud
cost of outworn buried
age*

he writes in the 64th sonnet and lists other victories that time gains over all that man wishes were proof against it. Then he says:

*Ruin hath taught me thus to ruminare,
That Time will come and take my love away.*

There is no question what that sonnet is about. Similarly with the famous 116th sonnet, which contains these lines:

*Love's not Time's fool, though rosy lips and cheeks
Within his bending sickle's compass come;
Love alters not with his brief hours and weeks,
But bears it out even to the edge of doom.*

But the almost equally famous 138th sonnet, which begins with the lines:

*When my love swears
that she is made of truth
I do believe her, though
I know she lies, is also
about the conflict
between love and time,
although the word "time"
appears nowhere in the
poem.*

That you will see without much difficulty. Nor is there any difficulty in seeing that Marvell's celebrated lyric "To His Coy Mistress" is about the same subject, for he makes this clear right at the beginning:

*Had we but world enough, and time,
This coyness, lady, were no crime.*

We do not have all the time in the world, Marvell says—for

*. . . at my back I always hear
Time's wingèd chariot hurrying near;
And yonder all before us lie
Deserts of vast eternity.*

Therefore, he adjures his mistress,

*Let us roll all our strength and all
Our sweetness up into one ball,
And tear our pleasures with rough strife
Thorough the iron gates of life.
Thus, though we cannot make our sun
Stand still, yet we will make him run.*

It is perhaps a bit harder to see that the subject of “You, Andrew Marvell,” by Archibald MacLeish, is exactly the same. The poem begins:

*And here face down beneath the sun
And here upon earth's noonward height
To feel the always coming on
The always rising of the night*

Thus MacLeish asks us to imagine someone (the poet? the speaker? the reader?) as lying in the noonday sun—but all the same, in the midst of that brightness and warmth, aware of “the earthly chill of dusk.” He imagines the line of the shadow of the setting sun—of all the cumulative successive setting suns of history—moving across the world, across Persia, and Baghdad . . . he feels “Lebanon fade out and Crete,” “And Spain go under and the shore / Of Africa the gilded sand,” and . . . “now the long light on the sea” vanishes, too. And he concludes:

*And here face downward in the sun
To feel how swift, how secretly,
The shadow of the night comes on. . . .*

The word “time” is not used in the poem, nor is there any mention of a lover. Nevertheless, the title reminds us of Marvell's lyric with its theme of “Had we but world enough and time,” and thus the combination of the poem itself and its title invokes the same conflict, between love (or life) and time, that was the subject of the other poems we have considered here.

One final piece of advice about reading lyric poems. In general, readers of such works feel that they must know more about the authors and their times than they really have to. We put much faith in commentaries, criticism, biographies—but this may be only because we doubt our own ability to read. Almost everyone can read any poem, if he will go to work on it. Anything you discover about an author's life or times is valid and may be helpful. But a vast knowledge of the context of a poem is no guarantee that the poem itself will be

understood. To be understood it must be read—over and over. Reading any great lyric poem is a lifetime job—not, of course, in the sense that it should go on and on throughout a lifetime, but rather that as a great poem, it deserves many return visits. And during vacations from a given poem, we may learn more about it than we realise.

Books That Will Not Be Continually Analyse

If The Books are:

1. Imaginative Literature
2. Stories
3. Plays
4. Tragedy
5. Lyric Poetry
6. Poems

These Books are being analysed in Kinds of Books from 11-15, by using different type of Books to analyse these type of Genre of the books.

If The Books Non Fiction, Continually Analyse

If The book are:

1. Practical Book
2. Theoretical Book
3. Historical Book
4. Biographical Book
5. Autobiographical Book
6. Current Event
7. Science Book
8. Mathematical Book
9. Finance Book
10. Economic Book
11. Philosophy Book
12. Theology Book
13. Canonical Book
14. Religious Book
15. Social Science Book
16. Any Other Non Fiction

If The Books Non Fiction, then continually analyse the books, and follow below the steps of the analysis of the book

X-raying a Book

Every book has a skeleton hidden between its covers. Your job as an analytical reader is to find it.

A book comes to you with flesh on its bare bones and clothes over its flesh. It is all dressed up. You do not have to undress it or tear the flesh off its limbs to get at the firm structure that underlies the soft surface. But you must read the book with X-ray eyes, for it is an essential part of your apprehension of any book to grasp its structure.

Recognition of the need to see the structure of a book leads to the discovery of the second and third rules for reading any book. We say “any book.” These rules apply to poetry as well as to science, and to any kind of expository work. Their application will be different, of course, according to the kind of book they are used on. The unity of a novel is not the same as the unity of a treatise on politics; nor are the parts of the same sort, or ordered in the same way. But every book without exception that is worth reading at all has a unity and an organization of parts. A book that did not would be a mess. It would be relatively unreadable, as bad books actually are.

We will state these two rules as simply as possible. Then we will explain and illustrate them.

RULE 2. STATE THE UNITY OF THE WHOLE BOOK IN A SINGLE SENTENCE, OR AT MOST A FEW SENTENCES (A SHORT PARAGRAPH). This means that you must say what the whole book is about as briefly as possible. To say what the whole book is about is not the same as saying what kind of book it is. (That was covered by Rule 1.) The word “about” may be misleading here. In one sense, a book is *about* a certain type of subject matter, which it treats in a certain way. If you know this, you know what *kind* of book it is. But there is another, more colloquial sense of “about.” We ask a person what he is about, what he is up to. So we can wonder what an author is up to, what he is trying to do. To find out what a book is about in this sense is to discover its *theme* or main *point*.

A book is a work of art. (Again, we want to warn you against too narrow a conception of “art.” We do not mean, or we do not only mean, “fine art” here. A book is the product of someone who has a certain skill in making. He is a maker of books and he has made one here for our benefit.) In proportion as it is good, as a book and as a work of art, it has a more nearly perfect, a more pervasive unity. This is true of music and paintings, of novels and plays; it is no less true of books that convey knowledge.

But it is not enough to acknowledge this fact vaguely. You must apprehend the unity with definiteness. There is only one way to know that you have succeeded. You must be able to tell yourself or anybody else what the unity is, and in a few words. (If it requires too many words, you have not seen the unity but a multiplicity.) Do not be satisfied with “feeling the unity” that you cannot express. The reader who says, “I know what it is, but I just can’t say it,” probably does not even fool himself.

RULE 3. SET FORTH THE MAJOR PARTS OF THE BOOK, AND SHOW HOW THESE ARE ORGANISED INTO A WHOLE, BY BEING ORDERED TO ONE ANOTHER AND TO THE UNITY OF THE WHOLE.

The reason for this rule should be obvious. If a work of art were absolutely simple, it would, of course, have no parts. But that is never the case. None of the sensible, physical things man knows is simple in this absolute way, nor is any human production. They are all complex unities. You have not grasped a complex unity if all you know about it is *how it is one*. You must also know *how it is many*, not a many that consists of a lot of separate things, but an organized many. If the parts were not organically related, the whole that they composed would not be one. Strictly speaking, there would be no whole at all but merely a collection.

There is a difference between a heap of bricks, on the one hand, and the single house they can constitute, on the other. There is a difference between a single house and a collection of houses. A book is like a single house. It is a mansion having many rooms, rooms on different levels, of different sizes and shapes, with different outlooks, with different uses. The rooms are independent, in part. Each has its own structure and interior decoration. But they are not absolutely independent and separate. They are connected by doors and arches, by corridors and stairways, by what architects call a “traffic pattern.” Because they are connected, the partial function that each performs contributes its share to the usefulness of the whole house. Otherwise the house would not be livable.

The analogy is almost perfect. A good book, like a good house, is an orderly arrangement of parts. Each major part has a certain amount of independence. As we will see, it may have an interior structure of its own, and it may be decorated in a different way from other parts. But it must also be connected with the other parts—that is, related to them functionally—for otherwise it would not contribute its share to the intelligibility of the whole.

As houses are more or less livable, so books are more or less readable. The most readable book is an architectural achievement on the part of the author. The best books are those that have the most intelligible structure. Though they are usually more complex than poorer books, their greater complexity is also a greater simplicity, because their parts are better organized, more unified.

That is one of the reasons why the best books are also the most readable. Lesser works are really more bothersome to read. Yet to read them well—that is, as well as they can be read—you must try to find some plan in them. They would have been better books if their authors had themselves seen the plan a little more clearly. But if they hang together at all, if they are a complex unity to any degree and not mere collections, there must be a plan and you must find it.

Of Plots and Plans: Stating the Unity of a Book

Let us return now to the second rule, which requires you to state the unity of a book. A few illustrations of the rule in operation may guide you in putting it into practice.

Let us begin with a famous case. You probably read Homer's *Odyssey* in school. If not, you must know the story of Odysseus, or Ulysses, as the Romans call him, the man who took ten years to return from the siege of Troy only to find his faithful wife Penelope herself besieged by suitors. It is an elaborate story as Homer tells it, full of exciting adventures on land and sea, replete with episodes of all sorts and many complications of plot. But it also has a single unity of action, a main thread of plot that ties everything together.

Aristotle, in his *Poetics*, insists that this is the mark of every good story, novel, or play. To support his point, he shows how the unity of the *Odyssey* can be summarized in a few sentences.

A certain man is absent from home for many years; he is jealously watched by Poseidon, and left desolate. Meanwhile his home is in a wretched plight; suitors are wasting his substance and plotting against his son. At length, tempest-tossed, he himself arrives; he makes certain persons acquainted with him; he attacks the suitors with his own hand, and is himself preserved while he destroys them.

"This," says Aristotle, "is the essence of the plot; the rest is episode."

After you know the plot in this way, and through it the unity of the whole narrative, you can put the parts into their proper places. You might find it a good exercise to try this with some novels you have read. Try it on some good ones, such as Fielding's *Tom Jones* or Dostoevsky's *Crime and Punishment* or Joyce's modern *Ulysses*. The plot of *Tom Jones*, for instance, can be reduced to the familiar formula: Boy meets girl, boy loses girl, boy gets girl. That, indeed, is the plot of every romance. To recognize this is to learn what it means to say that there are only a small number of plots in the world. The difference between good and bad stories having the same essential plot lies in what the author does with it, how he dresses up the bare bones.

You do not always have to find out the unity of a book all by yourself. The author often helps you. Sometimes, the title is all you have to read. In the eighteenth century, writers had the habit of composing elaborate titles that told the reader what the whole book was about. Here is a title by Jeremy Collier, an English divine who attacked what he considered to be the obscenity—we would say pornography, perhaps—of Restoration drama much more learnedly than is customary nowadays: *A Short View of the Immorality and Profaneness of the English Stage, together with the Sense of Antiquity upon this Argument*. You can guess from this that Collier recites many flagrant instances of the abuse of morals and that he supports his protest by quoting texts from those ancients who argued, as Plato did, that the stage corrupts youth, or, as the early Church fathers did, that plays are seductions of the flesh and the devil.

Sometimes the author tells you the unity of his plan in his preface. In this respect, expository books differ radically from fiction. A scientific or philosophical writer has no reason to keep you in suspense. In fact, the less suspense he keeps you in, the more likely you are to sustain the effort of reading his work through. Like a newspaper article, an expository book may summarize itself in its first paragraph.

Do not be too proud to accept the author's help if he proffers it, but do not rely too completely on what he says in the preface, either. The best-laid plans of authors, like those of mice and other men, often go awry. Be guided by the prospectus the author gives you, but always remember that the obligation of finding the unity belongs finally to the reader, as much as the obligation of having one belongs to the writer. You can discharge that obligation honestly only by reading the whole book.

The introductory paragraph of Herodotus' history of the war between the Greeks and the Persians provides an excellent summary of the whole. It runs:

These are the researches of Herodotus of Halicarnassus, which he publishes, in the hope of thereby preserving from decay the remembrance of what men have done, and of preventing the great and wonderful actions of the Greeks and the Barbarians from losing their due meed of glory; and withal to put on record what were their grounds of feud.

That is a good beginning for you as a reader. It tells you succinctly what the whole book is about.

But you had better not stop there. After you have read the nine parts of Herodotus' history through, you will probably find it necessary to elaborate on that statement to do justice to the whole. You might want to mention the Persian kings —Cyrus, Darius, and Xerxes; the Greek heroes of the war—primarily Themistocles; and the major events—the crossing of the Hellespont and the decisive battles, notably Thermopylae and Salamis.

All the rest of the fascinating details, with which Herodotus richly prepares you for his climax, can be left out of your summary of the plot. Note, here, that the unity of a history is a single thread of plot, very much as in fiction. So far as unity is concerned, this rule of reading elicits the same kind of answer in history and in fiction.

A few more illustrations may suffice. Let us take a practical book first. The unity of Aristotle's *Ethics* can be stated thus:

This is an inquiry into the nature of human happiness and an analysis of the conditions under which happiness may be gained or lost, with an indication of what men must do in their conduct and thinking in order to become happy or to avoid unhappiness, the principal emphasis being placed on the cultivation of the virtues, both moral and intellectual,

although other goods are also recognized as necessary for happiness, such as wealth, health, friends, and a just society in which to live.

Another practical book is Adam Smith's *The Wealth of Nations*. Here the reader is aided by the author's own statement of "the plan of the work" at the very beginning. But that takes several pages. The unity can be more briefly stated as follows:

This is an inquiry into the source of national wealth in any economy that is built on a division of labor, considering the relation of the wages paid labor, the profits returned to capital, and the rent owed the landowner, as the prime factors in the price of commodities. It discusses the various ways in which capital can be more or less gainfully employed, and relates the origin and use of money to the accumulation and employment of capital. Examining the development of opulence in different nations and under different conditions, it compares the several systems of political economy, and argues for the beneficence of free trade.

If a reader grasped the unity of *The Wealth of Nations* in this way, and did a similar job for Marx's *Das Kapital*, he would be well on the way toward seeing the relation between two of the most influential books of the past two centuries.

Darwin's *The Origin of Species* provides us with a good example of the unity of a theoretical book in science. Here is a statement of it:

This is an account of the variation of living things during the course of countless generations and the way in which this results in new groupings of plants and animals; it treats both of the variability of domesticated animals and of variability under natural conditions, showing how such factors as the struggle for existence and natural selection operate to bring about and sustain such groupings; it argues that species are not fixed and immutable groups, but that they are merely varieties in transition from a less to a more marked and permanent status, supporting this argument by evidences from extinct animals found in the earth's crust, and from comparative embryology and anatomy.

That may seem like a big mouthful, but the book was an even bigger one for a great many readers in the nineteenth century, partly because they did not go to the trouble of finding out what it was really about.

Finally, let us take Locke's *Essay Concerning Human Understanding* as a theoretical book in philosophy. You may recall our observing that Locke himself summarized his work by saying that it was "an inquiry into the origin, certainty and extent of human knowledge, together with the grounds and degrees of belief, opinion and assent." We would not quarrel with so excellent a statement of plan by the author, except to add two subordinate

qualifications to do justice to the first and third parts of the essay: it will be shown, we would add, that there are no innate ideas, but that all human knowledge is acquired from experience; and language will be discussed as a medium for the expression of thought, its proper use and most familiar abuses to be indicated.

There are two things we want you to note before we proceed. The first is how frequently you can expect the author, especially a good one, to help you to state the plan of his book. Despite that fact, most readers are at a total loss if you ask them to say briefly what the whole book is about. Partly this is owing to the widespread inability to speak concise English sentences. Partly it is owing to neglect of this rule in reading. But it also indicates that many readers pay as little attention to the author's introductory words as they ordinarily do to his title.

The second point is a word of caution. Do not take the sample summaries we have given you as if they were, in each case, a final and absolute formulation of the book's unity. A unity can be variously stated. There is no one right way to do it. One statement is better than another, of course, in proportion as it is brief, accurate, and comprehensive. But quite different statements may be equally good, or equally bad.

We have here sometimes stated the unity of a book quite differently from the author's expression of it, and without apologies to him. You may differ similarly from us. After all, a book is something different to each reader. It would not be surprising if that difference expressed itself in the way the reader stated its unity. This does not mean, however, that anything goes. Though readers are different, the book is the same, and there can be an objective check upon the accuracy and fidelity of the statements anyone makes about it.

Mastering the Multiplicity: The Art of Outlining a Book

Let us turn now to the other structural rule, the rule that requires us to set forth the major parts of the book in their order and relation. This third rule is closely related to the second. A well-stated unity indicates the major parts that compose the whole; you cannot comprehend a whole without somehow seeing its parts. But it is also true that unless you grasp the organisation of its parts, you cannot know the whole comprehensively.

Why, then, make two rules here instead of one? It is primarily a matter of convenience. It is easier to grasp a complex and unified structure in two steps than in one. The second rule directs your attention toward the unity, the third toward the complexity, of a book. There is another reason for the separation. The major parts of a book may be seen at the moment when you grasp its unity. But these parts are themselves usually complex and have an interior structure you must see. Hence the third rule involves more than just an enumeration of the parts. It means outlining them, that is, treating the parts as if they were subordinate wholes, each with a unity and complexity of its own.

A formula can be stated for operating according to this third rule. It will guide you in a general way. According to the second rule, we had to say: The whole book is about so and so and such and such. That done, we might obey the third rule by proceeding as follows: (1) The author accomplished this plan in five major parts, of which the first part is about so and so, the second part is about such and such, the third part is about this, the fourth part about that, and the fifth part about still another thing. (2) The first of these major parts is divided into three sections, of which the first considers X, the second considers Y, and the third considers Z. (3) In the first section of the first part, the author makes four points, of which the first is A, the second B, the third C, and the fourth D. And so on and so forth.

You may object to this much outlining. It would take a lifetime to read a book that way. But of course this is only a formula. The rule looks as if it required an impossible amount of work from you. In fact, the good reader does this sort of thing habitually, and hence easily and naturally. He may not write it all out. He may not even at the time of reading have made it all verbally explicit. But if he were called upon to give an account of the structure of the book, he would do something that approximated the formula we have described.

The word "approximation" should relieve your anxiety. A good rule always describes the ideal performance. But a person can be skilled in an art without being the ideal artist. He can be a good practitioner if he merely approximates the rule. We have stated the rule here for the ideal case. You should be satisfied if you make a very rough approximation to what is required.

Even when you become more skilled, you will not want to read every book with the same degree of effort. You will not find it profitable to expend all your skill on some books. Even the best readers try to make a fairly close approximation to the requirements of this rule for only a relatively few books. For the most part, they are satisfied with a rough notion of the book's structure. The degree of approximation varies with the character of the book and your purpose in reading it. Regardless of this variability, the rule remains the same. You must know how to follow it, whether you follow it closely or only in a rough fashion.

You should understand that the limitations on the degree to which you can approximate the rule are not only ones of time and effort. You are a finite, mortal creature; but a book is also finite and, if not mortal, at least defective in the way all things made by man are. No book deserves a perfect outline because no book is perfect. It goes only so far, and so must you. This rule, after all, does not call for your putting things into the book that the author did not put there. Your outline is of the book itself, not the subject matter that the book is about. Perhaps the outline of a subject matter could be extended indefinitely, but not your outline of the book, which gives the subject matter only more or less definitive treatment. Hence you should not feel that we are urging you merely to be lazy about following this rule. You could not follow it out to the bitter end even if you wanted to.

The forbidding aspect of the formula for setting forth the order and relation of the parts may be somewhat lessened by a few illustrations of the rule in operation. Unfortunately, it

is more difficult to illustrate this rule than the other one about stating the unity. A unity, after all, can be stated in a sentence or two, at most a short paragraph. But in the case of a large and complex book, a careful and adequate outline of the parts, and their parts, and *their* parts down to the least structural unit that is comprehensible and worthwhile identifying, would take a great many pages to write out.

Theoretically, the outline could be longer than the original. Some of the great medieval commentaries on the works of Aristotle *are* longer than the works they comment on. They include, of course, more than an outline, for they undertake to interpret the author sentence by sentence. The same is true of certain modern commentaries, such as the great ones on Kant's *Critique of Pure Reason*. And a variorum edition of a Shakespeare play, which includes an exhaustive outline as well as other things, is many times as long—perhaps ten times as long—as the original. You might look into a commentary of this sort if you want to see the rule followed as close to perfection as man can do. Aquinas, for instance, begins each section of his commentary with a beautiful outline of the points that Aristotle has made in a particular part of his work; and he always says explicitly how that part fits the structure of the whole, especially in relation to the parts that come before and after.

Let us take something easier than a treatise of Aristotle. Aristotle is probably the most compact of prose writers; you would expect that an outline of one of his works would be extensive and difficult. Let us also agree that, for the sake of the example, we will not carry the process out to the relative perfection that would be possible if we had a great number of pages available.

The United States Constitution is an interesting, practical document, and a very well-organized piece of writing. If you examine it, you should have no difficulty in finding its major parts. They are pretty clearly indicated, though you have to do some thinking to make the main divisions. Here is a suggested outline of the document:

FIRST: The Preamble, setting forth the purpose(s) of the Constitution;

SECOND: The first Article, dealing with the legislative department of the government;

THIRD: The second Article, dealing with the executive department of the government;

FOURTH: The third Article, dealing with the judicial department of the government;

FIFTH: The fourth Article, dealing with the relationship between the state governments and the federal government;

SIXTH: The fifth, sixth, and seventh Articles, dealing with the amendment of the Constitution, its status as the supreme law of the land, and provisions for its ratifications;

SEVENTH: The first ten amendments, constituting the Bill of Rights;

EIGHTH: The remaining amendments up to the present day.

Those are the major divisions. Now let us outline one of them, the *Second*, comprising the Constitution's first Article. Like most of the other Articles, it is divided into Sections. Here is a suggested outline.

- II, 1: Section 1, establishing legislative powers in a Congress of the United States, divided into two bodies, a Senate and a House of Representatives;**
- II, 2: Sections 2 and 3, respectively describing the composition of the House and Senate and stating the qualifications of members. In addition, it is stated that the House has the sole power of impeachment, while the Senate has the sole power of trying impeachments;**
- II, 3: Sections 4 and 5, having to do with the election of members of both branches of Congress and with the internal organization and affairs of each;**
- II, 4: Section 6, stating the perquisites and emoluments of members of both branches, and stating one limitation on civil employment of members;**
- II, 5: Section 7, defining the relationship between the legislative and executive departments of the government and describing the President's veto power;**
- II, 6: Section 8, stating the powers of Congress;**
- II, 7: Section 9, stating some limitations on the powers outlined in Section 8;**
- II, 8: Section 10, stating limitations on the powers of the states and the extent to which they must give over certain powers to the Congress.**

We could then proceed to make a similar outline of all the other major divisions, and, after completing that, return to outline the Sections in turn. Some of these, for example Section 8 in Article I, would require the identification of many different topics and subtopics.

Of course, this is only one way of doing the job. There are many others. The first three Articles could be grouped together in one major division, for instance; or instead of two divisions with respect to the amendments, more major divisions could be introduced, grouping the amendments according to the problems they dealt with. We suggest that you try your hand at making your own division of the Constitution into its main parts. Go even further than we did, and try to state the parts of the parts as well. You may have read the Constitution many times, but if you have not applied this rule before, you will find that it reveals much in the document that you never saw.

Here is one more example, again very brief. We have already stated the unity of Aristotle's *Ethics*. Now let us attempt a first approximation of its structure. The whole is divided into the following main parts: A first, treating of happiness as the end of life, and discussing it in relation to all other practicable goods; a second, treating of the nature of voluntary action, and its relation to the formation of good and bad habits; a third, discussing the various virtues and vices, both moral and intellectual; a fourth, dealing with moral states that are neither virtuous nor vicious; a fifth, treating of friendship; and a sixth and last, discussing pleasure, and completing the account of human happiness begun in the first.

These divisions obviously do not correspond to the ten books of the *Ethics*. Thus, the first part is accomplished in the first book; the second part runs through Book II and the first half of Book III; the third part extends from the rest of Book III through the end of Book VI; the discussion of pleasure occurs at the end of Book VII and again at the beginning of Book X.

We mention this to show you that you need not follow the apparent structure of a book as indicated by its chapter divisions. That structure may, of course, be better than the outline you develop, but it may also be worse; in any event, the point is to make your own outline. The author made his in order to write a good book. You must make yours in order to read it well. If he were a perfect writer and you a perfect reader, it would follow that the two would be the same. In proportion as either of you falls away from perfection, all sorts of discrepancies will inevitably result.

This does not mean that you should ignore chapter headings and sectional divisions made by the author; we did not ignore them in our analysis of the *Constitution*, although we did not slavishly follow them, either. They are intended to help you, just as titles and prefaces are. But you must use them as guides for your own activity, and not rely on them passively. There are few authors who execute their plan perfectly, but there is often more plan in a good book than meets the eye at first. The surface can be deceiving. You must look beneath it to discover the real structure.

How important is it to discover that real structure? We think very important. Another way of saying this is to say that Rule 2—the requirement that you state the unity of a book—cannot be effectively followed without obeying Rule 3—the requirement that you state the parts that make up that unity. You might, from a cursory glance at a book, be able to come up with an adequate statement of its unity in two or three sentences. But you would not really know that it was adequate. Someone else, who had read the book better, might know this, and award you high marks for your efforts. But for you, from your point of view, it would have been merely a good guess, a lucky hit. This is why the third rule is absolutely necessary as a complement to the second one.

A very simple example will show what we mean. A two-year-old child, just having begun to talk, might say that “two plus two is four.” Objectively, this is a true statement; but we would be wrong to conclude from it that the child knew much mathematics. In fact, the child probably would not know what the statement meant, and so, although the statement by itself was adequate, we would have to say that the child still needed training in the subject. Similarly, you might be right in your guess about a book’s main theme or point, but you still need to go through the exercise of showing *how* and *why* you stated it as you did. The requirement that you outline the parts of a book, and show how they exemplify and develop the main theme, is thus supportive of your statement of the book’s unity.

Inspectional Reading IV: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed
4. Read or Listen The Full Book Without Stopping
5. Read or listen 25min and 5min break
 - Read or Listen 20 pages an Hour according Mortimer Adler
6. Read or Listen between 1-50 times the book
7. Speed of Audiobook
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

The Reciprocal Arts of Reading and Writing

In general, the two rules of reading that we have been discussing look as if they were rules of writing also. Of course they are. Writing and reading are reciprocal, as are teaching and being taught. If authors and teachers did not organize their communications, if they failed to unify them and order their parts, there would be no point in directing readers or listeners to search for the unity and uncover the structure of the whole.

Nevertheless, although the rules are reciprocal, they are not followed in the same way. The reader tries to *uncover* the skeleton that the book conceals. The author starts with the skeleton and tries to *cover it up*. His aim is to conceal the skeleton artistically or, in other words, to put flesh on the bare bones. If he is a good writer, he does not bury a puny skeleton under a mass of fat; on the other hand, neither should the flesh be too thin, so that the bones show through. If the flesh is thick enough, and if flabbiness is avoided, the joints will be detectable and the motion of the parts will reveal the articulation.

Why is this so? Why should not an expository book, one that attempts to present a body of knowledge in an ordered way, be merely an outline of the subject? The reason is not only that most readers cannot read outlines, and that such a book would be repellent to a self-respecting reader who thought that if he could do his job, the author ought to do his. There is more to it than that. The flesh of a book is as much a part of it as the skeleton. This is as true of books as it is of animals and human beings. The flesh—the outline spelled out, “read out,” as we sometimes say —adds an essential dimension. It adds life, in the case of the animal. Just so, actually writing the book from an outline, no matter how detailed, gives the work a kind of life that it would not otherwise have had.

We can summarize all of this by recalling the old-fashioned maxim that a piece of writing should have unity, clarity, and coherence. That is, indeed, a basic maxim of good writing. The two rules we have been discussing in this chapter relate to writing that follows that maxim. If the writing has unity, we must find it. If the writing has clarity and coherence, we must appreciate it by finding the distinction and the order of the parts. What is clear is so by the distinctness of its outlines. What is coherent hangs together in an orderly disposition of parts.

These two rules, therefore, can be used to distinguish well made books from badly made ones. If, after you have attained sufficient skill, no amount of effort on your part results in your apprehension of the unity of a book, and if you are also not able to discern its parts and their relation to one another, then very likely the book is a bad one, whatever its reputation. You should not be too quick to make this judgment; perhaps the fault is in you instead of the book. However, neither should you fail ever to make it and always assume that the fault is in you. In fact, whatever your own failings as a reader, the fault is usually in the book, for most books—the very great majority—are badly made books in the sense that their authors did not write them according to these rules.

These two rules can also, we might add, be used in reading any substantial part of an expository book, as well as the whole. If the part chosen is itself a relatively independent, complex unity, its unity and complexity must be discerned for it to be well read. Here there is a significant difference between books conveying knowledge and poetical works, plays, and novels. The parts of the former can be much more autonomous than the parts of the latter. The person who says of a novel that he has “read enough to get the idea” does not know what he is talking about. He cannot be correct, for if the novel is any good at all, the idea is in the whole and cannot be found short of reading the whole. But you can get the idea of Aristotle’s *Ethics* or Darwin’s *Origin of Species* by reading some parts carefully, although you would not, in that case, be able to observe Rule 3.

Discovering the Author’s Intentions

There is one more rule of reading that we want to discuss in this chapter. It can be stated briefly. It needs little explanation and no illustration. It really repeats in another form what you have already done if you have applied the second and third rules. But it is a useful repetition because it throws the whole and its parts into another light.

RULE 4. FIND OUT WHAT THE AUTHOR’S PROBLEMS WERE. The author of a book starts with a question or a set of questions. The book ostensibly contains the answer or answers.

The writer may or may not tell you what the questions were as well as give you the answers that are the fruits of his work. Whether he does or does not, and especially if he does not, it is your task as a reader to formulate the questions as precisely as you can. You should be able to state the main question that the book tries to answer, and you should be able to state the subordinate questions if the main question is complex and has many parts. You should not only have a fairly adequate grasp of all the questions involved but should also be able to put the questions in an intelligible order. Which are primary and which secondary? Which questions must be answered first, if others are to be answered later?

You can see how this rule duplicates, in a sense, work you have already done in stating the unity and finding its parts. It may, however, actually help you to do that work. In other words, following the fourth rule is a useful procedure in conjunction with obeying the other two.

And since the rule is a little more unfamiliar than the other two, it may be even more helpful to you in tackling a difficult book. We want to emphasize, however, that we do not mean for you to fall into what is called by critics the intentional fallacy. That is the fallacy of thinking you can discover what was in an author’s mind from the book he has written. This applies particularly to literary works; it is a grave error, for example, to try to psychoanalyze Shakespeare from the evidence of *Hamlet*. Nevertheless, even with a poetical work, it is often extremely helpful to try to say what the author was trying to do. In the case of expository works, the rule has obvious merit. And yet most readers, no matter how skilled

in other respects, very often fail to observe it. As a result, their conception of a book's main point or theme may be extremely deficient, and of course their outline of its structure will be chaotic. They will fail to see the unity of a book because they do not see *why it has the unity it has*; and their apprehension of the book's skeletal structure will lack comprehension of *the end that it serves*.

If you know the kinds of questions anyone can ask about anything, you will become adept in detecting an author's problems. They can be formulated briefly: Does something exist? What kind of thing is it? What caused it to exist, or under what conditions can it exist, or why does it exist? What purpose does it serve? What are the consequences of its existence? What are its characteristic properties, its typical traits? What are its relations to other things of a similar sort, or of a different sort? How does it behave? *These are all theoretical questions*. What ends should be sought? What means should be chosen to a given end? What things must one do to gain a certain objective, and in what order? Under these conditions, what is the right thing to do, or the better rather than the worse? Under what conditions would it be better to do this rather than that? *These are all practical questions*.

This list of questions is far from being exhaustive, but it does represent the types of most frequently asked questions in the pursuit of theoretical or practical knowledge. It may help you discover the problems a book has tried to solve. The questions have to be adapted when applied to works of imaginative literature, and there too they will be useful.

The First Stage of Analytical Reading

We have now stated and explained the first four rules of reading. They are rules of analytical reading, although if you inspect a book well before reading it, that will help you to apply them.

It is important at this point to recognise that these first four rules are connected and form a group of rules having a single aim. Together, they provide the reader who applies them with a knowledge of a book's structure. When you have applied them to a book, or indeed to anything fairly lengthy and difficult that you may be reading, you will have accomplished the first stage of reading it analytically.

You should not take the term "stage" in a chronological sense, unless perhaps at the very beginning of your exercise as an analytical reader. That is, it is not necessary to read a book through in order to apply the first four rules, then to read it again and again in order to apply the other rules. The practiced reader accomplishes all of these stages at once. Nevertheless, you must realize that knowing a book's structure does constitute a stage toward reading it analytically.

Another way to say this is that applying these first four rules helps you to answer the first basic question about a book. You will recall that that first question is: *What is the book about as a whole?* You will also recall that we said that this means discovering the leading theme of the book, and how the author develops this theme in an orderly way by subdividing it into its essential subordinate themes or topics. Clearly, applying the first four rules of reading will provide most of what you need to know in order to answer this question—although it should be pointed out that your answer will improve in accuracy as you proceed to apply the other rules and to answer the other questions.

Since we have now described the first stage of analytical reading, let us pause a moment to write out the first four rules in order, under the appropriate heading, for review.

Theoretical book Questions

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?
- Does something exist?
- What kind of thing is it?
- What caused it to exist, or?
- Under what conditions can it exist, or why does it exist?
- What purpose does it serve?
- What are the consequences of its existence?
- What are its characteristic properties, its typical traits?
- What are its relations to other things of a similar sort, or of a different sort?
- How does it behave?
- These are all theoretical questions. What ends should be sought?

2. Practical book Questions.

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?
- What means should be chosen to a given end?
- What things must one do to gain a certain objective, and in what order? Under these conditions, what is the right thing to do, or the better rather than the worse?
- Under what conditions would it be better to do this rather than that? These are practical questions.

3. History Questions

- Who
- What
- Where
- When
- Why
- How

Despite the fact that most histories are closer to fiction than to science, they can be read as expository works, and therefore they should be. Hence, we must ask the same questions of a historical book that we ask of any expository book. Because of the special nature of history, we must ask those questions a little differently and must expect to receive slightly different kinds of answers. As far as the first question is concerned, every history has a particular and limited subject. It is surprising, then, how often readers do not trouble to find out what this is. In particular, they do not always note carefully what limitations the author sets for himself. A history of the Civil War is not a history of the world in the nineteenth century. It probably will not be a history of the American West in the 1860s. It could, though perhaps it should not, ignore the state of American education in that decade, or the movement of the American frontier, or the progress of American freedom. Hence, if we are to read a history well, it is necessary to know precisely what it is about and what it is not about. Certainly, if we are to criticize it, we must know the latter. An author cannot be blamed for not doing what he did not try to do.

With regard to the second question, the historian tells a story, and that story, of course, occurred in time. Its general outlines are thus determined, and we do not have to search for them. But there is more than one way to tell a story, and we must know how the historian has chosen to tell his. Does he divide his work into chapters that correspond to years or decades or generations? Or does he divide it according to other rubrics of his own choosing? Does he discuss, in one chapter, the economic history of his period, and cover its wars and religious movements and literary productions in others? Which of these is most important to him? If we discover that, if we can say which aspect of the story he is telling seems to him most fundamental, we can understand him better. We may not agree with his judgment about what is basic, but we can still learn from him.

Criticism of history takes two forms. We can judge—but only, as always, after we understand what is being said—that a historian's work lacks verisimilitude. People just do not act that way, we may feel. Even if the historian documents his statements by giving us access to his sources, and even if to our knowledge they are relevant, we can still feel that

he has misunderstood them, that he has judged them in the wrong way, perhaps through some deficiency in his grasp of human nature or human affairs. We tend to feel this, for example, about many older historians who do not include much discussion of economic matters in their work. People, we may be inclined to think now, act out of self-interest; too much nobility ascribed to the “hero” of a history may make us suspicious. On the other hand, we may think, especially if we have some special knowledge of the subject, that the historian has misused his sources. We may be indignant to discover that he has not read a certain book that we have read. And he may be misinformed about the facts of the matter. In that case, he cannot have written a good history of it. We expect a historian to be informed.

The first criticism is, however, more important. A good historian must combine the talents of the storyteller and the scientist. He must know what is likely to have happened as well as what some witnesses or writers said actually did happen. With regard to the last question, What of it?, it is possible that no kind of literature has a greater effect on the actions of men than history. Satires and pictures of philosophical utopias have little effect; we would all like the world to be better, but we are seldom inspired by the recommendations of authors who do no more than describe, often bitterly, the difference between the real and the ideal. History, which tells us of the actions of men of the past, often does lead us to make changes, to try to better our lot. In general, statesmen have been more learned in history than in other disciplines. History suggests the possible, for it describes things that have already been done. If they have been done, perhaps they can be done again—or perhaps they can be avoided. The main answer to the question, What of it?, therefore, lies in the direction of practical, political action. For this reason it is of great importance that history be read well. Unfortunately, leaders have often acted with some knowledge of history but not enough. With the world as small and dangerous as it has become, it would be a good idea for all of us to start reading history better.

4. Biography Question.

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

5. Autobiography Questions.

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

6. Current Events Question

Thus the most important thing to know, when reading any report of current happenings, is *who is writing the report*. What is involved here is not so much an acquaintance with the reporter himself as with the *kind* of mind he has. The various sorts of filter-reporters fall into groups. To understand what kind of filter our reporter's mind is, we must ask a series of questions about it. This amounts to asking a series of questions about any material dealing with current events. The questions are these:

1. What does the author want to prove?
2. Whom does he want to convince?
3. What special knowledge does he assume?
4. What special language does he use?
5. Does he really know what he is talking about?

For the most part it is safe to assume that all current events books want to prove something. Often it is easy enough to discover what this is. The blurb often states the main contention or thesis of such books. If it does not appear there, it may be stated by the author in a preface.

Having asked what the book is trying to prove, you should next ask whom the author is trying to convince. Is the book intended for those "in the know"—and are you in that category? Is it for that small group of persons who can do something, and quickly, about the situation the author describes? Or is it for everyone? If you do not belong to the audience for which the book is intended, you may not want to read it.

7. Science and Mathematics

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

8. Philosophy

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

What are these “childishly simple” questions that philosophers ask? When we write them down, they do not seem simple, because to answer them is so difficult. Nevertheless, they are initially simple in the sense of being basic or fundamental.

Take the following questions about *being or existence*, for example: What is the difference between existing and not existing? What is common to all the things that do exist, and what are the properties of everything that does exist? Are there different ways in which things can exist—different modes of being or existence? Do some things exist only in the mind or for the mind, whereas others exist outside the mind, and whether or not they are known to us, or even knowable by us? Does everything that exists exist physically, or are there some things that exist apart from material embodiment? Do all things change, or is there anything that is immutable? Does anything exist necessarily, or must we say that everything that does exist might not have existed? Is the realm of possible existence larger than the realm of what actually does exist?

These are typically the kind of questions that a philosopher asks when he is concerned to explore the nature of being itself and the realms of being. As questions, they are not difficult to state or understand, but they are enormously difficult to answer—so difficult, in fact, that there are philosophers, especially in recent times, who have held that they cannot be answered in any satisfactory manner.

Another set of philosophical questions concerns *change or becoming* rather than being. Of the things in our experience to which we would unhesitatingly attribute existence, we would also say that all of them are subject to change. They come into being and pass away; while in being, most of them move from one place to another; and many of them change in quantity or in quality: they become larger or smaller, heavier or lighter; or, like the ripening apple and the aging beefsteak, they change in color.

What is involved in any change? In every process of change, is there something that endures unchanged as well as some respect or aspect of that enduring thing which undergoes change? When you learn something that you did not know before, you have certainly changed with respect to the knowledge you have acquired, but you are also the same individual that you were before; if that were not the case, *you* could not be said to have changed through learning. Is this true of all change? For example, is it true of such

remarkable changes as birth and death—of coming to be and passing away—or only of less fundamental changes, such as local motion, growth, or alteration in quality? How many different kinds of change are there? Do the same fundamental elements or conditions enter into all processes of change, and are the same causes operative in all? What do we mean by a cause of change? Are there different types of causes responsible for change? Are the causes of change—of becoming—the same as the causes of being, or existence?

Such questions are asked by the philosopher who turns his attention from being to becoming and also tries to relate becoming to being. Once again, they are not difficult questions to state or understand, though they are extremely difficult to answer clearly and well. In any case, you can see how they begin with a childishly simple attitude toward the world and our experience of it.

Unfortunately, we do not have space to go into the whole range of questions more deeply. We can only list some other questions that philosophers ask and try to answer. There are questions not only about being and becoming, but also about necessity and contingency; about the material and the immaterial; about the physical and the non-physical; about freedom and indeterminacy; about the powers of the human mind; about the nature and extent of human knowledge; about the freedom of the will.

All these questions are speculative or theoretical in the sense of those terms that we have employed in distinguishing between the theoretical and practical realms. But philosophy, as you know, is not restricted to theoretical questions only.

Take *good and evil*, for instance. Children are much concerned with the difference between good and bad; their behinds are likely to suffer if they make mistakes about it. But we do not stop wondering about the difference when we grow up. Is there a universally valid distinction between good and evil? Are there certain things that are always good, others that are always bad, whatever the circumstances? Or was Hamlet right when, echoing Montaigne, he said: "There is nothing either good or bad but thinking makes it so."

Good and evil, of course, are not the same as right and wrong; the two pairs of terms seem to refer to different classes of things. In particular, even if we feel that whatever is right is good, we probably do not feel that whatever is wrong is evil. But how do we make this distinction precise?

"Good" is an important philosophical word, but it is an important word in our everyday vocabulary, too. Trying to say what it means is a heady exercise; it will involve you very deeply in philosophy before you know it. There are many things that are good, or, as we would prefer to say, there are many goods. Is it possible to order the goods? Are some more important than others? Do some depend on others? Are there circumstances in which goods conflict, so that you have to choose one good at the expense of forgoing another?

Again, we do not have space to go more extensively into these questions. We can only list some other questions in the practical realm. There are questions not only about

good and evil, right and wrong, and the order of goods, but also about duties and obligations; about virtues and vices; about happiness, life's purpose or goal; about justice and rights in the sphere of human relations and social interaction; about the state and its relation to the individual; about the good society, the just polity, and the just economy; about war and peace.

The two groups of questions that we have discussed determine or identify two main divisions of philosophy. The questions in the first group, the questions about being and becoming, have to do with what *is* or *happens* in the world. Such questions belong to the division of philosophy that is called theoretical or speculative. The questions in the second group, the questions concerning good and evil, or right and wrong, have to do with what *ought* to be done or sought, and they belong to the division of philosophy that is sometimes called practical, and is more accurately called normative. Books that tell you how to make something, such as a cookbook, or how to do something, such as a driver's manual, need not try to argue that you ought to become a good cook, or learn to drive a car well; they can assume that you want to make or do something and merely tell you how to succeed in your efforts. In contrast, books of normative philosophy concern themselves primarily with the goals all men *ought* to seek—goals such as leading a good life or instituting a good society—and, unlike cookbooks and driving manuals, they go no further than prescribing in the most universal terms the means that *ought* to be employed in order to achieve these goals.

The questions that philosophers ask also serve to distinguish subordinate branches of the two main divisions of philosophy. A work of speculative or theoretical philosophy is metaphysical if it is mainly concerned with questions about being or existence. It is a work in the philosophy of nature if it is concerned with becoming—with the nature and kinds of changes, their conditions and causes. If its primary concern is with knowledge—with questions about what is involved in our knowing anything, with the causes, extent, and limits of human knowledge, and with its certainties and uncertainties—then it is a work in epistemology, which is just another name for theory of knowledge. Turning from theoretical to normative philosophy, the main distinction is between questions about the good life and what is right or wrong in the conduct of the individual, all of which fall within the sphere of ethics, and questions about the good society and the conduct of the individual in relation to the community—the sphere of politics or political philosophy.

9. Theology.

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

10. Social Science.

- What?
- Who?
- When?
- Where?
- How?
- Do/Does?
- Can?
- May/might?

THE FIRST STAGE OF ANALYTICAL READING, OR RULES FOR FINDING WHAT A BOOK IS ABOUT

- 1. Classify the book according to kind and subject matter.**
- 2. State what the whole book is about with the utmost brevity.**
- 3. Enumerate its major parts in their order and relation, and outline these parts as you have outlined the whole.**
- 4. Define the problem or problems the author is trying to solve.**

Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context?

Analysis of Grammar.

English Grammar: What topics to cover when analyse the grammar

Rule 5. Review and analyze text in grammatical way. There are number of things I will look when analyse and review text in grammatical way:

- A. The verb.
- B. Verb and Auxiliaries.
- C. The semantics of the verb phrase.
- D. Nouns and determiners.
- E. Noun and noun phrases.
- F. Pronouns and numerals.
- G. Adjectives and adverbs.
- H. The semantics and grammar of adverbials.
- I. Prepositions and prepositional phrases.
- J. The clause: adjunct.
- K. Negation.
- L. Clause type and Illocutionary Force.
- M. Content clauses and reported speech.
- N. Relative construction and unbounded dependencies.
- O. Comparative construction.
- P. Non finite and verbless clauses.
- Q. Coordination and supplementation.
- R. Information packaging.
- S. Deixis and anaphora.
- T. Inflectional morphology and related matters.
- U. Lexical words.
- V. Punctuation.
- W. The simple sentence.
- X. Sentence type and discourse and functions.
- Y. Pro forms and ellipsis.
- Z. Coordination.

- AA. The complex sentences.
- BB. Syntactic and semantic functions and subordinate clauses.
- CC. Complementization of verbs and adjectives.
- DD. The noun phrase.
- EE. Theme, focus and information processing.
- FF. From sentence to text.

Grammar

- 1. The Cambridge Grammar of English Language by Rodney Huddleston.**
- 2. Collins Cobuild English grammar.**
- 3. English Grammar and Composition by Wren and Martin.**
- 4. The Grammar of English Grammar by Gould Brown.**
- 5. Comprehensive grammar of English Language.**
- 6. The New Fowler's Modern English Usage.**

Discourse Analysis of The Text

- A. Use the Following Books for Discourse Analysis:
 - Critical Discourse Analysis_ The Critical Study of Language.
 - Discourse analysis.
 - The Routledge handbook of discourse analysis.

Inspectional Reading V: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed.
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed.
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed.
4. Read or Listen The Full Book Without Stopping.
5. Read or listen 25min and 5min break.
 - Read or Listen 20 pages an Hour according Mortimer Adler.
6. Read or Listen between 1-50 times the book.
7. Speed of Audiobook.
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed.
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Topics in Interpretation

Rule 6. Review The Figure of Speech of the Book the Author Wrote. Check Figure of Speech Folder.

- A. Literary Device.**
- B. FIGURES OF SPEECH - Biblical Research Journal.**
- C. Figure of Speech.**

Rule 7. Review and analyze text in hermeneutical way. There are number of things I will look when analyse and review text in Hermeneutical way By Milton Terry

- A. Symbols-What does it mean of symbols?**
- B. What Symbols meant at that time?**
- C. Did the symbols changed the meaning over time?**
- D. Books on Symbols.**
 - Blake Dictionary_ The Ideas and Symbols of William Blake.**
 - A Dictionary of Literary Symbols.**
 - A Dictionary of Literary Symbols.**
 - A DICTIONARY OF SYMBOLS.**
 - Dictionary of BIBLICAL IMAGERY.**
- E. Review academic word.**
- F. Review academic terms.**
- G. Review the figure of speech.**
- H. What does mean During that time? What Does mean now?**
- I. These are the following books to use for Review and Analysis of Propaganda:**
 - All Art of Propaganda by George Orwell.**
 - Computational Propaganda by Samuel Woolley.**
 - Fake News, Propaganda and plain old lies by Donald Barclay.**
 - How Propaganda Works by Jason Stanley.**
 - Propaganda and Persuasion by Garth Jowett.**
 - Media, persuasion and Propaganda by Marshall Soules.**
 - Primetime Propaganda by Ben Shapiro.**
 - Propaganda Studies by Jonathan Auerbach.**

Analysis of Logic: Coming to Terms with an Author

RULE 8. COMING TO TERMS WITH AN AUTHOR

A term is not a word—at least, not just a word without further qualifications. If a term and a word were exactly the same, you would only have to find the important words in a book in order to come to terms with it. But a word can have many meanings, especially an important word. If the author uses a word in one meaning, and the reader reads it in another, words have passed between them, but they have not come to terms. Where there is unresolved ambiguity in communication, there is no communication, or at best communication must be incomplete.

- A. Define each Term.
- B. Terms vs Opposite terms.
- C. Academic Terms.
- D. Make a list of the words that have not been understood and define them and find out the context.
- E. Ask the author, speaker, presenter or debater define the term.

Rules 9 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

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- 7. Symbolic Logic By Tony Roy.**
- 8. A System of Logic by John Stuart Mill.**
- 9. Argumentation and Debate by austin Freely.**
- 10. Critical Thinking, reading and Writing by Sylvan Barnett.**
- 11. Critical Thinking- The Art of Argument.**
- 12. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.**
- 13. Logic Complete Introduction.**
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
- 15. Complete Works By Aristotle.**

The first stage of analytical reading has been accomplished when you have applied the four rules listed at the end of the last chapter, which together allow you to tell what a book is about and to outline its structure. You are now ready to go on to the next stage, which also comprises four rules of reading. The first of these we call, for short, coming to terms.

Coming to terms is usually the last step in any successful business negotiation. All that remains is to sign on the dotted line. But in the analytical reading of a book, coming to terms is the first step beyond the outline. Unless the reader comes to terms with the author, the communication of knowledge from one to the other does not take place. For a *term is the basic element of communicable knowledge.*

Words vs. Terms

A *term* is not a *word*—at least, not just a word without further qualifications. If a term and a word were exactly the same, you would only have to find the important words in a book in order to come to terms with it. But a word can have many meanings, especially an important word. If the author uses a word in one meaning, and the reader reads it in another, words have passed between them, but they have not come to terms. Where there is unresolved ambiguity in communication, there is no communication, or at best communication must be incomplete.

Just look at the word “communication” for a moment. Its root is related to the word “common.” We speak of a community as a group of people who have something in common. Communication is an effort on the part of one person to share something with another person (or with an animal or a machine): his knowledge, his decisions, his sentiments. It succeeds only when it results in a common something, such as an item of information or knowledge that two parties share.

When there is ambiguity in the communication of knowledge, all that is in common are the words that one person speaks or writes and another hears or reads. So long as ambiguity persists, there is no meaning in common between writer and reader. For the communication to be successfully completed, therefore, it is necessary for the two parties to use the same words *with the same meanings*—in short, to come to terms. When that happens, communication happens, the miracle of two minds with but a single thought.

A term can be defined as an unambiguous word. That is not quite accurate, for strictly there are no unambiguous words. What we should have said is that a term is a word *used unambiguously*. The dictionary is full of words. They are almost all ambiguous in the sense that they have many meanings. But a word that has several meanings can be used in one sense at a time. When writer and reader somehow manage for a time to use a given word with one and only one meaning, then, during that time of unambiguous usage, they have come to terms.

You cannot find terms in dictionaries, though the materials for making them are there. Terms occur only in the process of communication. They occur when a writer tries to avoid ambiguity and a reader helps him by trying to follow his use of words. There are, of course, many degrees of success in this. Coming to terms is the ideal toward which writer and reader should strive. Since this is one of the primary achievements of the art of writing and reading, we can think of terms as *a skilled use of words for the sake of communicating knowledge*.

At this point it is probably clear that we are speaking exclusively of expository writers and expository books. Poetry and fiction are not nearly so concerned with the unambiguous use of words as expository works—works that convey knowledge in the broad sense of the word that we have been employing. It can even be argued that the best poetry is that which is the most richly ambiguous, and it has been said with justice that any good poet is sometimes intentionally ambiguous in his writing. This is an important insight

about poetry to which we will return later. It is obviously one of the primary differences between the poetical and the expository or scientific realms of literary art.

We are now ready to state the fifth rule of reading (an expository work). Stated roughly, it is this: You must spot the important words in a book and figure out how the author is using them. But we can make that a little more precise and elegant: RULE 10. FIND THE IMPORTANT WORDS AND THROUGH THEM COME TO TERMS WITH THE AUTHOR. Note that the rule has two parts. The first part is to locate the important words, the words that make a difference. The second part is to determine the meaning of these words, as used, with precision.

This is the first rule for the second stage of analytical reading, the aim of which is not the outlining of a book's structure but the interpretation of its contents or message. The other rules for this stage, to be discussed in the next chapter, are like this one in an important respect. They also require you to take two steps: a step dealing with the language as such, and a step beyond the language to the thought that lies behind it.

If language were a pure and perfect medium for thought, these steps would not be separate. If every word had only one meaning, if words could not be used ambiguously, if, in short, each word was an ideal term, language would be a diaphanous medium. The reader would see straight through the writer's words to the content of his mind. If that were the case, there would be no need at all for this second stage of analytical reading. Interpretation would be unnecessary.

But of course that is far from the case. There is no use crying about it, no use making up impossible schemes for an ideal language, as the philosopher Leibniz and some of his followers have tried to do. Indeed, if they succeeded, there would be no more poetry. The only thing to do, therefore, in expository works, is to make the best of language as it is, and the only way to do that is to use language as skillfully as possible when you want to convey, or to receive, knowledge.

Because language is imperfect as a medium for conveying knowledge, it also functions as an obstacle to communication. The rules of interpretive reading are directed to overcoming that obstacle. We can expect a good writer to do his best to reach us through the barrier language inevitably sets up, but we cannot expect him to do the job all by himself. We must meet him halfway. We, as readers, must try to tunnel through from our side of the barrier. The likelihood of a meeting of minds *through* language depends on the willingness of both reader and writer to work together. Just as teaching will not avail unless there is a *reciprocal activity of being taught*, so no author, regardless of his skill in writing, can achieve communication without a *reciprocal skill on the part of readers*. If that were not so, the diverse skills of writing and reading would not bring minds together, however much effort was expended, any more than the men who tunnel through from opposite sides of a mountain would ever meet unless they made their calculations according to the same principles of engineering.

As we have pointed out, each of the rules of interpretive reading involves two steps. To get technical for a moment, we may say that these rules have a grammatical and a logical aspect. The grammatical aspect is the one that deals with words. The logical step deals with their meanings or, more precisely, with terms. So far as communication is concerned, both steps are indispensable. If language is used without thought, nothing is being communicated. And thought or knowledge cannot be communicated without language. As arts, grammar and logic are concerned with language in relation to thought and thought in relation to language. That is why skill in both reading and writing is gained through these arts.

This business of language and thought—especially the distinction between words and terms—is so important that we are going to risk being repetitious to be sure the main point is understood. The main point is that *one* word can be the vehicle for *many* terms, and *one* term can be expressed by *many* words. Let us illustrate this schematically in the following manner. The word “reading” has been used in many senses in the course of our discussion. Let us take three of these senses: By the word “reading” we may mean (1) reading to be entertained, (2) reading to get information, and (3) reading to achieve understanding.

Now let us symbolise the word “reading” by the letter *X*, and the three meanings by the letters *a*, *b*, and *c*. What is symbolised in this scheme by *Xa*, *Xb*, and *Xc*, are not three words, for *X* remains the same throughout. But they are three terms, on the condition, of course, that you, as reader, and we, as writers know when *X* is being used in one sense and not another. If we write *Xa* in a given place, and you read *Xb*, we are writing and you are reading the same word, but not in the same way. The ambiguity prevents or at least impedes communication. Only when you think the word as we think it, do we have one thought between us. Our minds cannot meet in *X*, but only in *Xa* or *Xb* or *Xc*. Thus we come to terms.

You cannot locate the key words without making an effort to understand the passage in which they occur. This situation is somewhat paradoxical. If you do understand the passage, you will, of course, know which words in it are the most important. If you do not fully understand the passage, it is probably because you do not know the way the author is using certain words. If you mark the words that trouble you, you may hit the very ones the author is using specially. That this is likely to be so follows from the fact that you should have no trouble with the words the author uses in an ordinary way.

From your point of view as a reader, therefore, the most important words are those that give you trouble. It is likely that these words are important for the author as well. However, they may not be.

It is also possible that words that are important for the author do not bother you, and precisely because you understand them. In that case, you have already come to terms with the author. Only where you fail to come to terms have you work still to do.

- A. Define each Term.
- B. Does the definition is coextensive with the things defined. Is is too broad or too narrow or neither?
- C. Is the definition clear or obscure?
- D. Is the definition literal or metaphorical?
- E. Is the definition brief or long?
- F. Is the definition negative, positive?
- G. Is the definition circular?
- H. Is the definition nominal definition?
- I. Is the definition is essential definition?
- J. What type of definition?
 - Stipulative Definition.
 - Lexical Definition.
 - Precising Definition.
 - Theoretical definition.
 - Persuasive definition.
- K. The structure of definition.
 - Extension and Intension.
 - Extension and Denotative definition.
 - Ostensive definition and quasi-ostensive definition.
 - Intension and intensional definition.
 - Synonymous definition.
 - Operational definition.
 - Definition by genus and difference.
- L. What division of terms does the author use?
 - Qualitative vs Quantitative.
 - Comprehension vs extension.
 - Intension vs extension.
 - Connotation vs Denotation.
 - Meaning vs Reference.
- M. Terms vs Opposite terms.
- N. Academic Terms.
- O. Make a list of the words that have not been understood and define them and find out the context.
- P. Ask the author, speaker, presenter or debater define the term.

- Q. Make a list of the terms author, presenter, discussion, debate used.
- R. Are all terms unambiguous or ambiguous?
- S. Are the terms clear or unclear?
- T. Are the terms exact or vague?
- U. Are the terms univocal, analogical or equivocal?
- V. Are the terms literal or metaphor?
- W. Are the terms positive or negative?
- X. Are the terms simple or complex?
- Y. Are terms categorematic or syncategorematic?
- Z. Are terms universal, particular or singular?
- AA. Are the terms collective or divisive?
- BB. Are the terms concrete or abstract?
- CC. Are terms absolute or relative?
- DD. Good Evidence, does not become Bad evidence, because of the Lapse of Time
- EE. Double Standards is the sign of failed argument
- FF. Inconsistency is the sign of failed Argument

Rules 11 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

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- 13. Logic Complete Introduction.**
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
- 15. Complete Works By Aristotle.**

Finding the Key Words

We are now prepared to put flesh on the rule that requires the reader to come to terms. How does he go about doing it? How does he find the important or key words in a book?

You can be sure of one thing. Not all the words an author uses are important. Better than that, you can be sure that most of his words are not. Only those words that he uses in a special way are important for him, and for us as readers. This is not an absolute matter, of course, but one of degree. Words may be more or less important. Our only concern is with the fact that some words in a book are more important than others. At one extreme are the words that the author uses as the proverbial man in the street does. Since the author is using these words as everyone does in ordinary discourse, the reader should have no trouble with them. He is familiar with their ambiguity and he has grown accustomed to the variation in their meanings as they occur in this context or that.

For example, the word “reading” occurs in A. S. Eddington’s book, *The Nature of the Physical World*. He speaks of “pointer-readings,” the readings of dials and gauges on scientific instruments. He is using the word “reading” in one of its ordinary senses. It is not for him a technical word. He can rely on ordinary usage to convey what he means to the

reader. Even if he used the word “reading” in a different sense somewhere else in the book—in a phrase, let us say, such as “reading nature”—he could be confident that the reader would note the shift to another of the word’s ordinary meanings. The reader who could not do this could not talk to his friends or carry on his daily business.

But Eddington is not able to use the word “cause” so lightheartedly. That may be a word of common speech, but he is using it in a definitely special sense when he discusses the theory of causation. How that word is to be understood makes a difference that both he and the reader must bother about. For the same reason, the word “reading” is important in this book. We cannot get along with merely using it in an ordinary way.

An author uses most words as men ordinarily do in conversation, with a range of meanings, and trusting to the context to indicate the shifts. Knowing this fact is some help in detecting the more important words. We must not forget, however, that at different times and places the same words are not equally familiar items in daily usage. Contemporary writers will employ most words as they are ordinarily used *today*, and you will know which words these are because you are alive today. But in reading books written in the past, it may be more difficult to detect the words the author is using as most people did at the time and place he was writing. The fact that some authors intentionally employ archaic words, or archaic senses of words, complicates the matter further, as does the translation of books from foreign languages.

Nevertheless, it remains true that most of the words in any book can be read just as one would use them in talking to one’s friends. Take any page of this book and count the words we are using in that way: all the prepositions, conjunctions, and articles, and almost all of the verbs, nouns, adverbs, and adjectives. In this chapter so far, there have been only a few important words: “word,” “term,” “ambiguity,” “communication,” and perhaps one or two more. Of these, “term” is clearly the most important; all the others are important in relation to it.

You cannot locate the key words without making an effort to understand the passage in which they occur. This situation is somewhat paradoxical. If you do understand the passage, you will, of course, know which words in it are the most important. If you do not fully understand the passage, it is probably because you do not know the way the author is using certain words. If you mark the words that trouble you, you may hit the very ones the author is using specially. That this is likely to be so follows from the fact that you should have no trouble with the words the author uses in an ordinary way.

From your point of view as a reader, therefore, the most important words are *those that give you trouble*. It is likely that these words are important for the author as well. However, they may not be.

It is also possible that words that are important for the author do not bother you, and precisely because you understand them. In that case, you have already come to terms with the author. Only where you fail to come to terms have you work still to do.

Technical Words and Special Vocabularies

So far we have been proceeding negatively by eliminating the ordinary words. You discover some of the important words by the fact that they are *not ordinary for you*. That is why they bother you. But is there any other way of spotting the important words? Are there any positive signs that point to them?

There are several. The first and most obvious sign is the explicit stress an author places upon certain words and not others. He may do this in many ways. He may use such typographical devices as quotation marks or italics to mark the word for you. He may call your attention to the word by explicitly discussing its various senses and indicating the way he is going to use it here and there. Or he may emphasize the word by defining the thing that the word is used to name.

No one can read Euclid without knowing that such words as “point,” “line,” “plane,” “angle,” “parallel,” and so forth are of the first importance. These are the words that name geometrical entities defined by Euclid. There are other important words, such as “equals,” “whole,” and “part,” but these do not name anything that is defined. You know they are important from the fact that they occur in the axioms. Euclid helps you here by making his primary propositions explicit at the very beginning. You can guess that the terms composing such propositions are basic, and that underlines for you the words that express these terms. You may have no difficulty with these words, because they are words of common speech, and Euclid appears to be using them that way.

If all authors wrote as Euclid did, you may say, this business of reading would be much easier. But that of course is not possible, although there have in fact been men who thought that any subject matter could be expounded in the geometrical manner. The procedure—the method of exposition and proof—that works in mathematics is not applicable in every field of knowledge. In any event, for our purposes it is sufficient to note what is common to every sort of exposition. *Every field of knowledge has its own technical vocabulary*. Euclid makes his plain right at the beginning. The same is true of any writer, such as Galileo or Newton, who writes in the geometrical manner. In books differently written or in other fields, the technical vocabulary must be discovered by the reader.

If the author has not pointed out the words himself, the reader may locate them through having some prior knowledge of the subject matter. If he knows something about biology or economics before he begins to read Darwin or Adam Smith, he certainly has some leads toward discerning the technical words. The rules of analyzing a book's structure may help here. If you know what kind of book it is, what it is about as a whole, and what its major parts are, you are greatly aided in separating the technical vocabulary from the ordinary words. The author's title, chapter headings, and preface may be useful in this connection.

From this you know, for example, that “wealth” is a technical word for Adam Smith, and “species” for Darwin. Since one technical word leads to another, you cannot help but discover other technical words in a similar fashion. You can soon make a list of the important words used by Adam Smith: labor, capital, land, wages, profits, rent, commodity,

price, exchange, productive, unproductive, money, and so forth. And here are some you cannot miss in Darwin: variety, genus, selection, survival, adaptation, hybrid, fittest, creation.

Where a field of knowledge has a well-established technical vocabulary, the task of locating the important words in a book treating that subject matter is relatively easy. You can spot them *positively* through having some acquaintance with the field, or *negatively* by knowing what words must be technical, because they are not ordinary. Unfortunately, there are many fields in which a technical vocabulary is not well established.

Philosophers are notorious for having private vocabularies. There are some words, of course, that have a traditional standing in philosophy. Though they may not be used by all writers in the same sense, they are nevertheless technical words in the discussion of certain problems. But philosophers often find it necessary to coin new words, or to take some word from common speech and *make it a technical word*. This last procedure is likely to be most misleading to the reader who supposes that he knows what the word means, and therefore treats it as an ordinary word. Most good authors, however, anticipating just this confusion, give very explicit warning whenever they adopt the procedure.

In this connection, one clue to an important word is that the author quarrels with other writers about it. When you find an author telling you how a particular word has been used by others, and why he chooses to use it otherwise, you can be sure that word makes a great difference to him.

We have here emphasized the notion of technical vocabulary, but you must not take this too narrowly. The relatively small set of words that express an author's main ideas, his leading concepts, constitutes his special vocabulary. They are the words that carry his analysis, his argument. If he is making an original communication, some of these words are likely to be used by him in a very special way, although he may use others in a fashion that has become traditional in the field. In either case, these are the words that are most important *for him*. They should be important *for you* as a reader also, but in addition any other word whose meaning is not clear is important for you.

The trouble with most readers is that they simply do not pay enough attention to words to locate their difficulties. They fail to distinguish the words that they do not understand sufficiently from those they do. All the things we have suggested to help you find the important words in a book will be of no avail unless you make a deliberate effort to note the words you must work on to find the terms they convey. The reader who fails to ponder, or at least to mark, the words he does not understand is headed for disaster.

If you are reading a book that can increase your understanding, it stands to reason that not all of its words will be completely intelligible to you. If you proceed as if they were all ordinary words, all on the same level of general intelligibility as the words of a newspaper article, you will make no headway toward interpretation of the book. You might

just as well be reading a newspaper, for the book cannot enlighten you if you do not try to understand it.

Most of us are addicted to non-active reading. The outstanding fault of the non-active or undemanding reader is his inattention to words, and his consequent failure to come to terms with the author.

Finding the Meanings

RULE 12. You have to discover the meaning of a word you do not understand by using the meanings of all the other words in the context that you do understand.

Spotting the important words is only the beginning of the task. It merely locates the places in the text where you have to go to work. There is another part of this fifth rule of reading. Let us turn to that now. Let us suppose you have marked the words that trouble you. What next?

There are two main possibilities. Either the author is using these words in a single sense throughout or he is using them in two or more senses, shifting his meaning from place to place. In the first alternative, the word stands for a single term. A good example of the use of important words so that they are restricted to a single meaning is found in Euclid. In the second alternative, the word stands for several terms.

In the light of these alternatives, your procedure should be as follows. First, try to determine whether the word has one or many meanings. If it has many, try to see how they are related. Finally, note the places where the word is used in one sense or another, and see if the context gives you any clue to the reason for the shift in meaning. This last will enable you to follow the word in its change of meanings with the same flexibility that characterises the author's usage.

But, you may complain, everything is clear except the main thing. How does one find out what the meanings are? The answer, though simple, may appear unsatisfactory. But patience and practice will show you otherwise. The answer is that *you have to discover the meaning of a word you do not understand by using the meanings of all the other words in the context that you do understand*. This must be the way, no matter how merry-go-roundish it may seem at first.

The easiest way to illustrate this is to consider a definition. A definition is stated in words. If you do not understand any of the words used in the definition, you obviously cannot understand the meaning of the word that names the thing defined. The word "point" is a basic word in geometry. You may think you know what it means (in geometry), but Euclid wants to be sure you use it in only one way. He tells you what he means by first defining the thing he is later going to use the word to name. He says: "A point is that which has no part."

How does that help to bring you to terms with him? You know, he assumes, what every other word in the sentence means with sufficient precision. You know that whatever has parts is a complex whole. You know that the opposite of complex is simple. To be simple is the same as to lack parts. You know that the use of the words "is" and "that which" means that the thing referred to must be an entity of some sort. Incidentally, it follows from all this that, if there are no physical things without parts, a point, as Euclid speaks of it, cannot be physical.

This illustration is typical of the process by which you acquire meanings. You operate with meanings you already possess. If every word that was used in a definition had itself to be defined, nothing could ever be defined. If every word in a book you were reading was entirely strange to you, as in the case of a book in a totally foreign language, you could make no progress at all.

That is what people mean when they say of a book that it is all Greek to them. They simply have not tried to understand it, which would be justifiable if it were really in Greek. But most of the words in any English book are familiar words. These words surround the strange words, the technical words, the words that may cause the reader some trouble. The surrounding words are the *context* for the words to be interpreted. The reader has all the materials he needs to do the job.

We are not pretending the job is an easy one. We are only insisting that it is not an impossible one. If it were, no one could read a book to gain in understanding. The fact that a book can give you new insights or enlighten you indicates that it probably contains words you may not readily understand. If you could not come to understand those words by your own efforts, then the kind of reading we are talking about would be impossible. It would be impossible to pass from understanding less to understanding more by your own operations on a book.

There is no rule of thumb for doing this. The process is something like the trial-and-error method of putting a jigsaw puzzle together. The more parts you put together, the easier it is to find places for the remaining parts, if only because there are fewer of them. A book comes to you with a large number of words already in place. *A word in place is a term.* It is definitely located by the meaning that you and the author share in using it. The remaining words must be put in place. You do this by trying to make them fit this way or that. The better you understand the picture that the words so far in place already partially reveal, the easier it is to complete the picture by making terms of the remaining words. Each word put into place makes the next adjustment easier.

You will make errors, of course, in the process. You will think you have managed to find where a word belongs and how it fits, only to discover later that the placement of another word requires you to make a whole series of readjustments. The errors will get corrected because, so long as they are not found out, the picture cannot be completed. Once you have had any experience at all in this work of coming to terms, you will soon be able to check yourself. You will know whether you have succeeded or not. You will not blithely think you understand when you do not.

In comparing a book to a jigsaw puzzle, we have made one assumption that is not true. A good puzzle is, of course, one all of whose parts fit. The picture can be perfectly completed. The same is true of the ideally good book, but there is no such book. In proportion as books are good, their terms will be so well made and put together by the author that the reader can do the work of interpretation fruitfully. Here, as in the case of every other rule of reading, bad books are less readable than good ones. The rules do not work on them, except to show you how bad they are. If the author uses words

ambiguously you cannot find out what he is trying to say. You can only find out that he has not been precise.

But, you may ask, does not an author who uses a word in more than a single sense use it ambiguously? And is it not the usual practice for authors to use words in several senses, especially their most important words?

The answer to the first question is No; to the second, Yes. To use a word ambiguously is to use it in several senses without distinguishing or relating their meanings. (For example, we have probably used the word “important” ambiguously in this chapter, for we were not always clear as to whether we meant important for the author or important for you.) The author who does that has not made terms that the reader can come to. But the author who distinguishes the several senses in which he is using a critical word and enables the reader to make a responsive discrimination is offering terms.

You should not forget that one word can represent several terms. One way to remember this is to distinguish between the author’s *vocabulary* and his *terminology*. If you make a list in one column of the important words, and in another of their important meanings, you will see the relation between the vocabulary and the terminology.

There are several further complications. In the first place, a word that has several distinct meanings can be used either in a single sense or in a combination of senses. Let us take the word “reading” again as an example. In some places, we have used it to stand for reading any kind of book. In others, we have used it to stand for reading books that instruct rather than entertain. In still others, we have used it to stand for reading that enlightens rather than informs.

Now if we symbolise here, as we did before, these three distinct meanings of “reading” by Xa , Xb , and Xc , then the first usage just mentioned is $Xabc$, the second is Xbc , and the third Xc . In other words, if several meanings are related, one can use a word to stand for all of them, for some of them, or for only one of them at a time. So long as each usage is definite, the word so used is a term.

In the second place, there is the problem of synonyms. The repetition of a single word over and over is awkward and boring, except in mathematical writing, and so good authors often substitute different words having the same or very similar meanings for important words in their text. This is just the opposite of the situation where one word can stand for several terms; here, one and the same term is represented by two or more words used synonymously.

We can express this symbolically as follows. Let X and Y be two different words, such as “enlightenment” and “insight.” Let the letter a stand for the same meaning that each can express, namely, a gain in understanding. Then Xa and Ya represent the same term, though they are distinct as words. When we speak of reading “for insight” and reading “for enlightenment,” we are referring to the same kind of reading, because the two phrases are

being used with the same meaning. The words are different, but there is only one term for you as a reader to grasp.

This is important, of course. If you supposed that every time an author changed his words, he was shifting his terms, you would make as great an error as to suppose that every time he used the same words, the terms remained the same. Keep this in mind when you list the author's vocabulary and terminology in separate columns. You will find two relationships. On the one hand, a single word may be related to several terms. On the other hand, a single term may be related to several words.

In the third place, and finally, there is the matter of phrases. If a phrase is a unit, that is, if it is a whole that can be the subject or predicate of a sentence; it is like a single word. Like a single word, it can refer to something being talked about in some way.

It follows, therefore, that a term can be expressed by a phrase as well as by a word. And all the relations that exist between words and terms hold also between terms and phrases. Two phrases may express the same term, and one phrase may express several terms, according to the way its constituent words are used.

In general, a phrase is less likely to be ambiguous than a word. Because it is a group of words, each of which is in the context of the others, the single words are more likely to have restricted meanings. That is why a writer is likely to substitute a fairly elaborate phrase for a single word if he wants to be sure that you get his meaning.

One illustration should suffice. To be sure that you come to terms with us about reading, we substitute phrases like "reading for enlightenment" for the single word "reading." To make doubly sure, we may substitute a more elaborate phrase, such as "the process of passing from understanding less to understanding more by the operation of your mind upon a book." There is only one term here, a term referring to the kind of reading that this book is mostly about. But that one term has been expressed by a single word, a short phrase, and a longer one.

This has been a hard chapter to write, and probably a hard one to read. The reason is clear. The rule of reading we have been discussing cannot be made fully intelligible without going into all sorts of grammatical and logical explanations about words and terms.

In fact, we have actually done very little explaining. To give an adequate account of these matters would take many chapters. We have merely touched upon the most essential points. We hope we have said enough to make the rule a useful guide in practice. The more you put it into practice, the more you will appreciate the intricacies of the problem. You will want to know something about the literal and metaphorical use of words. You will want to know about the distinction between abstract and concrete words, and between proper and common names. You will become interested in the whole business of definition: the difference between defining words and defining things; why some words are indefinable, and yet have definite meanings, and so forth. You will seek light on what is called "the emotive use of words," that is, the use of words to arouse

emotions, to move men to action or change their minds, as distinct from the communication of knowledge. And you may even become interested in the relation between ordinary “rational” speech and “bizarre” or “crazy” talk—the speech of the mentally disturbed, where almost every word carries weird and unexpected but nevertheless identifiable connotations.

If the practice of analytical reading elicits these further interests, you will be in a position to satisfy them by reading books on these special subjects. And you will profit more from reading such books, because you will go to them with questions born of your own experience in reading. The study of grammar and logic, the sciences that underlie these rules, is practical only to the extent you can relate it to practice.

You may never wish to go further. But even if you do not, you will find that your comprehension of any book will be enormously increased if you only go to the trouble of finding its important words, identifying their shifting meanings, and coming to terms. Seldom does such a small change in a habit have such a large effect.

Rules 13 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill’s Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

- 1. Introduction to Logic by Patrick Hurley.**
- 2. Handbook of Logic and language by J van Benthem.**
- 3. Introduction to logic and critical thinking by Merrilee h Salmon.**
- 4. Logically Fallacious By Bo BENNET.**
- 5. Modal Logic by Patrick Blackburn.**
- 6. Modal Logic by Brian Chellas.**
- 7. Symbolic Logic By Tony Roy.**
- 8. A System of Logic by John Stuart Mill.**
- 9. Argumentation and Debate by Austin Freely.**
- 10. Critical Thinking, reading and Writing by Sylvan Barnett.**
- 11. Critical Thinking- The Art of Argument.**
- 12. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.**
- 13. Logic Complete Introduction.**
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
- 15. Complete Works By Aristotle.**

Inspectional Reading VI: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed
4. Read or Listen The Full Book Without Stopping
5. Read or listen 25min and 5min break
 - Read or Listen 20 pages an Hour according Mortimer Adler
6. Read or Listen between 1-50 times the book
7. Speed of Audiobook
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Determining an Author's Message

Not only coming to terms but also making propositions occurs among traders as well as in the world of books. What a buyer or seller means by a proposition is some sort of proposal, some sort of offer or acceptance. In honest dealings, the person who makes a proposition in this sense is declaring his intention to act in a certain way. More than honesty is required for successful negotiations. The proposition should be clear and, of course, attractive. Then the traders can come to terms.

A proposition in a book is also a declaration. It is an expression of the author's judgment about something. He affirms something he thinks to be true, or denies something he judges to be false. He asserts this or that to be a fact. A proposition of this sort is a declaration of knowledge, not intentions. The author may tell us his intentions at the beginning in a preface. In an expository book, he usually promises to instruct us about something. To find out whether he keeps those promises, we must look for his propositions.

Generally, the order of reading reverses the order of business. Businessmen usually come to terms after they find out what the proposition is. But the reader must usually come to terms with an author first, before he can find out what the author is proposing, what judgment he is declaring. That is why the fifth rule of analytical reading concerns words and terms, and the sixth, which we are about to discuss, concerns sentences and propositions.

There is a seventh rule that is closely related to the sixth. The author may be honest in declaring himself on matters of fact or knowledge. We usually proceed in that trust. But unless we are exclusively interested in the author's personality, we should not be satisfied with knowing what his opinions are. *His propositions are nothing but expressions of personal opinion unless they are supported by reasons.* If it is the book and the subject with which it deals that we are interested in, and not just the author, we want to know not merely what his propositions are, but *also why he thinks we should be persuaded to accept them.*

The seventh rule, therefore, deals with arguments of all sorts. There are many kinds of reasoning, many ways of supporting what one says. Sometimes it is possible to argue that something is true; sometimes no more than a probability can be defended. But every sort of argument consists of a number of statements related in a certain way. *This* is said *because of that*. The word "because" here signifies a reason being given.

The presence of arguments is indicated by other words that relate statements, such as: *if* this is so, *then* that; or, *since* this, *therefore* that; or, it *follows* from this, that that is the case. In the course of earlier chapters in this book, such sequences occurred. For those of us who are no longer in school, we observed, it is necessary, if we want to go on learning and discovering, to know how to make books teach us well. In that situation, *if* we want to go on learning, *then* we must know how to learn from books, which are absent teachers.

An argument is always a set or series of statements of which some provide the grounds or reasons for what is to be concluded. A paragraph, therefore, or at least a collection of sentences, is required to express an argument. The premises or principles of an argument may not always be stated first, but they are the *source* of the conclusion, nevertheless. If the argument is valid, the conclusion follows from the premises. That does not necessarily mean that the conclusion is true, since one or all of the premises that support it may be false.

There is a grammatical as well as a logical aspect to the order of these rules of interpretation. We go from terms to propositions to arguments, by going from words (and phrases) to sentences to collections of sentences (or paragraphs). We are building up from simpler to more complex units. The smallest significant element in a book is, of course, a single word. It would be true but not adequate to say that a book consists of words. It also consists of groups of words, taken as units, and similarly of groups of sentences, taken as units. The active reader is attentive not only to the words but also to the sentences and paragraphs. There is no other way of discovering the author's terms, propositions, and arguments.

The movement at this stage of analytical reading—*when interpretation is our goal*—seems to be in the opposite direction from the movement in the first stage—*when the goal was a structural outline*. There we went from the book as a whole to its major parts, and then to their subordinate divisions. As you might suspect, the two movements meet somewhere. The major parts of a book and their principal divisions contain many propositions and usually several arguments. But if you keep on dividing the book into its parts, at last you have to say: "In this part, the following points are made." Now each of these points is likely to be a proposition, and some of them taken together probably form an argument.

Thus, the two processes, outlining and interpretation, meet at the level of propositions and arguments. You work down to propositions and arguments by dividing the book into its parts. You work up to arguments by seeing how they are composed of propositions and ultimately of terms. When you have completed the two processes, you can really say that you know the contents of a book.

Sentences vs. Propositions

We have already noticed another thing about the rules we are going to discuss in this chapter. As in the case of the rule about words and terms, we are here also dealing with the relation of language and thought. Sentences and paragraphs are grammatical units. They are units of language. Propositions and arguments are logical units, or units of thought and knowledge.

We have to face here a problem similar to the one we faced in the last chapter. Because language is not a perfect medium for the expression of thought, because one word can have many meanings and two or more words can have the same meaning, we saw how complicated was the relation between an author's *vocabulary* and his *terminology*. One word may represent several terms, and one term may be represented by several words.

Mathematicians describe the relation between the buttons and the buttonholes on a well-made coat as a one-to-one relationship. There is a button for every buttonhole, and a hole for every button. Well, the point is that words and terms do *not* stand in a one-to-one relation. The greatest error you can make in applying these rules is to suppose that a one-to-one relationship exists between the elements of language and those of thought or knowledge.

As a matter of fact, it would be wise not to make too easy assumptions even about buttons and buttonholes. The sleeves of most men's suit jackets bear buttons that have no corresponding buttonholes. And if you have worn the coat for a while, it may have a hole with no corresponding button.

Let us illustrate this in the case of sentences and propositions. Not every sentence in a book expresses a proposition. For one thing, some sentences express questions. They state problems rather than answers. *Propositions are the answers to questions*. They are declarations of knowledge or opinion. That is why we call sentences that express them declarative, and distinguish sentences that ask questions as interrogative. Other sentences express wishes or intentions. They may give us some knowledge of the author's purpose, but they do not convey the knowledge he is trying to expound.

Moreover, not all the declarative sentences can be read as if each expressed one proposition. There are at least two reasons for this. The first is the fact that words are ambiguous and can be used in various sentences. Thus, it is possible for the same sentence to express different propositions if there is a shift in the terms the words express. "Reading is learning" is a simple sentence; but if at one place we mean by "learning" the acquisition of information, and at another we mean the development of understanding, the proposition is not the same, because the terms are different. Yet the sentence is the same.

The second reason is that all sentences are not as simple as "Reading is learning." When its words are used unambiguously, a simple sentence *usually* expresses a single proposition. But even when its words are used unambiguously, a compound sentence expresses two or more propositions. A compound sentence is really a collection of

sentences, connected by such words as “and,” or “if . . . then,” or “not only . . . but also.” You may rightly conclude that the line between a long compound sentence and a short paragraph may be difficult to draw. A compound sentence can express a number of propositions related in the form of an argument.

Such sentences can be very difficult to interpret. Let us take an interesting sentence from Machiavelli’s *The Prince* to show what we mean:

A prince ought to inspire fear in such a way that, if he does not win love, he avoids hatred; because he can endure very well being feared whilst he is not hated, which will always be as long as he abstains from the property of his citizens and from their women.

This is grammatically a *single* sentence, though it is extremely complex. The semicolon and the “because” indicate the major break in it. The first proposition is that a prince ought to inspire fear in a certain way.

Beginning with the word “because,” we have what is in effect another sentence. (It could be made independent by saying: “The reason for this is that he can endure,” and so forth.) And this sentence expresses two propositions at least: (1) the reason why the prince ought to inspire fear in a certain way is that he can endure being feared so long as he is not hated; (2) he can avoid being hated only by keeping his hands off the property of his citizens and their women.

It is important to distinguish the various propositions that a long, complex sentence contains. In order to agree or disagree with Machiavelli, you must first understand what he is saying. But he is saying three things in this one sentence. You may disagree with one of them and agree with the others. You may think Machiavelli is wrong in recommending terrorism to a prince on any grounds; but you may acknowledge his shrewdness in saying that the prince had better not arouse hatred along with fear, and you may also agree that keeping his hands off his subjects’ property and women is an indispensable condition of not being hated. Unless you recognize the distinct propositions in a complicated sentence, you cannot make a discriminating judgment on what the writer is saying.

Lawyers know this fact very well. They have to examine sentences carefully to see what is being alleged by the plaintiff or denied by the defendant. The single sentence, “John Doe signed the lease on March 24,” looks simple enough, but still it says several things, some of which may be true and the others false. John Doe may have signed the lease, but not on March 24, and that fact may be important. In short, even a grammatically simple sentence sometimes expresses two or more propositions.

We have said enough to indicate what we mean by the difference between sentences and propositions. They are not related as one to one. Not only can a single sentence express several propositions, either through ambiguity or complexity, but one and the same proposition can also be expressed by two or more different sentences. If you grasp our terms through the words and phrases we use synonymously, you will know that we are

saying the same thing when we say, “Teaching and being taught are correlative functions,” and “Initiating and receiving communication are related processes.”

We are going to stop explaining the grammatical and logical points involved and turn to the rules. The difficulty in this chapter, as in the last, is to stop explaining. Instead, we will assume that you know some grammar. We do not necessarily mean that you must understand everything about syntax, but you should be concerned about the ordering of words in sentences and their relation to one another. Some knowledge of grammar is indispensable to a reader. You cannot begin to deal with terms, propositions, and arguments—the elements of thought—until you can penetrate beneath the surface of language. So long as words, sentences, and paragraphs are opaque and unanalyzed, they are a barrier to, rather than a medium of, communication. You will read words but not receive knowledge.

Here are the rules. The tenth rule of reading, as you will recall from the last

RULE 14. FIND THE IMPORTANT WORDS AND COME TO TERMS. The TENTH rule can be expressed thus:

RULE 15. MARK THE MOST IMPORTANT SENTENCES IN A BOOK AND DISCOVER THE PROPOSITIONS THEY CONTAIN. The seventh rule is this:

RULE 16. LOCATE OR CONSTRUCT THE BASIC ARGUMENTS IN THE BOOK BY FINDING THEM IN THE CONNECTION OF SENTENCES. You will see later why we did not say “paragraphs” in the formulation of this rule.

Incidentally, it is just as true of these new rules as it was of the rule about coming to terms that they apply primarily to expository works. The rules about propositions and arguments are quite different when you are reading a poetical work—a novel, play, or poem. We will discuss the changes that are required in applying them to such works later.

Finding the Key Sentences

Rule 15. MARK THE MOST IMPORTANT SENTENCES IN A BOOK AND DISCOVER THE PROPOSITION THEY CONTAIN.

How does one locate the most important sentences in a book? How, then, does one interpret these sentences to discover the one or more propositions they contain?

Again, we are placing emphasis on what is important. To say that there is only a relatively small number of key sentences in a book does not mean that you need pay no attention to all the rest. Obviously, you have to understand every sentence. But most of the sentences, like most of the words, will cause you no difficulty. As we pointed out in our discussion of reading speeds, you will read them relatively quickly. From your point of view as a reader, the sentences important *for you* are those that require an effort of interpretation because, at first sight, they are not perfectly intelligible. You understand them just well enough to know there is more to understand. They are the sentences that you read much more slowly and carefully than the rest. These may not be the sentences that are most important *for the author*, but they are likely to be, because you are likely to have the greatest difficulty with the most important things the author has to say. And it hardly needs remarking that those are the things you should read most carefully.

From the author's point of view, the important sentences are the ones that express the judgments on which his whole argument rests. A book usually contains much more than the bare statement of an argument, or a series of arguments. The author may explain how he came to the point of view he now holds, or why he thinks his position has serious consequences. He may discuss the words he has to use. He may comment on the work of others. He may indulge in all sorts of supporting and surrounding discussion. But *the heart of his communication lies in the major affirmations and denials he is making, and the reasons he gives for so doing*. To come to grips, therefore, you have to see the main sentences as if they were raised from the page in high relief.

Some authors help you do this. They underline the sentences for you. They either tell you that this is an important point when they make it, or they use one or another typographical device to make their leading sentences stand out. Of course, nothing helps those who will not keep awake while reading. We have met many readers and students who paid no attention even to such clear signs. They preferred to read on rather than stop and examine the important sentences carefully.

There are a few books in which the leading propositions are set forth in sentences that occupy a special place in the order and style of the exposition. Euclid, again, gives us the most obvious example of this. He not only states his definitions, his postulates, and his axioms—his principal propositions—at the beginning, but he also labels every proposition to be proved. You may not understand all of his statements. You may not follow all of his arguments. But you cannot miss the important sentences or the grouping of sentences for the statement of the proofs.

The *Summa Theologica* of St. Thomas Aquinas is another book whose style of exposition puts the leading sentences into high relief. It proceeds by raising questions. Each section is headed by a question. There are many indications of the answer that Aquinas is trying to defend. A whole series of objections opposing the answer is stated. The place where Aquinas begins to argue his own point is marked by the words, "I answer that." There is no excuse for not being able to locate the important sentences in such a book—those expressing the reasons as well as the conclusions—yet even here it remains all a blur for those readers who treat everything they read as equally important—and read it all at the same speed, either fast or slow. That usually means that everything is equally unimportant.

Apart from books whose style or format calls attention to what most needs interpretation by the reader, the spotting of the important sentences is a job the reader must perform for himself. There are several things he can do. We have already mentioned one. If he is sensitive to the difference between passages he can understand readily and those he cannot, he will probably be able to locate the sentences that carry the main burden of meaning. Perhaps you are beginning to see how essential a part of reading it is to *be perplexed and know it*. Wonder is the beginning of wisdom in learning from books as well as from nature. If you never ask yourself any questions about the meaning of a passage, you cannot expect the book to give you any insight you do not already possess.

Another clue to the important sentences is found in the words that compose them. If you have already marked the important words, they should lead you to the sentences that deserve further attention. Thus the first step in interpretive reading prepares for the second. But the reverse may also be the case. It may be that you will mark certain words only after you have become puzzled by the meaning of a sentence. The fact that we have stated these rules in a fixed order does not mean that you have to follow them in that order. Terms constitute propositions. Propositions contain terms. If you know the terms the words express, you have caught the proposition in the sentence. If you understand the proposition conveyed by a sentence, you have arrived at the terms also.

This suggests one further clue to the location of the principal propositions. They must belong to the main argument of the book. They must be either premises or conclusions. Hence, if you can detect those sentences that seem to form a sequence, a sequence in which there is a beginning and an end, you probably have put your finger on the sentences that are important.

We said a sequence in which there is a beginning and an end. Every argument that men can express in words takes time to state. You may speak a sentence in one breath, but there are pauses in an argument. You have to say one thing first, then another, and then another. An argument begins somewhere, goes somewhere, gets somewhere. It is a movement of thought. It may begin with what is really the conclusion and then proceed to give the reasons for it. Or it may start with the evidence and the reasons and bring you to the conclusion that follows therefrom.

Of course, here as elsewhere, the clue will not work unless you know how to use it. You have to recognize an argument when you see one. Despite some disappointing

experiences, however, we persist in our opinion that the human mind is as naturally sensitive to arguments as the eye is to colors. (There may be some people who are argument-blind!) But the eye will not see if it is not kept open, and the mind will not follow an argument if it is not awake.

Many persons believe that they know how to read because they read at different speeds. But they pause and go slow *over the wrong sentences*. They pause over the sentences that *interest* them rather than the ones that *puzzle* them. Indeed, this is one of the greatest obstacles to reading a book that is not completely contemporary. Any old book contains facts that are somewhat surprising because they are different from what we know. But when you are reading for understanding it is not that kind of novelty that you are seeking. Your interest in the author himself, or in his language, or in the world in which he wrote, is one thing; your concern to understand his ideas is quite another. It is this concern that the rules we are discussing here can help you to satisfy, not your curiosity about other matters.

Finding the Propositions

Rules 16 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

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9. Argumentation and Debate by austin Freely.
10. Critical Thinking, reading and Writing by Sylvan Barnett.
11. Critical Thinking- The Art of Argument.
12. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.

13. Logic Complete Introduction.

14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.

15. Complete Works By Aristotle.

Let us suppose that you have located the leading sentences. Another step is required by **Rule 16**. You must discover the proposition or propositions that each of these sentences contains. This is just another way of saying that you must know what the sentence means. You discover terms by discovering what a word means in a given usage. You discover propositions similarly by interpreting all the words that make up the sentence, and especially its principal words.

Once more, you cannot do this very well unless you know a little grammar. You must know the role that adjectives and adverbs play, how verbs function in relation to nouns, how modifying words and clauses restrict or amplify the meaning of the words they modify, and so forth. Ideally, you should be able to dissect a sentence according to the rules of syntax, although you do not necessarily have to do it in a formal way. Despite the current de-emphasis on teaching grammar in school, we have to assume that you know this much of it. We cannot believe you do not, though you may have grown a little rusty from lack of practice in the rudiments of the art of reading.

There are only two differences between finding the terms that words express and the propositions that sentences express. One is that you employ a larger context in the latter case. You bring all the surrounding sentences to bear on the sentence in question, just as you used the surrounding words to interpret a particular word. In both cases, you proceed from what you do understand to the gradual elucidation of what is at first relatively unintelligible.

The other difference lies in the fact that complicated sentences usually express more than one proposition. You have not completed your interpretation of an important sentence until you have separated out of it all the different, though perhaps related, propositions. Skill in doing this comes with practice. Take some of the complicated sentences in this book and try to state in your own words each of the things that is being asserted. Number them and relate them.

“State in your own words!” That suggests the best test we know for telling whether you have understood the proposition or propositions in the sentence. If, when you are asked to explain what the author means by a particular sentence, all you can do is repeat his very words, with some minor alterations in their order, you had better suspect that you do not know what he means. Ideally, you should be able to say the same thing in totally different words. The idea can, of course, be approximated in varying degrees. But if you cannot get away at all from the author’s words, it shows that *only words* have passed from him to you, *not thought or knowledge*. You know his words, not his mind. He was trying to communicate knowledge, and all you received was words.

The process of translation from a foreign language to English is relevant to the test we have suggested. If you cannot state in an English sentence what a French sentence says, you know you do not understand the meaning of the French. But even if you can, your translation may remain only on the verbal level; for even when you have formed a faithful English replica, you still may not know what the writer of the French sentence was trying to convey.

The translation of one English sentence into another, however, is not merely verbal. The new sentence you have formed is not a verbal replica of the original. If accurate, *it is faithful to the thought alone*. That is why making such translations is the best test you can apply to yourself, if you want to be sure you have digested the proposition, not merely swallowed the words. If you fail the test, you have uncovered a failure of understanding. If you say that you know what the author means, but can only repeat the author's sentence to show that you do, then you would not be able to recognize the author's proposition if it were presented to you in other words.

The author may himself express the same proposition in different words in the course of his writing. The reader who has not seen through the words to the proposition they convey is likely to treat the equivalent sentences as if they were statements of different propositions. Imagine a person who did not know that " $2 + 2 = 4$ " and " $4 - 2 = 2$ " were different notations for the same arithmetic relationship—the relationship of four as the double of two, or two as the half of four.

You would have to conclude that that person simply did not understand the equation. The same conclusion is forced on you concerning yourself or anybody else who cannot tell when equivalent statements of the same proposition are being made, or who cannot himself offer an equivalent statement when he claims to understand the proposition a sentence contains.

These remarks have a bearing on syntopical reading—the reading of several books about the same subject matter. Different authors frequently say the same thing in different words, or different things using almost the same words. The reader who cannot see through the language to the terms and propositions will never be able to compare such related works. Because of their verbal differences, he is likely to misread the authors as disagreeing, or to ignore their real differences because of verbal resemblances in their statements.

There is one other test of whether you understand the proposition in a sentence you have read. Can you point to some experience you have had that the proposition describes or to which the proposition is in any way relevant? Can you exemplify the general truth that has been enunciated by referring to a particular instance of it? To imagine a possible case is often as good as citing an actual one. If you cannot do anything at all to exemplify or illustrate the proposition, either imaginatively or by reference to actual experiences, you should suspect that you do not know what is being said.

Not all propositions are equally susceptible to this test. It may be necessary to have the special experience that only a laboratory can afford to be sure you have grasped certain scientific propositions. But the main point is clear. Propositions do not exist in a vacuum. They refer to the world in which we live. Unless you can show some acquaintance with actual or possible facts to which the proposition refers or is relevant somehow, you are *playing with words*, not dealing with thought and knowledge.

Let us consider one example of this. A basic proposition in metaphysics is expressed by the following words: “Nothing acts except what is actual.” We have heard many students repeat those words to us with an air of satisfied wisdom. They have thought they were discharging their duty to us and to the author by so perfect a verbal repetition. But the sham was obvious as soon as we asked them to state the proposition in other words. Seldom could they say, for instance, that if something does not exist, it cannot do anything. Yet this is an immediately apparent translation —apparent, at least, to anyone who understood the proposition in the original sense.

Failing to get a translation, we would then ask for an exemplification of the proposition. If any one of them told us that grass is not made to grow by merely *possible* showers—that one’s bank account does not increase on account of a merely *possible* raise—we would know that the proposition had been grasped.

The vice of “verbalism” can be defined as the bad habit of using words without regard for the thoughts they should convey and without awareness of the experiences to which they should refer. It is playing with words. As the two tests we have suggested indicate, “verbalism” is the besetting sin of those who fail to read analytically. Such readers never get beyond the words. They possess what they read as a verbal memory that they can recite empty. One of the charges made by certain modern educators against the liberal arts is that they tend to verbalism, but just the opposite seems to be the case. The failure in reading—the omnipresent verbalism— of those who have not been trained in the arts of grammar and logic shows how lack of such discipline results in slavery to words rather than mastery of them.

Rules 17 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

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- 13. Logic Complete Introduction.**
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
- 15. Complete Works By Aristotle.**

Inspectional Reading VII: Superficial Reading

1. Skimming through Audiobook between 190 words per minute to 375 words per minute or between 1.25-2.5 times speed
2. Normally listen audiobook from beginning to end between 190 words per minute to 285 words per minute or between 1.25-1.9 times speed
3. Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed
4. Read or Listen The Full Book Without Stopping
5. Read or listen 25min and 5min break
 - Read or Listen 20 pages an Hour according Mortimer Adler
6. Read or Listen between 1-50 times the book
7. Speed of Audiobook
 - Normally listen audiobook from beginning to end between 150 words per minute to 300 words per minute or between 1-2 times speed.
8. A good speed reading course should therefore teach you to read at many different speeds, not just one speed that is faster than anything you can manage now. It should enable you to vary your rate of reading in accordance with the nature and complexity of the material.
9. Many books are hardly worth even skimming; some should be read quickly; and a few should be read at a rate, usually quite slow, that allows for complete comprehension. It is wasteful to read a book slowly that deserves only a fast reading; speed reading skills can help you solve that problem.
10. With regard to rates of reading, then, the ideal is not merely to be able to read faster, but to be able to read at different speeds—and to know when the different speeds are appropriate. Inspectional reading is accomplished quickly, but that is not only because you read faster, although in fact you do; it is also because you read less of a book when you give it an inspectional reading, and because you read it in a different way, with different goals in mind. Analytical reading is ordinarily much slower than inspectional reading, but even when you are giving a book an analytical reading, you should not read all of it at the same rate of speed. Every book, no matter how difficult, contains interstitial material that can be and should be read quickly; and every good book also contains matter that is difficult and should be read very slowly.

Finding the Arguments

Rule 18. Know the author's arguments, by finding them in, or constructing them out of, sequences of sentences.

The author may be honest in declaring himself on matters of fact or knowledge. We usually proceed in that trust. But unless we are exclusively interested in the author's personality, we should not be satisfied with knowing what his opinions are. His propositions are nothing but expressions of personal opinion unless they are supported by reasons. If it is the book and the subject with which it deals that we are interested in, and not just the author, we want to know not merely what his propositions are, but also why he thinks we should be persuaded to accept them.

The seventeenth rule, therefore, deals with arguments of all sorts. There are many kinds of reasoning, many ways of supporting what one says. Sometimes it is possible to argue that something is true; sometimes no more than a probability can be defended. But every sort of argument consists of a number of statements related in a certain way. This is said because of that. The word "because" here signifies a reason being given.

The presence of arguments is indicated by other words that relate statements, such as: if this is so, then that; or, since this, therefore that; or, it follows from this, that that is the case. In the course of earlier chapters in this book, such sequences occurred. For those of us who are no longer in school, we observed, it is necessary, if we want to go on learning and discovering, to know how to make books teach us well. In that situation, if we want to go on learning, then we must know how to learn from books, which are absent teachers.

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An argument is always a set or series of statements of which some provide the grounds or reasons for what is to be concluded. A paragraph, therefore, or at least a collection of sentences, is required to express an argument. The premises or principles of an argument may not always be stated first, but they are the source of the conclusion, nevertheless. If the argument is valid, the conclusion follows from the premises. That does not necessarily mean that the conclusion is true, since one or all of the premises that support it may be false.

Not every sentence in a book expresses a proposition. For one thing, some sentences express questions. They state problems rather than answers. Propositions are the answers to questions. They are declarations of knowledge or opinion. That is why we call sentences that express them declarative, and distinguish sentences that ask questions as interrogative. Other sentences express wishes or intentions. They may give us some knowledge of the author's purpose, but they do not convey the knowledge he is trying to expound.

Moreover, not all the declarative sentences can be read as if each expressed one proposition. There are at least two reasons for this. The first is the fact that words are ambiguous and can be used in various sentences. Thus, it is possible for the same sentence to express different propositions if there is a shift in the terms the words express. "Reading is learning" is a simple sentence; but if at one place we mean by "learning" the acquisition of information, and at another we mean the development of understanding, the proposition is not the same, because the terms are different. Yet the sentence is the same. The second reason is that all sentences are not as simple as "Reading is learning." When its words are used unambiguously, a simple sentence usually expresses a single proposition. But even when its words are used unambiguously, a compound sentence expresses two or more propositions. A compound sentence is really a collection of sentences, connected by such words as "and," or "if . . . then," or "not only . . . but also." You may rightly conclude that the line between a long compound sentence and a short paragraph may be difficult to draw. A compound sentence can express a number of propositions related in the form of an argument.

We have spent enough time on propositions. Let us now turn to the seventh rule of analytical reading, which requires the reader to deal with collections of sentences. We said before that there was a reason for not formulating this rule of interpretation by saying that the reader should find the most important paragraphs. The reason is that there are no settled conventions among writers about how to construct paragraphs. Some great writers, such as Montaigne, Locke, or Proust, write extremely long paragraphs; others, such as Machiavelli, Hobbes, or Tolstoy, write relatively short ones. In recent times, under the influence of newspaper and magazine style, most writers tend to cut their paragraphs to fit quick and easy reading. This paragraph, for instance, is probably too long. If we had wanted to coddle our readers, we should have started a new one with the words, "Some great writers."

It is not merely a matter of length. The point that is troublesome here has to do with the relation between language and thought. The logical unit to which the seventh rule directs our reading is the argument—a sequence of propositions, some of which give reasons for another. This logical unit is not uniquely related to any recognizable unit of writing, as terms are related to words and phrases, and propositions to sentences. An

argument may be expressed in a single complicated sentence. Or it may be expressed in a number of sentences that are only part of one paragraph. Sometimes an argument may coincide with a paragraph, but it may also happen that an argument runs through several or many paragraphs.

There is one further difficulty. *There are many paragraphs in any book that do not express an argument at all*—perhaps not even part of one. They may consist of collections of sentences that detail evidence or report how the evidence has been gathered. As there are sentences that are of secondary importance, because they are merely digressions or side remarks, so also can there be paragraphs of this sort. It hardly needs to be said that they should be read rather quickly.

Because of all this, we suggest another formulation of RULE 19, as follows: FIND IF YOU CAN THE PARAGRAPHS IN A BOOK THAT STATE ITS IMPORTANT ARGUMENTS; BUT IF THE ARGUMENTS ARE NOT THUS EXPRESSED, YOUR TASK IS TO CONSTRUCT THEM, BY TAKING A SENTENCE FROM THIS PARAGRAPH, AND ONE FROM THAT, UNTIL YOU HAVE GATHERED TOGETHER THE SEQUENCE OF SENTENCES THAT STATE THE PROPOSITIONS THAT COMPOSE THE ARGUMENT.

After you have discovered the leading sentences, the construction of paragraphs should be relatively easy. There are various ways of doing this. You can do it by actually writing out on a piece of paper the propositions that together form an argument. But usually a better way, as we have already suggested, is to put numbers in the margin, together with other marks, to indicate the places where the sentences occur that should be tied together in a sequence.

Authors are more or less helpful to their readers in this matter of making the arguments plain. Good expository authors try to reveal, not conceal, their thought. Yet not even all good authors do this in the same way. Some, such as Euclid, Galileo, Newton (authors who write in a geometrical or mathematical style), come close to the ideal of making a single paragraph an argumentative unit. The style of most writing in non-mathematical fields tends to present two or more arguments in a single paragraph or to have an argument run through several.

In proportion as a book is more loosely constructed, the paragraphs tend to become more diffuse. You often have to search through all the paragraphs of a chapter to find the sentences you can construct into a statement of a single argument. Some books make you search in vain, and some do not even encourage the search.

A good book usually summarizes itself as its arguments develop. If the author summarizes his arguments for you at the end of a chapter, or at the end of an elaborate section, you should be able to look back over the preceding pages and find the materials he has brought together in the summary. In *The Origin of Species*, Darwin summarizes his whole argument for the reader in a last chapter, entitled “Recapitulation and Conclusion.” The reader who has worked through the book deserves that help. The one who has not cannot use it.

Incidentally, if you have inspected the book well before beginning to read it analytically, you will know whether the summary passages exist and if they do, where they are. You can then make the best possible use of them when interpreting the book.

Another sign of a bad or loosely constructed book is the omission of steps in an argument. Sometimes they can be omitted without damage or inconvenience, because the propositions left out can be generally supplied from the common knowledge of readers. But sometimes their omission is misleading, and may even be intended to mislead. One of the most familiar tricks of the orator or propagandist is to leave certain things unsaid, things that are highly relevant to the argument, but that might be challenged if they were made explicit. While we do not expect such devices in an honest author whose aim is to instruct us, it is nevertheless a sound maxim of careful reading to make every step in an argument explicit.

Whatever kind of book it is, your obligation as a reader remains the same. If the book contains arguments, you must know what they are, and be able to put them into a nutshell. Any good argument can be put into a nutshell. There are, of course, arguments built upon arguments. In the course of an elaborate analysis, one thing may be proved in order to prove another, and this may be used in turn to make a still further point. The units of reasoning, however, are single arguments. If you can find these in any book you are reading, you are not likely to miss the larger sequences.

This is all very well to say, you may object, but unless one knows the structure of arguments as a logician does, how can one be expected to find them in a book, or worse, to construct them when the author does not state them compactly in a single paragraph?

The answer is that it must be obvious that you do not have to know about arguments “as a logician does.” There are relatively few logicians in the world, for better or for worse. Most of the books that convey knowledge and can instruct us contain arguments. They are intended for the general reader, not for specialists in logic.

No great logical competence is needed to read these books. To repeat what we said before, the nature of the human mind is such that if it works at all during the process of reading, if it comes to terms with the author and reaches his propositions, it will see his arguments as well.

There are, however, a few things we can say that may be helpful to you in carrying out this rule of reading. *In the first place*, remember that every argument must involve a number of statements. Of these, some give the reasons why you should accept a conclusion the author is proposing. If you find the conclusion first, then look for the reasons. If you find the reasons first, see where they lead.

***In the second place*, discriminate between the kind of argument that points to one or more particular facts as evidence for some generalisation and the kind that offers a series of general statements to prove some further generalisations. The former kind of reasoning is usually referred to as inductive, the latter as deductive;**

but the names are not what is important. What is important is the ability to discriminate between the two.

In the literature of science, this distinction is observed whenever the difference is emphasized between the proof of a proposition by reasoning and its establishment by experiment. Galileo, in his *Two New Sciences*, speaks of illustrating by experiment conclusions that have already been reached by mathematical demonstration. And in a concluding chapter of his book *On the Motion of the Heart*, the great physiologist William Harvey writes: "It has been shown by reason and experiment that blood by the beat of the ventricles flows through the lungs and heart and is pumped to the whole body." Sometimes it is possible to support a proposition both by reasoning from other general truths and by offering experimental evidence. Sometimes only one method of argument is available.

In the third place, observe what things the author says he must assume, what he says can be proved or otherwise evidenced, and what need not be proved because it is self-evident. He may honestly try to tell you what all his assumptions are, or he may just as honestly leave you to find them out for yourself. Obviously, not everything can be proved, just as not everything can be defined. If every proposition had to be proved, there would be no beginning to any proof. Such things as axioms and assumptions or postulates are needed for the proof of other propositions. If these other propositions are proved, they can, of course, be used as premises in further proofs.

Every line of argument, in other words, must start somewhere. Basically, there are two ways or places in which it can start: with *assumptions* agreed on between writer and reader, or with what are called *self-evident propositions*, which neither the writer nor reader can deny. In the first case, the assumptions can be anything, so long as agreement exists. The second case requires some further comment here.

In recent times, it has become commonplace to refer to self-evident propositions as "tautologies"; the feeling behind the term is sometimes one of contempt for the trivial, or a suspicion of legerdemain. Rabbits are being pulled out of a hat. You put the truth in by defining your words, and then pull it out as if you were surprised to find it there. That, however, is not always the case.

For example, there is a considerable difference between a proposition such as "a father of a father is a grandfather," and a proposition such as "the whole is greater than its parts." The former statement *is* a tautology; the proposition is contained in the definition of the words; it only thinly conceals the verbal stipulation, "Let us call the parent of a parent a 'grandparent.' " But that is far from being the case with the second proposition. Let us try to see why.

The statement, "The whole is greater than its parts," expresses our understanding of things as they are and of their relationships, which would be the same no matter what words we used or how we set up our linguistic conventions. Finite quantitative wholes exist and they have definite finite parts; for example, this page can be cut in half or in quarters.

Now, as we understand a finite whole (that is, any finite whole) and as we understand a definite part of a finite whole, we understand the whole to be greater than the part, or the part to be less than the whole. So far is this from being a mere verbal matter that we cannot define the meaning of the words “whole” and “part”; these words express primitive or indefinable notions. As we are unable to define them *separately*, all we can do is express our understanding of whole and part by a statement of how wholes and parts are *related*.

The statement is axiomatic or self-evident in the sense that its opposite is immediately seen to be false. We can use the word “part” for this page, and the word “whole” for a half of this page after cutting it in two, but we cannot think that the page before it is cut is less than the half of it that we have in our hand after we have cut it. However we use language, our understanding of finite wholes and their definite parts is such that we are compelled to say that we know that the whole is greater than the part, and what we know is the relation between existent wholes and their parts, not something about the use of words or their meanings.

Such self-evident propositions, then, have the status of indemonstrable but also undeniable truths. They are based on common experience alone and are part of common-sense knowledge, for they belong to no organized body of knowledge; they do not belong to philosophy or mathematics any more than they belong to science or history. That is why, incidentally, Euclid called them “common notions.” They are also instructive, despite the fact that Locke, for example, did not think they were. He could see no difference between a proposition that really does not instruct, such as the one about the grandparent, and one that does—one that teaches us something we would not otherwise know—such as the one about parts and wholes. And those moderns who refer to all such propositions as tautologies make the same mistake. They do not see that some of the propositions they call “tautologies” really add to our knowledge, while others, of course, do not.

Rules 20 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

1. **Introduction to Logic by Patrick Hurley.**
2. **Handbook of Logic and language by J van Benthem.**
3. **Introduction to logic and critical thinking by Merrilee h Salmon.**
4. **Logically Fallacious By Bo BENNET.**
5. **Modal Logic by Patrick Blackburn.**
6. **Modal Logic by Brian Chellas.**
7. **Symbolic Logic By Tony Roy.**
8. **A System of Logic by John Stuart Mill.**
9. **Argumentation and Debate by austin Freely.**
10. **Critical Thinking, reading and Writing by Sylvan Barnett.**
11. **Critical Thinking- The Art of Argument.**
12. **Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.**
13. **Logic Complete Introduction.**
14. **Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
15. **Complete Works By Aristotle.**

Rules 21-Premises, Conclusions, Assumptions, Arguments, Logic

A. Did the author used non arguments:

- Question.
- Command.
- Reports.
- Piece of advice.
- Warnings.
- Statements of belief.
- Statements of opinion.
- Explanation.
- Instructions.
- Expository passages.
- Loosely associated statement.

B. Make a list of arguments used by author, presenter, talker provided.

C. How many arguments have/has the author, presenter, talker provided?

D. What are the assumption of the author on the topic?

E. What are the premises of the author on the topic?

- Is the argument truth or false?

F. What are the premise indicators:

- Since- as indicated by.
- Because- the reason is that.
- For- for the reason that.
- As- may be inferred from.
- Follows from- may be derived from.
- As shown by- may be deduced from.
- Inasmuch as- in view of the facts that.
- On the assumption that.
- If.
- If we assume that.
- If we suppose that\in the view of the fact that.
- As shown by.
- As indicated by.
- The reason is that.
- For the reason that.
- For this reason.

G. What is the conclusion of the author on the topic?

H. What are the conclusion indicator?

- Therefore- for these reasons.
- Hence- it follows that.
- So- I conclude that.
- Accordingly- which shows that.
- In consequence- which means that.
- Consequently- which entails that.
- Proves that- which implies that.
- As a result- which allows us to infer that.
- For this reason- which points to the conclusion that.
- Thus- we may infer.
- It follows.
- Which shows.
- So.
- Then (after if).
- Indicates that.
- Implies that.
- Entails that.
- So you can see that.
- We can conclude that.
- We can infer that.
- We may deduce that.
- Points to the conclusion that.
- Which means that.
- Which shows that.
- Leads one to believe that.
- Bears out the point that.
- Proves that.
- Thus.
- As a result.
- Accordingly.
- For this reason (followed by a comma).

- I. What are the arguments of the author on the topic?
- Is the argument valid or invalid.
- J. How did the author came up with this conclusion?
- K. Use each chapter of the book while finding the arguments.
- Basic Concepts.
 - Language and definition.
 - Informal Fallacies.
 - Categorical Propositions.
 - Categorical Syllogism.
 - Propositional Logic.
 - Natural Deduction in Propositional Logic.
 - Predicate Logic.
 - Analogy and Legal and Moral Reasoning.
 - Causality and Mill's Reasoning.
 - Probability.
 - Statistical Reasoning.
 - Hypothetical Scientific Reasoning.
 - Science and Superstition.
- L. Did the author used:
- Philosophical Logic.
 - Mathematical Logic.
 - Computational Logic.
 - Formal Logic.
 - Informal Logic.
 - Inductive.
 - Deductive.
 - Propositional logic.
 - Predicate logic.
 - Modal logic.
 - Non classical logic.
 - Symbolic Logic.
- M. Did the Author diagrammed his own argument?
- N. Did the author diagrammed opposite arguments?

- O. Square of the Opposition.
- P. Contradictions.
- Q. Categorical propositions.
- R. Categorical Syllogism.
- S. Hypothetical Syllogism.
- T. Proof of Invalidity.
- U. Analogical Reasoning.
- V. Causal Reasoning.
- W. Cause and Effect.
- X. Use the following:.

- What?
- Who?
- Why?
- When?
- Where?
- How?
- How not?
- Do?
- Do not?
- Did?
- Did not?
- Can?
- Can not?
- May?
- May not?
- Might?
- Might not?
- Does?
- Does not?

Determining an Author's Logical Fallacies

Rules 22-Find the Fallacies if there is any

- A. List of the Logical fallacies used by the author, presenter, speaker, writer?
- B. What classification of fallacies did the author, speaker, presenter, writer used?
- C. What Logical fallacies did the author used?
- D. What are the evidence of the logical fallacies? Show in the book, presentation, articles etc.
- E. Review every single fallacy and review if they committed one of the fallacy.
- F. Be honest if they did and advise, where did they make the fallacy and show evidence where the proof of the fallacy.
- G. What are the reason of the logical fallacies? Show in the book, presentation, articles etc.
- H. Did the author used logical fallacy in any of the presentation, writing, speech, talk, discussion, debate etc.
- I. Give example of similar logical fallacies.
- J. Did the author used logical fallacy in any of the presentation, writing, speech, talk, discussion, debate etc.

Rules 23 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

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- 7. Symbolic Logic By Tony Roy.
- 8. A System of Logic by John Stuart Mill.
- 9. Argumentation and Debate by austin Freely.
- 10. Critical Thinking, reading and Writing by Sylvan Barnett.
- 11. Critical Thinking- The Art of Argument.
- 12. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.
- 13. Logic Complete Introduction.
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.
- 15. Complete Works By Aristotle.

Determining Context, Author's Facts and Evidence Supporting Argument

Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context?

Facts within The Context.

Rules 24 What are the Facts supporting Author's arguments

- A. Listen or reading Facts Within Context.
- B. What facts the author provided? Make a list.
- C. What author provided? Make a list.

Rules 25 What are the Figures supporting Author's arguments

- A. Listen or reading figures.
- B. What figures does the author provided? Make a list.
- C. What statistics does the author provided? Make a list.
- D. What formulas does the author provided? Make a list.
- E. What mathematical results the author provided? Make a list.
- F. What author provided? Make a list.

Rules 26 What are the evidence supporting Author's arguments

- A. Listen or reading Facts, figures and ideas.
- B. What evidence does the author provided? Make a list.
- C. What author provided? Make a list.

Rules 27 Do the Fact Checking

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:
- Wikipedia
 - E-book
 - Books about autobiography and Biography
 - Websites
 - University
 - Books
 - Audiobooks
 - Handbooks
 - Dictionary
 - Cross References
 - Atlas
 - Commentaries
 - Articles
 - Journals
 - Newspapers
 - Websites
 - Harvard business review
 - Google professor manual

- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance

- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC

- Refseek
 - Google scholar
 - Microsoft academic search
 - Trade journals
 - Encyclopedia
 - Wiki
 - Handbooks
 - Diaries
 - Bubl Link
 - Look at all academic search engine and journals and books published by academics.
- C. Do full fact checking of the facts the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- D. Do full fact checking of the figures the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- E. Do full fact checking of the statistics the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- F. Do full fact checking of the formulas the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- G. Do full fact checking of the mathematical results the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

Author Bias and Unbiased

Rules 28 Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?

- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?
- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing view? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing view to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

Determining an Author's Sources

Rules 29 Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?
- D. Checking Each Fact's Sources, If they Are Reliable or Unreliable.

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.
 34. Eyewitness.

- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original format and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks, Commentaries
 - Magazines and newspaper articles
 - Website
 8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories
 8. Is the Source Reliable or Unreliable?

Analysis of Opposing Side Arguments

Rules 30 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

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7. **Symbolic Logic By Tony Roy.**
8. **A System of Logic by John Stuart Mill.**
9. **Argumentation and Debate by austin Freely.**
10. **Critical Thinking, reading and Writing by Sylvan Barnett.**
11. **Critical Thinking- The Art of Argument.**
12. **Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.**
13. **Logic Complete Introduction.**

14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.

15. Complete Works By Aristotle.

Rules 31-Premises, Conclusions, Assumptions, Arguments, Logic

A. Did the author used non arguments:

- Question.
- Command.
- Reports.
- Piece of advise.
- Warnings.
- Statements of belief.
- Statements of opinion.
- Explanation.
- Instructions.
- Expository passages.
- Loosely associated statement.

B. Make a list of arguments used by author, presenter, talker provided.

C. How many arguments have/has the author, presenter, talker provided?

D. What are the assumption of the author on the topic?

E. What are the premises of the author on the topic?

- Is the argument truth or false?

F. What are the premise indicators:

- Since- as indicated by.
- Because- the reason is that.
- For- for the reason that.
- As- may be inferred from.
- Follows from- may be derived from.
- As shown by- may be deduced from.
- Inasmuch as- in view of the facts that.
- On the assumption that.
- If.
- If we assume that.
- If we suppose that\in the view of the fact that.
- As shown by.

- As indicated by.
- The reason is that.
- For the reason that.
- For this reason.

G. What is the conclusion of the author on the topic?

H. What are the conclusion indicator?

- Therefore- for these reasons.
- Hence- it follows that.
- So- I conclude that.
- Accordingly- which shows that.
- In consequence- which means that.
- Consequently- which entails that.
- Proves that- which implies that.
- As a result- which allows us to infer that.
- For this reason- which points to the conclusion that.
- Thus- we may infer.
- It follows.
- Which shows.
- So.
- Then (after if).
- Indicates that.
- Implies that.
- Entails that.
- So you can see that.
- We can conclude that.
- We can infer that.
- We may deduce that.
- Points to the conclusion that.
- Which means that.
- Which shows that.
- Leads one to believe that.
- Bears out the point that.
- Proves that.
- Thus.

- As a result.
- Accordingly.
- For this reason (followed by a comma).

I. What are the arguments of the author on the topic?

- Is the argument valid or invalid.

J. How did the author came up with this conclusion?

K. Use each chapter of the book while finding the arguments

- Basic Concepts.
- Language and definition.
- Informal Fallacies.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

L. Did the author used:

- Philosophical Logic
- Mathematical Logic
- Computational Logic
- Formal Logic
- Informal Logic
- Inductive
- Deductive
- Propositional logic
- Predicate logic
- Modal logic
- Non classical logic

- Symbolic Logic

- M. Did the Author diagrammed his own argument?
- N. Did the author diagrammed opposite arguments?
- O. Square of the Opposition.
- P. Contradictions.
- Q. Categorical propositions.
- R. Categorical Syllogism.
- S. Hypothetical Syllogism.
- T. Proof of Invalidity.
- U. Analogical Reasoning.
- V. Causal Reasoning.
- W. Cause and Effect.
- X. Use the following:
 - What?
 - Who?
 - Why?
 - When?
 - Where?
 - How?
 - How not?
 - Do?
 - Do not?
 - Did?
 - Did not?
 - Can?
 - Can not?
 - May?
 - May not?
 - Might?
 - Might not?
 - Does?
 - Does not ?

- Y. Did author carefully reviewed the arguments and objections?
- Z. Did author very careful tried how to answer these objections? Did author correctly understood these objections?
- AA. Did author take the best arguments from opposing side on the topic, book, argument, facts from opposite side.
- BB. Does the author, presenter, speaker, writer calling opposing person by name to discredit him/her/ them?

Rules 32 Review and analyze text in logical way. There are number of things I will look when analyse and review text in Logical way:

- A. Basic Concepts.
- B. Language and definition.
- C. Informal Fallacies.
- D. Categorical Propositions.
- E. Categorical Syllogism.
- F. Propositional Logic.
- G. Natural Deduction in Propositional Logic.
- H. Predicate Logic.
- I. Analogy and Legal and Moral Reasoning.
- J. Causality and Mill's Reasoning.
- K. Probability.
- L. Statistical Reasoning.
- M. Hypothetical Scientific Reasoning.
- N. Science and Superstition.

Logic

- 1. Introduction to Logic by Patrick Hurley.**
- 2. Handbook of Logic and language by J van Benthem.**
- 3. Introduction to logic and critical thinking by Merrilee h Salmon.**
- 4. Logically Fallacious By Bo BENNET.**
- 5. Modal Logic by Patrick Blackburn.**
- 6. Modal Logic by Brian Chellas.**
- 7. Symbolic Logic By Tony Roy.**
- 8. A System of Logic by John Stuart Mill.**
- 9. Argumentation and Debate by austin Freely.**
- 10. Critical Thinking, reading and Writing by Sylvan Barnett.**
- 11. Critical Thinking- The Art of Argument.**
- 12. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies.**
- 13. Logic Complete Introduction.**
- 14. Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.**
- 15. Complete Works By Aristotle.**

Analysis of Opposing Side Logical Fallacies

Rules 33-Find the Fallacies if there is any

- A. List of the Logical fallacies used by the author, presenter, speaker, writer?
- B. What classification of fallacies did the author, speaker, presenter, writer used?
- C. What Logical fallacies did the author used?
- D. What are the evidence of the logical fallacies? Show in the book, presentation, articles etc.
- E. Review every single fallacy and review if they committed one of the fallacy.
- F. Be honest if they did and advise, where did they make the fallacy and show evidence where the proof of the fallacy.
- G. What are the reason of the logical fallacies? Show in the book, presentation, articles etc.
- H. Did the author used logical fallacy in any of the presentation, writing, speech, talk, discussion, debate etc..
- I. Give example of similar logical fallacies.
- J. Did the author used logical fallacy in any of the presentation, writing, speech, talk, discussion, debate etc.

Analysis of Opposing Side Facts and Evidence Supporting Argument

Rules 34 What are the Facts supporting Author's arguments

- A. Listen or reading Facts.
- B. What facts the author provided? Make a list.
- C. What author provided? Make a list.

Rules 35 What are the Figures supporting Author's arguments

- A. Listen or reading figures.
- B. What figures does the author provided? Make a list.
- C. What statistics does the author provided? Make a list.
- D. What formulas does the author provided? Make a list.
- E. What mathematical results the author provided? Make a list.
- F. What author provided? Make a list.

Rules 36 What are the evidence supporting Author's arguments

- A. Listen or reading Facts, figures and ideas.
- B. What evidence does the author provided? Make a list.
- C. What author provided? Make a list.

Rules 37 Do the Fact Checking

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
 - Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:
 - Wikipedia
 - E-book
 - Books about autobiography and Biography
 - Websites
 - University
 - Books
 - Audiobooks
 - Handbooks
 - Dictionary
 - Cross References
 - Atlas
 - Commentaries
 - Articles

- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy

- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels

- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

C. Do full fact checking of the facts the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

D. Do full fact checking of the figures the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

E. Do full fact checking of the statistics the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

F. Do full fact checking of the formulas the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

- G. Do full fact checking of the mathematical results the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
- Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

Analysis of Opposing Side Bias and Unbiased

Rules 38 Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?

- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?
- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing view? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing view to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

Analysis of Opposing Side Sources They Used

Rules 39 Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Checking Each Fact's Sources, If they Are Reliable or Unreliable.

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research
 2. Diaries and journals
 3. Letters and memos
 4. Autobiographies and memoirs
 5. Books or articles written at the time of event?
 6. Government documents
 7. Census statistics
 8. Organisational records
 9. Documentaries
 10. photographs, art (from the time period)
 11. Maps (from the period)
 12. Patents
 13. Theses
 14. Dissertations
 15. Photographs
 16. Journal articles
 17. Newspaper articles
 18. Survey research research
 19. Meetings
 20. Symposia
 21. Original documents
 22. Records of organisation
 23. Internet
 24. Email
 25. Communication in listservs
 26. Interviews
 27. Video recordings
 28. Audio recordings
 29. Websites
 30. Communication through social media
 31. Artefacts
 32. Reports
 33. Works of art and architecture
 34. Eyewitness

- 35. Statistics
- 36. Oral history
- 37. Description of travel
- 38. Cartoon
- 39. Postcards
- 40. Posters
- 41. Internet communications
- 42. Any above reprinted in the original format and language

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories

Analysis of Analysis of the Author, Writer, Presenter of opposing Arguments.

Rules 40 Analyse of the analysis of the author, writer, presenter.

- A. Has the author carefully reviewed the opposing arguments in comparison to their own?
- B. Did author take the best arguments from opposing side on the topic, book, argument, facts from opposite side.
- C. Did author PROVIDE THE BEST arguments against the opposing side and provide: best analysis, did not make any fallacies, honest and in the context analysis, provide correct facts, statistics.
- D. Find out what ideologies behind these arguments?
- E. Did the author correctly understood these objections?
- F. Has the author carefully thought out the answer to the objections?
- G. Did the author presenter, speaker, critic used tricks to get an attention from the audience? What was this/these tricks?
- H. Did the author used logical fallacies in any of the analysis of the opposing side in their presentation. Writing, speech, talk, debate.
- I. What logical fallacies did the author used in analysis.
- J. Did the author tried the best to criticise fairly the arguments, conclusion, topic, books, or articles?
- K. Did the Author used incorrect facts, statistics, information in presentation, writing, speech, talk, discussion, debate etc
- L. Where did the author used incorrect information, statistics, facts or made logical fallacy in presentation, writing, speech, talk, discussion, debate etc.
- M. What other sources did the author used in order to answer the objections to opposing side arguments.
- N. Did the author tired to provoke some sort of emotions, feelings?
- O. Does the author, presenter, speaker, writer calling opposing person by name to discredit him, her, them?
- P. Why do they want to discredit?
- Q. Did the author used all AVAILABLE SOURCES, INFORMATION, FACTS AND ARGUMENTS TO HIM/HER.
- R. Does the author trying to rewrite facts, information, history of the subject to fit his/ her arguments and situation?

- S. Did the author do honest analysis of all available sources, information, arguments, evidence and facts?
- T. Did the author Use socratic method and questions and tactics in their approach?
- U. Did author represent other side honestly.
- V. Did author represent other side argument in full and without any omit information?

Finding the Solutions

These three rules of analytical reading—about terms, propositions, and arguments —can be brought to a head in an eighth rule, which governs the last step in the interpretation of a book's content. More than that, it ties together the first stage of analytical reading (outlining the structure) and the second stage (interpreting the contents).

Rule 41. Determine which of his problems the author has solved, and which he has not; and as to the latter, decide which the author knew he had failed to solve. The last step in your attempt to discover what a book is about was the discovery of the major problems that the author tried to solve in the course of his book. (As you will recall, this was covered by Rule 4.) Now, after you have come to terms with him and grasped his propositions and arguments, you should check what you have found by addressing yourself to some further questions. Which of the problems that the author tried to solve did he succeed in solving? In the course of solving these, did he raise any new ones? Of the problems that he failed to solve, old or new, which did the author himself know he had failed on? A good writer, like a good reader, should know whether a problem has been solved or not, although of course it is likely to cost the reader less pain to acknowledge the situation.

This final step in interpretive reading is covered by RULE 42. FIND OUT WHAT THE AUTHOR'S SOLUTIONS ARE. When you have applied this rule, and the three that precede it in interpretive reading, you can feel reasonably sure that you have managed to understand the book. If you started with a book that was over your head—one, therefore, that was able to teach you something—you have come a long way. More than that, you are now able to complete your analytical reading of the book. The third and last stage of the job will be relatively easy. You have been keeping your eyes and your mind open and your mouth shut. Up to this point, you have been following the author. From this point on, you are going to have a chance to argue with the author and express yourself.

The Second Stage of Analytical Reading

We have now described the second stage of analytical reading. Another way to say this is that we have now set forth the materials for answering the second basic question that you must ask about a book, or indeed anything that you read. You will recall that that second question is *What is being said in detail, and how?* Applying Rules 5 through 8 clearly helps you to answer this question. When you have come to terms with the author, found his key propositions and arguments, and identified his solutions of the problems that he faced, you will know what he is saying in his book, and you are thus prepared to go on to ask the final two basic questions about it.

Since we have now completed another stage in the analytical reading process, let us, as before, pause a moment to write out the rules of this stage for review.

THE SECOND STAGE OF ANALYTICAL READING, OR RULES FOR FINDING WHAT A BOOK SAYS (INTERPRETING ITS CONTENTS)

- 5. Come to terms with the author by interpreting his key words.**
- 6. Grasp the author's leading propositions by dealing with his most important sentences.**
- 7. Know the author's arguments, by finding them in, or constructing them out of, sequences of sentences.**
- 8. Determine which of his problems the author has solved, and which he has not; and as to the latter, decide which the author knew he had failed to solve.**

Criticising a Book Fairly

We said at the end of the last chapter that we had come a long way. We have learned how to outline a book. We have learned the four rules for interpreting a book's contents. We are now ready for the last stage of analytical reading. Here you will reap the reward of all your previous efforts.

Reading a book is a kind of conversation. You may think it is not conversation at all, because the author does all the talking and you have nothing to say. If you think that, you do not realise your full obligation as a reader—and you are not grasping your opportunities.

As a matter of fact, the reader is the one who has the last word. The author has had his say, and then it is the reader's turn. The conversation between a book and its reader would appear to be an orderly one, each party talking in turn, no interruptions, and so forth. If, however, the reader is undisciplined and impolite, it may be anything but orderly. The poor author cannot defend himself. He cannot say, "Here, wait till I've finished, before you start disagreeing." He cannot protest that the reader has misunderstood him, has missed his point.

Ordinary conversations between persons who confront each other are good only when they are carried on civilly. We are not thinking merely of the civilities according to conventions of social politeness. Such conventions are not really important. What is important is that there is an *intellectual* etiquette to be observed. Without it, conversation is bickering rather than profitable communication. We are assuming here, of course, that the conversation is about a serious matter on which men can agree or disagree. Then it becomes important that they conduct themselves well. Otherwise, there is no profit in the enterprise. The profit in good conversation is something learned.

What is true of ordinary conversation is even more true of the rather special situation in which a book has talked to a reader and the reader talks back. That the author is well disciplined, we will take for granted temporarily. That he has conducted his part of the conversation well can be assumed in the case of good books. What *can* the reader do to reciprocate? What *must* he do to hold up his end well?

The reader has an obligation as well as an opportunity to talk back. The opportunity is clear. Nothing can stop a reader from pronouncing judgment. The roots of the obligation, however, lie a little deeper in the nature of the relation between books and readers.

If the book is of the sort that conveys knowledge, the author's aim was to instruct. He has tried to teach. He has tried to convince or persuade his reader about something. His effort is crowned with success only if the reader finally says, "I am taught. You have convinced me that such and such is true, or persuaded me that it is probable." But even if the reader is not convinced or persuaded, the

author's intention and effort should be respected. The reader owes him a considered judgment. If he cannot say, "I agree," he should at least have grounds for disagreeing or even for suspending judgment on the question.

We are really saying no more than what we have already said many times. A good book deserves an active reading. The activity of reading does not stop with the work of understanding what a book says. *It must be completed by the work of criticism, the work of judging.* The undemanding reader fails to satisfy this requirement, probably even more than he fails to analyze and interpret. He not only makes no effort to understand; he also dismisses a book simply by putting it aside and forgetting it. Worse than faintly praising it, he damns it by giving it no critical consideration whatever.

Teachability as a Virtue

What we mean by talking back is not something apart from reading. It is the third stage in the analytical reading of a book; and there are rules here as in the case of the first two stages. Some of these rules are general maxims of intellectual etiquette. We will deal with them in this chapter. Others are more specific criteria for defining points of criticism. They will be discussed in the next chapter.

There is a tendency to think that a good book is above the criticism of the average reader. The reader and the author are not peers. The author, according to this view, should be subjected to a trial only by a jury of his peers. Remember Bacon's recommendation to the reader: "Read not to contradict and confute; nor to believe and take for granted; nor to find talk and discourse; but to weigh and consider." Sir Walter Scott casts even more dire aspersions on those "who read to doubt or read to scorn."

There is a certain truth here, of course, but there is also a good deal of nonsense about the aura of impeccability with which books are thus surrounded, and the false piety it produces. Readers may be like children, in the sense that great authors can teach them, but that does not mean they must not be heard from. Cervantes may or not have been right in saying, "There is no book so bad but something good may be found in it." It is more certain that there is no book so good that no fault can be found with it.

It is true that a book that can enlighten its readers, and is in this sense superior to them, should not be criticised by them until they understand it. When they do, they have elevated themselves almost to equality with the author. Now they are fit to exercise the rights and privileges of their new position. Unless they exercise their critical faculties now, they are doing the author an injustice. He has done what he could to make them his equal. He deserves that they act like his peers, that they engage in conversation with him, that they talk back.

We are discussing here the virtue of teachability—a virtue that is almost always misunderstood. Teachability is often confused with subservience. A person is wrongly thought to be teachable if he is passive and pliable. On the contrary, teachability is an extremely active virtue. No one is really teachable who does not freely exercise his power

of independent judgment. He can be trained, perhaps, but not taught. *The most teachable reader is, therefore, the most critical.* He is the reader who finally responds to a book by the greatest effort to make up his own mind on the matters the author has discussed.

We say “finally” because teachability requires that a teacher be fully heard and, more than that, understood before he is judged. We should add also that sheer amount of effort is not an adequate criterion of teachability. The reader must know *how* to judge a book, just as he must know how to arrive at an understanding of its contents. This third group of rules for reading, then, is a guide to the last stage in the disciplined exercise of teachability.

The Role of Rhetoric

We have everywhere found a certain reciprocity between the art of teaching and the art of being taught, between the skill of the author that makes him a considerate writer and the skill of the reader that makes him handle a book with consideration. We have seen how the same principles of grammar and logic underlie rules of good writing as well as rules of good reading. The rules we have so far discussed concern the achievement of intelligibility on the part of the writer and the achievement of understanding on the part of the reader. This last set of rules goes beyond understanding to critical judgment. Here is where rhetoric comes in.

There are, of course, many uses of rhetoric. We usually think of it in connection with the orator or the propagandist. But in its most general significance, rhetoric is involved in every situation in which communication takes place among human beings. If we are the talkers, we wish not only to be understood but also to be agreed with in some sense. If our purpose in trying to communicate is serious, we wish to convince or persuade—more precisely, to convince about theoretical matters and to persuade about matters that ultimately affect action or feeling.

To be equally serious in receiving such communication, one must be not only a *responsive* but also a *responsible* listener. You are responsive to the extent that you follow what has been said and note the intention that prompts it. But you also have the responsibility of taking a position. When you take it, it is yours, not the author's. To regard anyone except yourself as responsible for your judgment is to be a slave, not a free man. It is from this fact that the liberal arts acquire their name.

On the part of the speaker or writer, rhetorical skill is knowing how to convince or persuade. Since this is the ultimate end in view, all the other aspects of communication must serve it. Grammatical and logical skill in writing clearly and intelligibly has merit in itself, but it is also a means to an end. Reciprocally, on the part of the reader or listener, rhetorical skill is knowing how to react to anyone who tries to convince or persuade us. Here, too, grammatical and logical skill, which enables us to understand what is being said, prepares the way for a critical reaction.

RULE 43. Rhetorical Analysis Of The Text.

A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:

- Rhetoric By Aristotle.
- A Companion to Rhetoric and Rhetorical Criticism.
- Ancient Rhetoric From Aristotle to Philostratus.
- Ancient Rhetoric For Contemporary Students by Sharon Crowley.
- Art Of Rhetoric By Aristotle.
- Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
- Encyclopaedia of Rhetoric.
- On Rhetoric: Theory of Civic Discourse by Aristotle.
- Politics and Rhetoric: The Persuasive Power of Metaphor.
- Rhetoric By Jennifer Richards.
- Rhetoric In Details By John Benjamins.
- Rhetorical Grammar By Martha Kolln.
- Sourcebook on Rhetoric By James Jasinski.
- The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
- The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
- The Rhetoric of Reason By James Crosswhite.
- Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
- Writing Arguments: a RHETORIC With Reading by John Ramage.

B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

The Importance of Suspending Judgment

Thus you see how the three arts of grammar, logic, and rhetoric cooperate in regulating the elaborate processes of writing and reading. Skill in the first two stages of analytical reading comes from a mastery of grammar and logic. Skill in the third stage depends on the remaining art. The rules of this stage of reading rest on the principles of rhetoric, conceived in the broadest sense. We will consider them as a code of etiquette to make the reader not only polite, but also effective, in talking back. (Although it is not generally recognized, etiquette always serves these two purposes, not just the former.)

You probably also see what the ninth rule of reading is going to be. It has been intimated several times already. Do not begin to talk back until you have listened carefully and are sure you understand. Not until you are honestly satisfied that you have accomplished the first two stages of reading should you feel free to express yourself. When you have, you not only have earned the right to turn critic, you also have the duty to do so.

This means, in effect, that the third stage of analytical reading must always follow the other two in time. The first two stages interpenetrate each other. Even the beginning reader can combine them somewhat, and the expert combines them almost completely. He can discover the contents of a book by breaking down the whole into its parts and at the same time constructing the whole out of its elements of thought and knowledge, its terms, propositions, and arguments. Furthermore, even for the beginner, a certain amount of the work required at those two stages can be performed during a good inspectional reading. But the expert no less than the beginner must wait until he understands before he starts to criticize.

Let us restate this ninth rule of reading in the following form: RULE 44. YOU MUST BE ABLE TO SAY, WITH REASONABLE CERTAINTY, "I UNDERSTAND," BEFORE YOU CAN SAY ANY ONE OF THE FOLLOWING THINGS: "I AGREE," OR "I DISAGREE," OR "I SUSPEND JUDGMENT." These three remarks exhaust all the critical positions you can take. We hope you have not made the error of supposing that to criticise is always to disagree. That is a popular misconception. To agree is just as much an exercise of critical judgment on your part as to disagree. You can be just as wrong in agreeing as in disagreeing. To agree without understanding is inane. To disagree without understanding is impudent.

Though it may not be so obvious at first, suspending judgment is also an act of criticism. It is taking the position that something has not been shown. You are saying that you are not convinced or persuaded one way or the other.

The rule seems to be such obvious common sense that you may wonder why we have bothered to state it so explicitly. There are two reasons. In the first place, many people make the error already mentioned of identifying criticism with disagreement. (Even “constructive” criticism is disagreement.) In the second place, though this rule seems obviously sound, our experience has been that few people observe it in practice. Like the golden rule, it elicits more lip service than intelligent obedience.

Every author has had the experience of suffering book reviews by critics who did not feel obliged to do the work of the first two stages first. The critic too often thinks he does not have to be a reader as well as a judge. Every lecturer has also had the experience of having critical questions asked that were not based on any understanding of what he had said. You yourself may remember an occasion where someone said to a speaker, in one breath or at most two, “I don’t know what you mean, but I think you’re wrong.”

There is actually no point in answering critics of this sort. The only polite thing to do is to ask them to state your position for you, the position they claim to be challenging. If they cannot do it satisfactorily, if they cannot repeat what you have said *in their own words*, you know that they do not understand, and you are entirely justified in ignoring their criticisms. They are irrelevant, as all criticism must be that is not based on understanding. When you find the rare person who shows that he understands what you are saying as well as you do, then you can delight in his agreement or be seriously disturbed by his dissent.

In years of reading books with students of one kind and another, we have found this rule more honoured in the breach than in the observance. Students who plainly do not know what the author is saying seem to have no hesitation in setting themselves up as his judges. They not only disagree with something they do not understand but, what is equally bad, they also often agree to a position they cannot express intelligibly in their own words. Their discussion, like their reading, is all words. Where understanding is not present, affirmations and denials are equally meaningless and unintelligible. Nor is a position of doubt or detachment any more intelligent in a reader who does not know what he is suspending judgment about.

There are several further points to note concerning the observance of this rule. If you are reading a good book, you ought to hesitate before you say, “I understand.” The presumption certainly is that you have a lot of work to do before you can make that declaration honestly and with assurance. You must, of course, be a judge of yourself in this matter, and that makes the responsibility even more severe.

To say “I don’t understand” is, of course, also a critical judgment, but *only after you have tried your hardest does it reflect on the book rather than yourself*. If you have done everything that can be expected of you and still do not understand, it may be because the book is unintelligible. The presumption, however, is in favor of the book, especially if it is a good one. In reading good books, failure to understand

is usually the reader's fault. Hence he is obligated to stay with the task imposed by the first two stages of analytical reading a long time before entering on the third. When you say "I don't understand," watch your tone of voice. Be sure it concedes the possibility that it may not be the author's fault.

There are two other conditions under which the rule requires special care. If you are reading only part of a book, it is more difficult to be sure that you understand, and hence you should be more hesitant to criticise. And sometimes a book is related to other books by the same author, and depends upon them for its full significance. In this situation, also, you should be more circumspect about saying "I understand," and slower to raise your critical lance.

A good example of brashness in this last respect is furnished by literary critics who have agreed or disagreed with Aristotle's *Poetics* without realising that the main principles in Aristotle's analysis of poetry depend in part on points made in other of his works, his treatises on psychology and logic and metaphysics. They have agreed or disagreed without understanding what it is all about.

The same is true of other writers, such as Plato and Kant, Adam Smith and Karl Marx, who have not been able to say everything they knew or thought in a single work. Those who judge Kant's *Critique of Pure Reason* without reading his *Critique of Practical Reason*, or Adam Smith's *Wealth of Nations* without reading his *Theory of the Moral Sentiments*, or *The Communist Manifesto* without Marx's *Capital*, are more likely than not to be agreeing or disagreeing with something they do not fully understand.

The first thing a reader can say is that he understands or that he does not. In fact, he must say he understands, in order to say more. ***If he does not understand The Book, Article, Discussion, Debate or any other resource he should keep his peace and go back to work on the book, Article, Discussion, Debate or any other resource.***

The Importance of Avoiding Contentiousness

The second general maxim of critical reading is as obvious as the first, but it needs explicit statement, nevertheless, and for the same reason. It is **RULE 45**, and it can be expressed thus: **WHEN YOU DISAGREE, DO SO REASONABLY, AND NOT DISPUTATIIOUSLY OR CONTENTIOUSLY**. There is no point in winning an argument if you know or suspect you are wrong. Practically, of course, it may get you ahead in the world for a short time. But honesty is the better policy in the slightly longer run.

We learned this maxim first from Plato and Aristotle. In a passage in the *Symposium*, this interchange occurs:

I cannot refute you, Socrates, said Agathon: Let us assume that what you say is true.

Say rather, Agathon, that you cannot refute the truth; for Socrates is easily refuted.

The passage is echoed in a remark of Aristotle's in the *Ethics*. "It would be thought to be better," he says, indeed to be our duty, for the sake of maintaining the truth even to destroy what touches us closely, especially as we are philosophers or lovers of wisdom; for, while both are dear, piety requires us to honor truth above our friends.

Plato and Aristotle here give us advice that most people ignore. Most people think that winning the argument is what matters, not learning the truth.

He who regards conversation as a battle can win only by being an antagonist, only by disagreeing successfully, whether he is right or wrong. The reader who approaches a book in this spirit reads it only to find something he can disagree with. For the disputatious and the contentious, a bone can always be found to pick a quarrel over. It makes no difference whether the bone is really a chip on your own shoulder.

In a conversation that a reader has with a book in the privacy of his own study, there is nothing to prevent the reader from seeming to win the argument. He can dominate the situation. The author is not there to defend himself. If all he wants is the empty satisfaction of seeming to show the author up, the reader can get it readily. He scarcely has to read the book through to get it. Glancing at the first few pages will suffice.

But if he realizes that the only profit in conversation, with living or dead teachers, is what one can learn from them, if he realizes that you win only by gaining knowledge, not by knocking the other fellow down, he may see the futility of mere contentiousness. We are not saying that a reader should not ultimately disagree and try to show where the author is wrong. We are saying only that *he should be as prepared to agree as to disagree*. Whichever he does should be motivated by one consideration alone—the facts, the truth about the case. More than honesty is required here. It goes without saying that a reader should admit a point when he sees it. But he also should not feel *whipped* by having to agree with an author, instead of dissenting. If he feels that way, he is inveterately

disputatious. In the light of this second maxim, his problem is seen to be emotional rather than intellectual.

On the Resolution of Disagreements

The third maxim is closely related to the second. It states another condition prior to the undertaking of criticism. It recommends that you regard disagreements as capable of being resolved. Where the second maxim urged you not to disagree *disputatiously*, this one warns you against disagreeing *hopelessly*. One is hopeless about the fruitfulness of discussion if he does not recognize that all rational men can agree. Note that we said “can agree.” We did not say all rational men *do* agree. Even when they do not agree, they can. The point we are trying to make is that disagreement is futile agitation unless it is undertaken with the hope that it may lead to the resolution of an issue.

These two facts, that people do disagree and can agree, arise from the complexity of human nature. Men are rational animals. Their rationality is the source of their power to agree. Their animality, and the imperfections of their reason that it entails, is the cause of most of the disagreements that occur. Men are creatures of passion and prejudice. The language they must use to communicate is an imperfect medium, clouded by emotion and colored by interest, as well as inadequately transparent for thought. Yet to the extent that men are rational, these obstacles to their understanding can be overcome. The sort of disagreement that is only apparent, the sort that results from misunderstanding, is certainly curable.

There is, of course, another sort of disagreement, which is owing merely to inequalities of knowledge. The relatively ignorant often wrongly disagree with the relatively learned about matters exceeding their knowledge. The more learned, however, have a right to be critical of errors made by those who lack relevant knowledge. Disagreement of this sort can also be corrected. Inequality of knowledge is always curable by instruction.

There may still be other disagreements that are more deeply buried, and that may subsist in the body of reason itself. It is hard to be sure about these, and almost impossible for reason to describe them. In any event, what we have just said applies to the great majority of disagreements. They can be resolved by the removal of misunderstanding or of ignorance. Both cures are usually possible, though often difficult. Hence the person who, at any stage of a conversation, disagrees, should at least hope to reach agreement in the end. He should be as much prepared to have his own mind changed as seek to change the mind of another. He should always keep before him the possibility that he misunderstands or that he is ignorant on some point. No one who looks upon disagreement as an occasion for teaching another should forget that it is also an occasion for being taught.

The trouble is that many people regard disagreement as unrelated to either teaching or being taught. They think that everything is just a matter of opinion. I have mine, and you have yours; and our right to our opinions is as inviolable as our right to private property. On such a view, communication cannot be profitable if the profit to be gained is an increase in knowledge. Conversation is hardly better than a ping-pong game of opposed opinions, a game in which no one keeps score, no one wins, and everyone is satisfied because he does not lose—that is, he ends up holding the same opinions he started with.

We would not—and could not—write this book if we held this view. Instead, we hold that knowledge can be communicated and that discussion can result in learning. If genuine knowledge, not mere personal opinion, is at stake, then, for the most part, either disagreements are apparent only—to be removed by coming to terms and a meeting of minds; or they are real, and the genuine issues can be resolved—in the long run, of course—by appeals to fact and reason. The maxim of rationality concerning disagreements is to be patient for the long run. We are saying, in short, that disagreements are arguable matters. And argument is empty unless it is undertaken on the supposition that there is attainable an understanding that, when attained by reason in the light of all the relevant evidence, resolves the original issues.

How does this third maxim apply to the conversation between reader and writer? How can it be stated as a rule of reading? It deals with the situation in which the reader finds himself disagreeing with something in the book. It requires him first to be sure that the disagreement is not owing to misunderstanding. Suppose that the reader has been careful to observe the rule that he must not render a critical judgment until he understands, and is therefore satisfied that there is no misunderstanding here. What then?

This maxim then requires him to distinguish between genuine knowledge and mere opinion, and to regard an issue where knowledge is concerned as one that can be resolved. If he pursues the matter further, he may be instructed by the author on points that will change his mind. If that does not happen, he may be justified in his criticism, and, metaphorically at least, be able to instruct the author. He can at least hope that were the author alive and present, his mind could be changed.

You may remember something that was said on this subject in the last chapter. If an author does not give reasons for his propositions, they can be treated only as expressions of personal opinions on his part. The reader who does not distinguish between the reasoned statement of knowledge and the flat expression of opinion is not reading to learn. He is at most interested in the author's personality and is using the book as a case history. Such a reader will, of course, neither agree nor disagree. He does not judge the book but the man.

If, however, the reader is primarily interested in the book and not the man, he should take his critical obligations seriously. These involve applying the distinction between real knowledge and mere opinion to himself as well as to the author. Thus the reader must do

more than make judgments of agreement or disagreement. He must give reasons for them. In the former case, of course, it suffices if he actively shares the author's reasons for the point on which they agree. But when he disagrees, he must give his own grounds for doing so. Otherwise, he is treating a matter of knowledge as if it were opinion.

RULE 46, therefore, can be stated as follows: RESPECT THE DIFFERENCE BETWEEN KNOWLEDGE AND MERE PERSONAL OPINION BY GIVING REASONS FOR ANY CRITICAL JUDGMENT YOU MAKE.

Incidentally, we would not want to be understood as claiming that there is a great deal of "absolute" knowledge available to men. Self-evident propositions, in the sense in which we defined them in the previous chapter, seem to us to be both indemonstrable and undeniable truths. Most knowledge, however, lacks that degree of absoluteness. What we know, we know subject to correction; we know it because all, or at least the weight, of the evidence supports it, but we are not and cannot be certain that new evidence will not sometime invalidate what we now believe is true.

This, however, does not remove the important distinction between knowledge and opinion that we have been stressing. Knowledge, if you please, consists in those *opinions that can be defended*, opinions for which there is evidence of one kind or another. If we really know something, in this sense, we must believe that we can convince others of what we know. Opinion, in the sense in which we have been employing the word, is unsupported judgment. That is why we have employed the modifiers "mere" or "personal" in conjunction with it. We can do no more than opine that something is true when we have no evidence or reason for the statement other than our personal feeling or prejudice. We can say that it is true and that we know it when we have objective evidence that other reasonable men are likely to accept.

Let us now summarize the three general maxims we have discussed in this chapter. The three together state the conditions of a critical reading and the manner in which the reader should proceed to "talk back" to the author.

The first requires the reader to complete the task of understanding before rushing in. The second adjures him not to be disputatious or contentious. The third asks him to view disagreement about matters of knowledge as being generally remediable. This rule goes further: It also commands him to give reasons for his disagreements so that issues are not merely stated but also defined. In that lies all hope for resolution.

Agreeing or Disagreeing with an Author

The first thing a reader can say is that he understands or that he does not. In fact, he must say he understands, in order to say more. If he does not understand, he should keep his peace and go back to work on the book.

There is one exception to the harshness of the second alternative. “I don’t understand” may itself be a critical remark. To make it so, the reader must be able to support it. If the fault is with the book rather than himself, the reader must locate the sources of trouble. He should be able to show that the structure of the book is disorderly, that its parts do not hang together, that some of it lacks relevance, or, perhaps, that the author equivocates in the use of important words, with a whole train of consequent confusions. To the extent that a reader can support his charge that the book is unintelligible, he has no further critical obligations.

Let us suppose, however, that you are reading a good book. That means it is a relatively intelligible one. And let us suppose that you are finally able to say “I understand.” If, in addition to understanding the book, you agree thoroughly with what the author says, the work is over. The analytical reading is completely done. You have been enlightened, and convinced or persuaded. It is clear that we have additional steps to consider only in the case of disagreement or suspended judgment. The former is the more usual case.

To the extent that authors argue with their readers—and expect their readers to argue back—the good reader must be acquainted with the principles of argument. He must be able to carry on civil, as well as intelligent, controversy. That is why there is need for a chapter of this sort in a book on reading. *Not simply by following an author’s arguments, but only by meeting them as well, can the reader ultimately reach significant agreement or disagreement with his author.*

The meaning of agreement and disagreement deserves a moment’s further consideration. The reader who comes to terms with an author and grasps his propositions and reasoning shares the author’s mind. In fact, the whole process of interpretation is directed toward a meeting of minds through the medium of language. Understanding a book can be described as a kind of agreement between writer and reader. They agree about the use of language to express ideas. Because of that agreement, the reader is able to see through the author’s language to the ideas he is trying to express.

If the reader understands a book, how can he disagree with it? Critical reading demands that he make up his own mind. But his mind and the author’s have become as one through his success in understanding the book. What mind has he left to make up independently? There are some people who make the error that causes this apparent difficulty: they fail to distinguish between two senses of “agreement.” In consequence, they wrongly suppose that where there is

understanding between men, disagreement is impossible. They say that all disagreement is simply owing to misunderstanding.

The error in this becomes obvious as soon as we remember that the author is making judgments about the world in which we live. He claims to be giving us theoretical knowledge about the way things exist and behave, or practical knowledge about what should be done. Obviously, he can be either right or wrong. His claim is justified only to the extent that he speaks truly, to the extent that he says what is probable in the light of evidence. Otherwise, his claim is unfounded.

If you say, for instance, that “all men are equal,” we may take you to mean that all men are equally endowed at birth with intelligence, strength, and other abilities. In the light of the facts as we know them, we disagree with you. We think you are wrong. But suppose we have misunderstood you. Suppose you meant by these words that *all men should have equal political rights*. Because we misapprehended your meaning, our disagreement was irrelevant. Now suppose the mistake corrected. Two alternatives still remain. We can agree or disagree, *but now if we disagree, there is a real issue between us*. We understand your political position, but hold a contrary one.

Issues about matters of fact or policy—issues about the way things are or should be—are real in this sense only when they are based on a common understanding of what is being said. Agreement about the use of words is the indispensable condition for genuine agreement or disagreement about the facts being discussed. It is because of, not in spite of, your meeting the author’s mind through a sound interpretation of his book that you are able to make up your own mind as concurring in or dissenting from the position he has taken.

Prejudice and Judgment

Now let us consider the situation in which, having said you understand, you proceed to disagree. If you have tried to abide by the maxims stated in the previous chapter, you disagree because you think the author can be shown to be wrong on some point. You are not simply voicing your prejudice or expressing your emotions. Because this is true, then, from an ideal point of view, there are three conditions that must be satisfied if controversy is to be well conducted.

The first is this. Since men are animals as well as rational, it is necessary to acknowledge the emotions you bring to a dispute, or those that arise in the course of it. Otherwise you are likely to be giving vent to feelings, not stating reasons. You may even think you have reasons, when all you have are strong feelings.

Second, you must make your own assumptions explicit. You must know what your prejudices—that is, your prejudgments—are. Otherwise you are not likely to admit that your opponent may be equally entitled to different assumptions. ***Good***

controversy should not be a quarrel about assumptions. If an author, for example, explicitly asks you to take something for granted, the fact that the opposite can also be taken for granted should not prevent you from honoring his request. If your prejudices lie on the opposite side, and if you do not acknowledge them to be prejudices, you cannot give the author's case a fair hearing.

Third and finally, an attempt at impartiality is a good antidote for the blindness that is almost inevitable in partisanship. Controversy without partisanship is, of course, impossible. But to be sure that there is more light in it, and less heat, each of the disputants should at least try to take the other fellow's point of view. If you have not been able to read a book *sympathetically*, your disagreement with it is probably more contentious than civil.

These three conditions are, ideally, the *sine qua non* of intelligent and profitable conversation. They are obviously applicable to reading, insofar as that is a kind of conversation between reader and author. Each of them contains sound advice for readers who are willing to respect the civilities of disagreement.

But the ideal here, as elsewhere, can only be approximated. The ideal should never be expected from human beings. We ourselves, we hasten to admit, are sufficiently conscious of our own defects. We have violated our own rules about good intellectual manners in controversy. We have caught ourselves attacking a book rather than criticizing it, knocking straw men over, denouncing where we could not support denials, proclaiming our prejudices as if ours were any better than the author's.

We continue to believe, however, that conversation and critical reading *can* be well disciplined. We are therefore going to substitute for those three ideal conditions, a set of prescriptions that may be easier to follow. They indicate the four ways in which a book can be adversely criticized. Our hope is that if a reader confines himself to making these points, he will be less likely to indulge in expressions of emotion or prejudice.

The four points can be briefly summarized by conceiving the reader as conversing with the author, as talking back. After he has said, "I understand but I disagree," he can make the following remarks to the author: (1) "*You are uninformed*"; (2) "*You are misinformed*"; (3) "*You are illogical—your reasoning is not cogent*"; (4) "*Your analysis is incomplete.*"

These may not be exhaustive, though we think they are. In any event, they are certainly the principal points a reader who disagrees can make. They are somewhat independent. Making one of these remarks does not prevent you from making another. Each and all can be made, because the defects they refer to are not mutually exclusive. But, we should add, the reader cannot make any of these remarks without being definite and precise about the respect in which the author is uninformed or misinformed or illogical. A book cannot be uninformed or

misinformed about everything. It cannot be totally illogical. Furthermore, the reader who makes any of these remarks must not only make it definitely, by specifying the respect, but he must also support his point. He must give reasons for saying what he does.

Judging the Author's Soundness

The first three remarks are somewhat different from the fourth, as we will presently see. Let us consider each of them briefly, and then turn to the fourth.

- 1. To say that an author is *uninformed* is to say that he lacks some piece of knowledge that is relevant to the problem he is trying to solve. Notice here that unless the knowledge, if possessed by the author, would have been relevant, there is no point in making this remark. To support the remark, you must be able yourself to state the knowledge that the author lacks and show how it is relevant, how it makes a difference to his conclusions. A few illustrations here must suffice. Darwin lacked the knowledge of genetics that the work of Mendel and later experimentalists now provides. His ignorance of the mechanism of inheritance is one of the major defects in *The Origin of Species*. Gibbon lacked certain facts that later historical research has shown to have a bearing on the fall of Rome. Usually, in science and history, the lack of information is discovered by later researches. Improved techniques of observation and prolonged investigation make this the way things happen for the most part. But in philosophy, it may happen otherwise. There is just as likely to be loss as gain with the passage of time. The ancients, for example, clearly distinguished between what men can sense and imagine and what they can understand. Yet, in the eighteenth century, David Hume revealed his ignorance of this distinction between images and ideas, even though it had been so well established by the work of earlier philosophers.**
- 2. To say that an author is *misinformed* is to say that he asserts what is not the case. His error here may be owing to lack of knowledge, but the error is more than that. Whatever its cause, it consists in making assertions contrary to fact. The author is proposing as true or more probable what is in fact false or less probable. He is claiming to have knowledge he does not possess. This kind of defect should be pointed out, of course, only if it is relevant to the author's conclusions. And to support the remark you must be able to argue the truth or greater probability of a position contrary to the author's. For example, in one of his political treatises, Spinoza appears to say that democracy is a more primitive type of government than monarchy. This is contrary to well-ascertained facts of political history. Spinoza's error in this respect has a bearing on his argument. Aristotle was misinformed about the role that the female factor plays in animal reproduction, and consequently came to unsupportable conclusions about the processes of procreation.**

Aquinas erroneously supposed that the matter of the heavenly bodies is essentially different from that of terrestrial bodies, because he supposed that the former change only in position, and are otherwise unalterable. Modern astrophysics corrects this error and thereby improves on ancient and medieval astronomy. But here is an error that has limited relevance. Making it does not affect Aquinas' metaphysical account of the nature of all sensible things as composed of matter and form. These first two points of criticism may be related. Lack of information, as we have seen, may be the cause of erroneous assertions. Further, whenever a man is *misinformed* in a certain respect, he is also *uninformed* in the same respect. But it makes a difference whether the defect is simply negative or positive as well. Lack of relevant knowledge makes it impossible to solve certain problems or support certain conclusions. Erroneous suppositions, however, lead to wrong conclusions and untenable solutions. Taken together, these two points charge an author with defects in his premises. He needs more knowledge than he possesses. His evidences and reasons are not good enough in quantity or quality.

3. To say that an author is *illogical* is to say that he has committed a fallacy in reasoning. In general, fallacies are of two sorts. There is the *non sequitur*, which means that what is drawn as a conclusion simply does not follow from the reasons offered. And there is the occurrence of inconsistency, which means that two things the author has tried to say are incompatible. To make either of these criticisms, the reader must be able to show the precise respect in which the author's argument lacks cogency. One is concerned with this defect only to the extent that the major conclusions are affected by it. A book may safely lack cogency in irrelevant respects. It is more difficult to illustrate this third point, because few really good books make obvious slips in reasoning. When they do occur, they are usually elaborately concealed, and it requires a very penetrating reader to discover them. But we can show you a patent fallacy in Machiavelli's *The Prince*. Machiavelli writes: The chief foundations of all states, new as well as old, are good laws. As there cannot be good laws where the state is not well armed, it follows that where they are well armed they have good laws.

Now it simply does not follow from the fact that good laws depend on an adequate police force, that where the police force is adequate, the laws will necessarily be good. We are ignoring the highly questionable character of the first contention. We are only interested in the *non sequitur* here. It is truer to say that happiness depends on health than that good laws depend on an effective police force, but it does not follow that all who are healthy are happy.

In his *Elements of Law*, Hobbes argues in one place that all bodies are nothing but quantities of matter in motion. The world of bodies, he says, has no qualities whatsoever. Then, in another place, he argues that man is himself nothing but a body, or a collection of atomic bodies in motion. Yet, admitting the existence of sensory qualities—colors, odors, tastes, and so forth—he concludes that they are nothing but the motions of atoms in the brain. The conclusion is inconsistent with the position first taken, namely, that the world

of bodies in motion is without qualities. What is said of all bodies in motion must apply to any particular group of them, including the atoms of the brain. This third point of criticism is related to the other two. An author may, of course, fail to draw the conclusions that his evidences or principles imply. Thus his reasoning is incomplete. But we are here concerned primarily with the case in which *he reasons poorly from good grounds*. It is interesting, but less important, to discover lack of cogency in reasoning from premises that are themselves untrue, or from evidences that are inadequate. A person who from sound premises reaches a conclusion invalidly is, in a sense, misinformed. But it is worthwhile to distinguish the kind of erroneous statement that is owing to bad reasoning from the kind previously discussed, which is owing to other defects, especially insufficient knowledge of relevant details. Good Evidence, does not become Bad evidence, because of the Lapse of Time. Double Standards is the sign of failed argument. Inconsistency is the sign of failed Argument

Judging the Author's Completeness

The first three points of criticism, which we have just considered, deal with the soundness of the author's statements and reasoning. Let us turn now to the fourth adverse remark a reader can make. It deals with the completeness of the author's execution of his plan—the adequacy with which he discharges the task he has chosen.

Before we proceed to this fourth remark, one thing should be observed. Since you have said you understand, your failure to support any of these first three remarks obligates you to agree with the author as far as he has gone. You have no freedom of will about this. It is not your sacred privilege to decide whether you are going to agree or disagree.

If you have not been able to show that the author is uninformed, misinformed, or illogical on relevant matters, you simply cannot disagree. You must agree. You cannot say, as so many students and others do, "I find nothing wrong with your premises, and no errors in reasoning, but I don't agree with your conclusions." All you can possibly mean by saying something like that is that you do not *like* the conclusions. You are not disagreeing. You are expressing your emotions or prejudices. If you have been convinced, you should admit it. (If, despite your failure to support one or more of these three critical points, you still honestly feel unconvinced, perhaps you should not have said you understood in the first place.)

The first three remarks are related to the author's terms, propositions, and arguments. These are the elements he used to solve the problems that initiated his efforts. The fourth remark—that the book is incomplete—bears on the structure of the whole.

4. To say that an author's *analysis is incomplete* is to say that he has not solved all the problems he started with, or that he has not made as good a use of his materials as possible, that he did not see all their implications and ramifications, or that he has failed to make distinctions that are relevant to his undertaking. It is not enough to say that a book is incomplete. Anyone can say that of any book. Men are finite, and so are their works, every last one. There is no point in making this remark, therefore, unless the reader can define the inadequacy precisely, either by his own efforts as a knower or through the help of other books.

Let us illustrate this point briefly. The analysis of types of government in Aristotle's *Politics* is incomplete. Because of the limitations of his time and his erroneous acceptance of slavery, Aristotle fails to consider, or for that matter even to conceive, the truly democratic constitution that is based on universal suffrage; nor can he imagine either representative government or the modern kind of federated state. His analysis would have to be extended to apply to these political realities. Euclid's *Elements of Geometry* is an incomplete account because Euclid failed to consider other postulates about the relation of parallel lines. Modern geometrical works, making these other assumptions, supply the deficiencies. Dewey's *How We Think* is an incomplete analysis of thinking because it fails to treat the sort of thinking that occurs in reading or learning by instruction in addition to the sort that occurs in investigation and discovery. To a Christian who believes in personal immortality, the writings of Epictetus or Marcus Aurelius are an incomplete account of human happiness.

This fourth point is strictly not a basis for disagreement. It is critically adverse only to the extent that it marks the limitations of the author's achievement. A reader who agrees with a book in part—because he finds no reason to make any of the other points of adverse criticism—may, nevertheless, suspend judgment on the whole, in the light of this fourth point about the book's incompleteness. Suspended judgment on the reader's part responds to an author's failure to solve his problems perfectly.

Related books in the same field can be critically compared by reference to these four criteria. One is better than another in proportion as it speaks more truth and makes fewer errors. If we are reading for knowledge, that book is best, obviously, which most adequately treats a given subject matter. One author may lack information that another possesses; one may make erroneous suppositions from which another is free; one may be less cogent than another in reasoning from similar grounds. But the profoundest

comparison is made with respect to the completeness of the analysis that each presents. The measure of such completeness is to be found in the number of valid and significant distinctions that the accounts being compared contain. You may see now how useful it is to have a grasp of the author's terms. The number of distinct terms is correlative with the number of distinctions.

You may also see how the fourth critical remark ties together the three stages of analytical reading of any book. The last step of structural outlining is to know the problems that the author is trying to solve. The last step of interpretation is to know which of these problems the author solved and which he did not. The final step of criticism is the point about completeness. It touches structural outlining insofar as it considers how adequately the author has stated his problems, and interpretation insofar as it measures how satisfactorily he has solved them.

The Third Stage of Analytical Reading

We have now completed, in a general way, the enumeration and discussion of the rules of analytical reading. We can now set forth all the rules in their proper order and under appropriate headings.

I. THE FIRST STAGE OF ANALYTICAL READING: RULES FOR FINDING WHAT A BOOK IS ABOUT

- 1. Classify the book according to kind and subject matter.**
- 2. State what the whole book is about with the utmost brevity.**
- 3. Enumerate its major parts in their order and relation, and outline these parts as you have outlined the whole.**
- 4. Define the problem or problems the author has tried to solve.**

II. THE SECOND STAGE OF ANALYTICAL READING: RULES FOR INTERPRETING A BOOK'S CONTENTS

- 5. Come to terms with the author by interpreting his key words.**
- 6. Grasp the author's leading propositions by dealing with his most important sentences.**
- 7. Know the author's arguments, by finding them in, or constructing them out of, sequences of sentences.**
- 8. Determine which of his problems the author has solved, and which he has not; and of the latter, decide which the author knew he had failed to solve.**

III. THE THIRD STAGE OF ANALYTICAL READING: RULES FOR CRITICIZING A BOOK AS A COMMUNICATION OF KNOWLEDGE

A. General Maxims of Intellectual Etiquette

9. Do not begin criticism until you have completed your outline and your interpretation of the book. (Do not say you agree, disagree, or suspend judgment, until you can say "I understand.")
10. Do not disagree disputatiously or contentiously.
11. Demonstrate that you recognise the difference between knowledge and mere personal opinion by presenting good reasons for any critical judgment you make.

B. Special Criteria for Points of Criticism

12. Show where the author is uninformed.

13. Show where the author is misinformed.

14. Show where the author is illogical.

15. Show where the author's analysis or account is incomplete.

Note: Of these last four, the first three are criteria for disagreement.

Failing in all of these, you must agree, at least in part, although you may suspend judgment on the whole, in the light of the last point.

We observed at the end of Chapter 7 that applying the first four rules of analytical reading helps you to answer the first basic question you must ask about a book, namely, *What is the book about as a whole?* Similarly, at the end of Chapter 9, we pointed out that applying the four rules for interpretation helps you to answer the second question you must ask, namely, *What is being said in detail, and how?* It is probably clear that the last seven rules of reading—the maxims of intellectual etiquette and the criteria for points of criticism—help you to answer the third and fourth basic questions you must ask. You will recall that those questions are: *Is it true?* and *What of it?*

The question, *Is it true?* can be asked of anything we read. It is applicable to every kind of writing, in one or another sense of “truth”—mathematical, scientific, philosophical, historical, and poetical. No higher commendation can be given any work of the human mind than to praise it for the measure of truth it has achieved; by the same token, to criticize it adversely for its failure in this respect is to treat it with the seriousness that a serious work deserves. Yet, strangely enough, in recent years, for the first time in Western history, there is a dwindling concern with this criterion of excellence. Books win the plaudits of the critics and gain widespread popular attention almost to the extent that they flout the truth—the more outrageously they do so, the better. Many readers, and most particularly those who review current publications, employ other standards for judging, and praising or condemning, the books they read—their novelty, their sensationalism, their seductiveness, their force, and even their power to bemuse or befuddle the mind, but not their truth, their clarity, or their power to enlighten. They have, perhaps, been brought to this pass by the fact that so much of current writing outside the sphere of the exact sciences manifests so little concern with truth. One might hazard the guess that if saying something that is true, in any sense of that term, were ever again to become the primary concern it should be, fewer books would be written, published, and read.

Unless what you have read is true in some sense, you need go no further. But if it is, you must face the last question. You cannot read for information intelligently without determining what significance is, or should be, attached to the facts presented. Facts seldom come to us without some interpretation, explicit or implied. This is especially true if you are reading digests of information that necessarily select the facts according to some

evaluation of their significance, some principle of interpretation. And if you are reading for enlightenment, there is really no end to the inquiry that, at every stage of learning, is renewed by the question, What of it?

These four questions, as we have already pointed out, summarize all the obligations of a reader. The first three, moreover, correspond to something in the very nature of human discourse. If communications were not complex, structural outlining would be unnecessary. If language were a perfect medium instead of a relatively opaque one, there would be no need for interpretation. If error and ignorance did not circumscribe truth and knowledge, we should not have to be critical. The fourth question turns on the distinction between information and understanding. When the material you have read is itself primarily informational, you are challenged to go further and seek enlightenment. Even when you have been somewhat enlightened by what you have read, you are called upon to continue the search for significance.

Before proceeding to Part Three, perhaps we should stress, once again, that these rules of analytical reading describe an ideal performance. Few people have ever read any book in this ideal manner, and those who have, probably read very few books this way. The ideal remains, however, the measure of achievement. You are a good reader to the degree in which you approximate it.

When we speak of someone as “well-read,” we should have this ideal in mind. Too often, we use that phrase to mean the quantity rather than the quality of reading. A person who has read widely but not well deserves to be pitied rather than praised. As Thomas Hobbes said, “If I read as many books as most men do, I would be as dull-witted as they are.”

The great writers have always been great readers, but that does not mean that they read all the books that, in their day, were listed as the indispensable ones. In many cases, they read fewer books than are now required in most of our colleges, but what they did read, they read well. Because they had mastered these books, they became peers with their authors. They were entitled to become authorities in their own right. In the natural course of events, a good student frequently becomes a teacher, and so, too, a good reader becomes an author.

Our intention here is not to lead you from reading to writing. It is rather to remind you that one approaches the ideal of good reading by applying the rules we have described in the reading of a single book, and not by trying to become superficially acquainted with a larger number. There are, of course, many books worth reading well. There is a much larger number that should be only inspected. To become well-read, in every sense of the word, one must know how to use whatever skill one possesses with discrimination—by reading every book according to its merits.

Deep Work and Syntopicon

Method 23-Syntopicon

The Ultimate Goals of Reading

The Fourth Level of Reading: Syntopical Reading

So far we have not said anything specific about how to read two or more books on the same subject. We have tried to suggest that when certain subjects are discussed, more than one book is relevant, and we have also from time to time mentioned, in a very informal way, certain related books and authors in various fields. Knowing that more than one book is relevant to a particular question is the first requirement in any project of syntopical reading. Knowing which books should be read, in a general way, is the second requirement. The second requirement is a great deal harder to satisfy than the first.

The difficulty becomes evident as soon as we examine the phrase “two or more books on the same subject.” What do we mean by “same subject”? Perhaps this is clear enough when the subject is a single historical period or event, but in hardly any other sphere is there much clarity to be found. *Gone with the Wind* and *War and Peace* are both novels about a great war—but there, for the most part, the resemblance stops. Stendhal’s *The Charterhouse of Parma* is “about” the same conflict—that is, the Napoleonic Wars—that Tolstoy’s novel is “about.” But of course neither is about the war, or indeed about war in general, as such. War provides the context or background of both stories—as it does for much of human life—but it is the stories on which the authors rivet our attention. We may learn something about the war—in fact, Tolstoy once said that he had learned much of what he knew about battles from Stendhal’s account of the Battle of Waterloo—but we do not go to these novels or any others if our primary intention is to study war.

You could have anticipated that this situation would obtain in the case of fiction. It is inherent in the fact that the novelist does not communicate in the same way that an expository writer does. But the situation obtains in the case of expository works, as well.

Suppose, for example, that you are interested in reading about the idea of love. Since the literature of love is vast, you would have relatively little difficulty in creating a bibliography of books to read. Suppose that you have done that, by asking advisors, by searching through the card catalogue of a good library, and by examining the bibliography in a good scholarly treatise on the subject. And suppose in addition that you have confined yourself to expository works, despite the undoubted interest of novelists and poets in the subject. (We will explain why it would be advisable to do this later.) You now begin to examine the books in your bibliography. What do you find?

Even a cursory perusal reveals a very great range of reference. There is hardly a single human action that has not been called—in one way or another—an act of love. Nor is the range confined to the human sphere. If you proceed far enough in your reading, you

will find that love has been attributed to almost everything in the universe; that is, everything that exists has been said by someone either to love or to be loved—or both.

Stones are said to love the center of the earth. The upward motion of fire is called a function of its love. The attraction of iron filings to a magnet is described as an effect of love. Tracts have been written on the love life of amoebae, paramecia, snails, and ants, to say nothing of most of the so-called higher animals, who are said to love their masters as well as one another. When we come to human beings, we discover that authors speak and write of their love for men, women, a woman, a man, children, themselves, mankind, money, art, domesticity, principles, a cause, an occupation or profession, adventure, security, ideas, a country life, loving itself, a beefsteak, or wine. In certain learned treatises, the motions of the heavenly bodies are said to be inspired by love; in others, angels and devils are differentiated by the quality of their love. And of course God is said to *be* Love.

Confronted with this enormous range of reference, how are we to state what the subject is that we are investigating? Can we even be sure that there is a single subject? When one person says “I love cheese,” and another says “I love football,” and a third says “I love mankind,” are they all three using the word in any sense that is common? After all, one eats cheese but not football or mankind, one plays football but not cheese or mankind, and whatever “I love mankind” means, that meaning does not seem to be applicable to cheese or football. And yet all three do use the same word. Is there in fact some deep reason for that, some reason that is not immediately apparent on the surface? Difficult as that question is, can we say that we have identified the “same subject” until we have answered it?

Faced with this chaotic situation, you may decide to limit the enquiry to human love—to love between human beings, of the same sex or different sexes, of the same age or different ages, and so forth. That would rule out the three statements we have just discussed. But you would still find, even if you read only a small portion of the available books about the subject, a very great range of reference. You would find, for instance, that love is said by some writers to consist wholly in acquisitive desire, usually sexual desire; that is, love is merely a name for the attraction that almost all animals feel toward members of the opposite sex. But you would also find other authors who maintain that love, properly speaking, contains no acquisitive desire whatever, and consists in pure benevolence. Do acquisitive desire and benevolence have anything in common, considering that acquisitive desire always implies wanting some good *for oneself*, while benevolence implies wanting a good *for someone else*?

At least acquisitive desire and benevolence share a common note of tendency, of desire in some very abstract sense of the term. But your investigation of the literature of the subject would soon uncover writers who conceive of the essence of love as being cognitive rather than appetitive. Love, these writers maintain, is an intellectual act, not an emotional one. In other words, *knowing* that another person is *admirable* always precedes *desiring* him or her, in either of the two senses of desire. Such authors do not deny that desire enters into the picture, but they do deny that desire should be called love.

Let us suppose—in fact, we think it can be done—that you are able to identify some common meaning in these various conceptions of human love. Even then not all of your problems are solved. Consider the ways in which love manifests itself between and among human beings. Is the love that a man and woman have for each other the same when they are courting as when they are married, the same when they are in their twenties as when they are in their seventies? Is the love that a woman has for her husband the same as that she has for her children? Does a mother's love for her children change as they grow up? Is the love of a brother for his sister the same as his love for his father? Does a child's love for its parents change as he or she grows? Is the love that a man has for a woman, either his wife or some other, the same as the friendship he feels for another man, and does it make a difference what relationship he has with the man—such as one with whom he goes bowling, one with whom he works, and one whose intellectual company he enjoys? Does the fact that “love” and “friendship” are different words mean that the emotions they name (if that is in fact what they name) differ? Can two men of different ages be friends? Can they be friends if they are markedly different in some other respect, such as possession of wealth or degree of intelligence? Can women be friends at all? Can brothers and sisters be friends, or brother and brother, or sister and sister? Can you retain a friendship with someone you either borrow money from or lend it to? If not, why not? Can a boy love his teacher? Does it make a difference whether the teacher is male or female? If humanoid robots existed, could human beings love them? If we discovered intelligent beings on Mars or some other planet, could we love them? Can we love someone we have never met, like a movie star or the President? If we feel that we hate someone, is that really an expression of love?

These are just a few of the questions that would be raised by your reading of even a part of the standard expository literature of love. There are many other questions that could be asked. However, we think we have made the point. A curious paradox is involved in any project of syntopical reading. Although this level of reading is defined as the reading of two or more books on the same subject, which implies that the identification of the subject matter occurs before the reading begins, it is in a sense true that the identification of the subject matter must follow the reading, not precede it. In the case of love, you might have to read a dozen or a hundred works before you could decide what you were reading about. And when you had done that, you might have to conclude that half of the works you had read were not on the subject at all.

The Role of Inspection in Syntopical Reading

We have stated more than once that the levels of reading are cumulative, that a higher level includes all of those that precede or lie below it. It is now time to explain what that means in the case of syntopical reading.

You will recall that in explaining the relationship between inspectional reading and analytical reading, we pointed out that the two steps in inspectional reading— first, skimming; and second, superficial reading—anticipated the first two steps in analytical reading. Skimming helps to prepare you for the first step of analytical reading, in the course of which you identify the subject matter of whatever you are reading, state what kind of book it is, and outline its structure. Superficial reading, while it is also helpful in that first step of analytical reading, is primarily a preparation for the second step, when you are called upon to interpret a book's contents by coming to terms with the author, stating his propositions, and following his arguments.

In a somewhat analogous fashion, both inspectional and analytical reading can be considered as anticipations or preparations for syntopical reading. It is here, in fact, that inspectional reading comes into its own as a major tool or instrument for the reader.

Let us suppose once more that you have a bibliography of a hundred or so titles, all of which appear to be on the subject of love. If you read every one of them analytically, you would not only end up with a fairly clear idea of the subject that you were investigating—the “same subject” of the syntopical reading project—but you would also know which, if any, of the books you had read were not on that subject and thus irrelevant to your needs. But to read a hundred books analytically might well take you ten years. If you were able to devote full time to the project, it would still take many months. Some shortcut is obviously necessary, in the face of the paradox we have mentioned concerning syntopical reading.

That shortcut is provided by your skill in inspectional reading. The first thing to do when you have amassed your bibliography is to *inspect all of the books on your list*. You should not read any of them analytically before inspecting *all* of them. Inspectional reading will not acquaint you with all of the intricacies of the subject matter, or with all of the insights that your authors can provide, but it will perform two essential functions. First, it will give you a clear enough idea of your subject so that your subsequent analytical reading of *some* of the books on the list is productive. And second, it will allow you to cut down your bibliography to a more manageable size.

We can hardly think of any advice that would be more useful for students, especially graduate and research students, than this, if they would only heed it. In our experience, a certain number of students at those advanced levels of schooling have some capability of reading actively and analytically. There may not be enough of them, and they may be far from perfect readers, but they at least know how to get at the meat of a book, to make reasonably intelligible statements about it, and to fit it into a plot or plan of their subject matter. But their efforts are enormously wasteful because they do not understand *how to*

read some books faster than others. They spend the same amount of time and effort on every book or article they read. As a result, they do not read those books that deserve a really good reading as well as they deserve, and they waste time on works that deserve less attention.

The skilful inspectional reader does more than classify a book in his mental card catalogue, and achieve a superficial knowledge of its contents. He also discovers, in the very short time it takes him to inspect it, *whether the book says something important about his subject or not.* He may not yet know what that something is precisely—that discovery will probably have to wait for another reading. But he has learned one of two things. Either the book is one to which he must return for light, or it is one that, no matter how enjoyable or informative, contains no enlightenment and therefore does not have to be read again.

There is a reason why this advice is often unheeded. In the case of analytical reading, we said that the skillful reader performs concurrently steps that the beginner must treat as separate. By analogy, it might seem that this kind of preparation for syntopical reading—the inspection of all of the books on your list before starting the analytical reading of any of them—could be done concurrently with analytical reading. But we do not believe that can be done by any reader, no matter how skillful. And this indeed is the mistake that so many younger researchers make. Thinking they can collapse these two steps into one, they end up reading everything at the same rate, which may be either too fast or too slow for a particular work, but in any event is wrong for most of the books they read.

Once you have identified, by inspection, the books that are relevant to your subject matter, you can then proceed to read them syntopically. Note that in the last sentence we did not say “proceed to read them analytically,” as you might have expected. In a sense, of course, you do have to read each of the individual works that, together, constitute the literature of your subject, with those skills that you acquired by applying the rules of analytical reading. But it must never be forgotten that *the art of analytical reading applies to the reading of a single book*, when understanding of that book is the aim in view. As we will see, the aim in syntopical reading is quite different.

The Steps in Syntopical Reading

We are now prepared to explain how to read syntopically. We will assume that, by your inspection of a number of books, you have a pretty good idea of the subject that at least some of them are about, and furthermore that this is the subject you want to investigate. What, then, do you do?

There are five steps in syntopical reading. We shall not call them rules, although we might, for if any of the steps is not taken, syntopical reading becomes much more difficult, perhaps impossible. We will discuss them roughly in the order in which they occur, although in a sense all of them have to take place for any of them to.

Step 1. Create a tentative bibliography of your subject by recourse to library catalogues, advisors, and bibliographies in books.

Step 2. Inspect *all* of the books on the tentative bibliography to ascertain which are germane to your subject, and also to acquire a clearer idea of the subject. **Note:** These two steps are not, strictly speaking, chronologically distinct; that is, the two steps have an effect on each other, with the second, in particular, serving to modify the first.

STEP 3 IN SYNTOPICAL READING: FINDING THE RELEVANT PASSAGES. Since we are of course assuming that you know how to read analytically, we are assuming that you could read each of the relevant books thoroughly if you wanted to. But that would be to place the individual books first in the order of your priorities, and your problem second. In fact, the order is reversed. *In syntopical reading, it is you and your concerns that are primarily to be served, not the books that you read. First, the topic in connection with which the passage is being read serves to give direction to the reader in interpreting the passage. But it does not tell him what the passage means, since the passage may be relevant to the topic in several or many different ways. Hence the reader is called upon to discover precisely what relevance the passage has to the topic. To learn to do this is to acquire a major skill in the art of reading.*

Hence the first step at this level of reading is another inspection of the whole works that you have identified as relevant. Your aim is to find the passages in the books that are most germane to your needs. It is unlikely that the whole of any of the books is directly on the subject you have chosen or that is troubling you. Even if this is so, as it very rarely is, you should read the book quickly. You do not want to lose sight of the fact that you are reading it for an ulterior purpose—namely, for the light it may throw on your own problem—not for its own sake.

It might seem that this step could be taken concurrently with the previously described inspection of the book, the purpose of which was to discover whether the book was at all relevant to your concerns. In many cases, that is so. But it is unwise to consider that this is always possible. Remember that one of the aims of your first inspection of the book was to zero in on the subject matter of your syntopical reading project. We have said that an

adequate understanding of the problem is not always available until you have inspected many of the books on your original list. Therefore, to try to identify the *relevant passages* at the same time that you identify the *relevant books* is often perilous. Unless you are very skillful, or already quite familiar with your subject, you had better treat the two steps as separate.

What is important here is to recognize the difference between the first books that you read in the course of syntopical reading, and those that you come to after you have read many others on the subject. In the case of the later books, you probably already have a fairly clear idea of your problem, and in that case the two steps can coalesce. But at the beginning, they should be kept rigorously separated. Otherwise, you are likely to make serious mistakes in identifying the relevant passages, mistakes that will have to be corrected later with a consequent waste of time and effort.

Above all, remember that your task is not so much to achieve an overall understanding of the particular book before you as to find out how it can be useful to you *in a connection that may be very far from the author's own purpose in writing it*. That does not matter at this stage of the proceedings. The author can help you to solve your own problem without having intended to. In syntopical reading, as we have noted, the books that are read serve you, not the other way around. In this sense, syntopical reading is the most active reading you can do. Analytical reading is also active, of course. But when you read a book analytically, you put yourself in a relation to it of disciple to master. When you read syntopically, *you* must be the master of the situation.

Because this is so, you must go about the business of coming to terms with your authors in a somewhat different way than before.

STEP 4 Use Rules of Reading by Analysing the various text. IN SYNTOPICAL READING: BRINGING THE AUTHORS TO TERMS. In interpretive reading (the second stage of analytical reading) the first rule requires you to come to terms with the author, which means identifying his key words and discovering how he uses them. But now you are faced with a number of different authors, and it is unlikely that they will have all used the same words, or even the same terms. *Thus it is you who must establish the terms, and bring your authors to them rather than the other way around.* First the collection of a number of passages on the same topic, but from different works and different authors, serves to *sharpen the reader's interpretation of each passage read*. Sometimes, when passages from the same book are read in sequence and in the context of one another, each becomes clearer. Sometimes the meaning of each of a series of contrasting or conflicting passages from different books is accentuated when they are read against one another. And sometimes the passages from one author, by amplifying or commenting on the passages from another, materially help the reader's understanding of the second author. *Second* if syntopical reading is done on a number of different subjects, the fact that the same passage will often be found cited in the Syntopicon under two or more subjects will have its instructive effect. The passage has an amplitude of meaning that the reader will come to perceive as he interprets it somewhat differently in relation to different

topics. Such multiple interpretation not only is a basic exercise in the art of reading but also tends to make the mind habitually alert to the many strains of meaning that any rich or complex passage can contain.

This is probably the most difficult step in syntopical reading. What it really comes down to is forcing an author *to use your language, rather than using his*. All of our normal reading habits are opposed to this. As we have pointed out several times, we assume that the author of a book we want to read analytically is our better, and this is particularly true if the book is a great one. Our tendency is to accept the author's terms and his organization of the subject matter, no matter how active we may be in trying to understand him. In syntopical reading, however, we will very quickly be lost if we accept any one author's terminology. We may understand *his* book, but we will fail to understand the others, and we will find that not much light is shed on the subject in which we are interested.

Not only must we resolutely refuse to accept the terminology of *any one* author; we must also be willing to face the possibility that *no* author's terminology will be useful to us. In other words, we must accept the fact that coincidence of terminology between us and any of the authors on our list is merely accidental. Often, indeed, such coincidence will be inconvenient; for if we use one term or set of terms of an author, we may be tempted to use others among his terms, and these may get in the way rather than help.

Syntopical reading, in short, is to a large extent an exercise in translation. We do not have to translate from one natural language to another, as from French to English. But we do impose a common terminology on a number of authors who, whatever natural language they may have shared in common, may not have been specifically concerned with the problem we are trying to solve, and therefore may not have created the ideal terminology for dealing with it.

This means that as we proceed on our project of syntopical reading we must begin to build up a set of terms that first, helps us to understand all of our authors, not just one or a few of them, and second, helps us to solve our problem. That insight leads to the third step.

STEP 5 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: GETTING THE QUESTIONS CLEAR. The second rule of interpretive reading requires us to find the author's key sentences, and from them to develop an understanding of his propositions. Propositions are made up of terms, and of course we must do a similar job on the works we are reading syntopically. But since we ourselves are establishing the terminology in this case, we are *faced with the task of establishing a set of neutral propositions as well*. The best way to do this is to frame a set of questions that shed light on our problem, and to which each of our authors gives answers.

This, too, is difficult. The questions must be stated in such a way and in such an order that they help us to solve the problem we started with, but they also must be framed in such a way that all or most of our authors can be interpreted as giving answers to them.

The difficulty is that the questions we want answered may not have been seen as questions by the authors. Their view of the subject may have been quite different from ours.

Sometimes, indeed, we have to accept the fact that an author gives *no* answer to one or more of our questions. In that case, we must record him as silent or indeterminate on the question. But even if he does not discuss the question explicitly, we can sometimes find an implicit answer in his book. *If* he had considered the question, we may conclude, he would *then* have answered it in such and such a way. Restraint is necessary here; we cannot put thoughts into our authors' minds, or words into their mouths. But we also cannot depend entirely on their explicit statements about the problem. If we could depend on any one of them in that way, we probably would have no problem to solve.

We have said that the questions must be put in an order that is helpful to us in our investigation. The order depends on the subject, of course, but some general directions can be suggested. The first questions usually have to do with *the existence or character of the phenomenon or idea we are investigating*. If an author says that the phenomenon exists or that the idea has a certain character, then we may ask further questions of his book. These may have to do with *how the phenomenon is known or how the idea manifests itself*. A final set of questions might have to do with *the consequences of the answers to the previous questions*.

We should not expect that all of our authors will answer our questions in the same way. If they did, we would once again have no problem to solve; it would have been solved by consensus. Since the authors will differ, we are faced with having to take the next step in syntopical reading.

STEP 6 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: DEFINING THE ISSUES. If a question is clear, and if we can be reasonably certain that authors answer it in different ways— perhaps pro and con— then an issue has been defined. It is the issue between the authors who answer the question in one way, and those who answer it in one or another opposing way.

STEP 7 Use One of Rules of Reading Methods For Full Analysis of Texts.

STEP 8 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Context Of Author's text.

1. What is Immediate Context?
2. What is the Book Context?

STEP 9 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. What are The Facts Within Context of an Author.

STEP 10 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Grammar Of Texts.

STEP 11 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Logic Of Texts.

Step 12- Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

Step 13- Facts within The Context.

Step 14- Do the Fact Checking. Checking Facts, If they are correct or incorrect.

A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.

- Fact Checking Process.
- Verification Handbook.
- The Data Journalism.
- Data Journalism - Centre for Investigative Journalism.
- Tutorial-computational-fact-checking-a-content-management-perspective.
- Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
- Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
- The Effect of Fact-checking on Elites.
- Why do journalists fact-check.
- Fact-checking 101.
- Sagan-Baloney.
- Fact Checking.

B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:

- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries

- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University

- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

- C. Do full fact checking of the facts the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- D. Do full fact checking of the figures the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- E. Do full fact checking of the statistics the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- F. Do full fact checking of the formulas the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- G. Do full fact checking of the mathematical results the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

Step 15 Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?
- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?

- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing views? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing views to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

Step 16. Checking Each Fact's Sources, If they Are Reliable or Unreliable. Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Is the Source Reliable or Unreliable?

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.
 34. Eyewitness.

- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original format and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries, Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website
 8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories
 8. Is the Source Reliable or Unreliable?

STEP 17 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Rhetoric Of Texts.

A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:

- Rhetoric By Aristotle.
- A Companion to Rhetoric and Rhetorical Criticism.
- Ancient Rhetoric From Aristotle to Philostratus.
- Ancient Rhetoric For Contemporary Students by Sharon Crowley.
- Art Of Rhetoric By Aristotle.
- Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
- Encyclopaedia of Rhetoric.
- On Rhetoric: Theory of Civic Discourse by Aristotle.
- Politics and Rhetoric: The Persuasive Power of Metaphor.
- Rhetoric By Jennifer Richards.
- Rhetoric In Details By John Benjamins.
- Rhetorical Grammar By Martha Kolln.
- Sourcebook on Rhetoric By James Jasinski.
- The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
- The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
- The Rhetoric of Reason By James Crosswhite.
- Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
- Writing Arguments: a RHETORIC With Reading by John Ramage.

B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

When only two answers are given by all of the authors examined, the issue is a relatively simple one. Often, more than two alternative answers are given to a question. In that case, the opposing answers must be ordered in relation to one another, and the authors who adopt them classified according to their views.

An issue is truly joined when two authors who understand a question in the same way answer it in contrary or contradictory ways. But this does not happen as often as one might wish. Usually, differences in answers must be ascribed to *different conceptions of the question* as often as to *different views of the subject*. The task of the syntopical reader is to define the issues in such a way as to insure that they are joined as well as may be. Sometimes this forces him to frame the question in a way that is not explicitly employed by any author.

There may be many issues involved in the discussion of the problem we are dealing with, but it is likely that they will fall into groups. Questions about the character of the idea under consideration, for example, may generate a number of issues that are connected. A number of issues revolving around a closely connected set of questions may be termed the *controversy* about that aspect of the subject. Such a controversy may be very complicated, and it is the task of the syntopical reader to sort it out and arrange it in an orderly and perspicuous fashion, even if no author has managed to do that. This sorting and arranging of the controversies, as well as of the constituent issues, brings us to the final step in syntopical reading.

STEP 18 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. So far we have found the relevant passages in the works examined, created a neutral terminology that applies to all or most of the authors examined, framed and ordered a set of questions that most of them can be interpreted as answering, and defined and arranged the issues produced by differing answers to the questions. What then remains to be done?

The first four steps correspond to the first two groups of rules for analytical reading. Those rules, when followed and applied to any book, allowed us to answer the questions, What does it say? and How does it say it? In our syntopical reading project, we are similarly able at this point to answer the same questions about the discussion concerning our problem. In the case of the analytical reading of a single work, two further questions remained to be answered, namely, Is it true? and What of it? In the case of syntopical reading, we are now prepared to address ourselves to similar questions about the discussion.

Let us assume that the problem with which we began was not a simple one, but was rather one of those perennial problems with which thinkers have struggled for centuries, and about which good men have disagreed and can continue to disagree. We should recognize, on this assumption, that our task as syntopical readers is not merely to answer the questions ourselves—the questions that we have so carefully framed and ordered both to elucidate the discussion of the subject and the subject itself. The truth about a problem

of this sort is not found so easily. In fact, we would probably be presumptuous to expect that the truth could be found in any one set of answers to the questions. Rather, it is to be found, if at all, in *the conflict of opposing answers*, many if not all of which may have persuasive evidence and convincing reasons to support them.

The truth, then, insofar as it can be found—the solution to the problem, insofar as that is available to us—consists rather in the *ordered discussion itself* than in any set of propositions or assertions about it. Thus, in order to present this truth to our minds—and to the minds of others—we have to do more than merely ask and answer the questions. We have to ask them in a certain order, and be able to defend that order; we must show how the questions are answered differently and try to say why; and we must be able to point to the texts in the books examined that support our classification of answers. Only when we have done all of this can we claim to have analysed the discussion of our problem. And only then can we claim to have understood it.

We may, indeed, have done more than that. A thorough analysis of the discussion of a problem may provide the groundwork for further productive work on the problem by others. It can clear away the deadwood and prepare the way for an original thinker to make a breakthrough. Without the work of analysis, that might not have been possible, for the dimensions of the problem might not have been visible.

The Need for Objectivity

An adequate analysis of the discussion of a problem or subject matter identifies and reports the major issues, or basic intellectual oppositions, in that discussion. This does not imply that disagreement is always the dominant feature of every discussion. On the contrary, agreement in most cases accompanies disagreement; that is, on most issues, the opinions or views that present opposite sides of the dispute are shared by several authors, often by many. Seldom do we find a solitary exponent of a controversial position.

The agreement of human beings about the nature of things in any field of inquiry establishes some presumption of the truth of the opinions they commonly hold. But their disagreement establishes the counter-presumption—that *none* of the opinions in conflict, whether shared or not, may be wholly true. Among conflicting opinions, one may, of course, be wholly true and all the rest false; but it is also possible that each expresses *some portion of the whole truth*; and, except for flat and isolated contradictions (which are rare in any discussion of the kind of problems we are dealing with here), it is even possible that *all the conflicting opinions may be false*, just as it is possible for that opinion to be false on which all seem to agree. Some opinion as yet unexpressed may be the truth or nearer to it.

This is another way of saying that the aim of a project of syntopical reading is not final answers to the questions that are developed in the course of it, or the final solution of the problem with which the project began. This is particularly true of the report we might try to make of such syntopical reading. It would be dogmatic, not dialectical, if, on any of the important issues that it identified and analyzed, it asserted or tried to prove the truth or falsity of any view. If it did that, the syntopical analysis would cease to be syntopical; it would become simply one more voice in the discussion, thereby losing its detached and objective character.

The point is not that one more voice carries no weight in the forum of human discussion on important issues. The point is that a different type of contribution to the pursuit of understanding can and should be made. And this contribution consists in being resolutely objective and detached throughout. The special quality that a syntopical analysis tries to achieve can, indeed, be summarized in the two words “dialectical objectivity.”

The syntopical reader, in short, tries to *look at all sides and to take no sides*. Of course, he will fail in this exacting ideal. Absolute objectivity is not humanly possible. He may succeed in taking no sides, presenting the issues without prejudice to any partisan point of view, and treating opposing views impartially. But it is easier to take no sides than to look at all sides. In this latter respect, the syntopical reader will undoubtedly fail. All possible sides of an issue cannot be exhaustively enumerated. Nevertheless, he must try.

Taking no sides is easier than looking at all sides, we say, but it remains difficult even so. The syntopical reader must resist certain temptations and know his own mind. Perfect dialectical objectivity is not guaranteed by avoiding *explicit* judgments on the truth of conflicting opinions. Partiality can intrude in a variety of subtle ways —by the manner in which arguments are summarised, by shades of emphasis and neglect, by the tone of a

question or the colour of a passing remark, and by the order in which the various different answers to key questions are presented.

In order to avoid some of these dangers, the conscientious syntopical reader may resort to one obvious device and use it as much as possible. That is, *he must constantly refer back to the actual text of his authors*, reading the relevant passages over and over; and, in presenting the results of his work to a wider audience, he must quote the opinion or argument of an author in the writer's own language. Although it may appear to do so, this does not contradict what we said earlier about the necessity of finding a neutral terminology in which to analyze the problem. That necessity remains, and when summaries of an author's argument are presented, they must be presented in that language and not the author's. But the author's own words, carefully quoted so as not to wrench them out of context, must accompany the summary, so that the reader can judge for himself whether the interpretation of the author is correct.

Only the syntopical reader's firm intention to avoid them can be relied on to prevent other sorts of departure from dialectical objectivity. That ideal demands a deliberate effort to balance question against question, to forgo any comment that might be prejudicial, to check any tendency toward overemphasis or underemphasis. In the last analysis, although a reader may be the judge of the effectiveness of a written report of a dialectical exposition, only the writer of it—only the syntopical reader himself—can know whether he has satisfied these requirements.

An Example of an Exercise in Syntopical Reading: The Idea of Progress

An example may be helpful to explain how syntopical reading works. Let us consider the idea of progress. We do not take this subject at random. We have done extensive research on it. The example would not be so useful to you if that were not so.

The investigation of this important historical and philosophical idea occupied several years. The first task was to produce a list of works to be examined for relevant passages—to amass a bibliography (it finally ran to more than 450 items). This task was accomplished by a series of inspectional readings of several times that many books, articles, and other pieces. It is important to point out that in the case of the idea of progress, as would be true in the case of most other important ideas, many of the items finally judged to be relevant were found more or less by accident, or at least with the help of educated guesses. There were obvious places to start; many recent books contain the word “progress” in their titles. But others do not, and most of the older books, although relevant to the subject, do not even employ the term.

A few fictional and poetical works were read, but on the whole it was decided to concentrate on expository works. We have already observed that including novels, plays, and poems in a syntopical reading project is difficult, and this is so for several reasons. First of all, the backbone or essence of a story is its plot, not its positions on issues. Second, even the most talkative characters seldom take clear positions on an issue—they tend to talk, in the story, about other matters, mainly emotional relations. Third, even if a character does make such a speech—as, for example, Settembrini does about progress in Thomas Mann’s *Magic Mountain*—we can never be sure that it is the *author’s* view that is being represented. Is the author being ironic in allowing his character to go on about the subject? Is he intending you to see the foolishness of the position, rather than its wisdom? Generally speaking, an intensive effort of synthetic interpretation is required before a fictional work can be placed on one side or another of an issue. The effort is so great, and the results essentially so dubious, that usually it is prudent to abstain.

The discussion of progress in the many works that remained to be examined was, as is usually the case, apparently chaotic. Faced with this fact, the task was, as we have indicated, to develop a neutral terminology. This was a complex undertaking, but one example may help to explain what was done.

The word “progress” itself is used by authors in a number of different ways. Most of these different ways reflect no more than shades of meaning, and they can be handled in the analysis. But the word is used by *some* authors to denote a certain kind of movement forward in history that is not an improvement. Since *most* of the authors use the word to denote a historical change in the human condition that is for the better, and since betterment is of the essence of the conception, the same word could not be applied to both views. In this case, the majority gained the day, and the minority faction had to be referred to as authors who assert “non-meliorative advance” in history. The point is that when

discussing the views of the minority faction, *we could not employ the word “progress,” even though the authors involved had used it themselves.*

The third step in syntopical reading is, as we have noted, getting the questions clear. Our intuition about the primary question in the case of progress turned out to be correct upon examination. The first question to ask, the question to which authors can be interpreted as giving various answers, is, Does progress occur in history? Is it a fact that the general course of historical change is in the direction of improvement in man's condition? Basically, there are three different answers to this question put forth in the literature of the subject: (1) Yes, (2) No, and (3) We cannot know. However, there are a number of different ways of saying Yes, several different ways of saying No, and at least three different ways of saying that we cannot know whether human progress occurs or not.

The multifarious and interrelated answers to this primary question constitute what we decided to call the *general* controversy about progress. It is general in the sense that every author we studied who has anything significant to say about the subject takes sides on the various issues that can be identified within it. But there is also a *special* controversy about progress, which is made up of issues that are joined only by progress authors—authors who assert that progress occurs. These issues have to do with the nature or properties of the progress that they all, *being progress authors*, assert is a fact of history. There are only three issues here, although the discussion of each of them is complex. They can be stated as questions: (1) Is progress necessary, or is it contingent on other occurrences? (2) Will progress continue indefinitely, or will it eventually come to an end or “plateau out”? (3) Is there progress in human nature as well as in human institutions—in the human animal itself, or merely in the external conditions of human life?

Finally, there is a set of subordinate issues, as we called them, again only among progress authors, about the *respects* in which progress occurs. We identified six areas in which progress is said by some authors to occur, although other writers deny its occurrence in one or more of these areas—although never in all (since they are by definition authors who assert the occurrence of some kind of progress). The six are:

(1) progress in knowledge, (2) technological progress, (3) economic progress, (4) political progress, (5) moral progress, and (6) progress in the fine arts. The discussion of the last point raises special problems, since in our opinion no author genuinely asserts that such aesthetic progress occurs, although a number of writers deny that progress occurs in this respect.

The structure of the analysis of progress just described exemplifies our effort to define the issues within the discussion of this subject and to analyze the discussion itself—in other words, to take the fourth and fifth steps in syntopical reading. And something like this must always be done by a syntopical reader, although of course he does not always have to write a long book reporting his researches.¹¹

The Syntopicon and How to Use It

If you read this chapter carefully, you will have noticed that, although we spent some time discussing it, we did not really solve what we called the paradox of syntopical reading. That paradox can be stated thus: Unless you know what books to read, you cannot read syntopically, but unless you can read syntopically, you do not know what to read. Another way to state it is in the form of what may be called the fundamental problem of syntopical reading, namely, that if you do not know where to start, you cannot read syntopically; and even if you have a rough idea of where to begin, the time required to find the relevant books and relevant passages in those books may exceed the time required to take all of the other steps combined.

Actually, of course, there is at least a theoretical resolution of the paradox and solution of the problem. Theoretically, you could know the major literature of our tradition so thoroughly that you had a working notion of where every idea is discussed in it. But if you are such a person, you need no help from anybody, and we cannot tell you anything you do not know about syntopical reading.

On the other hand, even if you did not have this knowledge yourself, you might be able to apply to someone else who did. But you should recognize that if you were able to apply to such a person, his advice might turn out to be almost as much a hindrance as a help. If the subject was one on which he had himself done special research, it would be hard for him merely to tell you the relevant passages to read without telling you *how to read them*—and that might well get in your way. But if he had not done special research on the subject, he might not know a great deal more than yourself, although it might seem so both to him and to you.

What is needed, therefore, is a reference book that tells you where to go to find the relevant passages on a large number of subjects of interest, without at the same time saying how the passages should be read—without prejudging their meaning or significance. The Syntopicon is an example of such a work. Produced in the 1940s, it is a topical index to the set of books titled *Great Books of the Western World*. Under each of some 3,000 topics or subjects, it lists references to pages within the set where that subject is discussed. Some of the references are to passages covering many pages, others are to key paragraphs or even parts of paragraphs. No more time is required to find them than is needed to take down the indicated volume and flip through its pages.

The Syntopicon has one major defect, of course. It is an index of just one set of books (albeit a large one), and it gives only a very rough indication of where passages may be found in other books that are not included in the set. Nevertheless, it always provides you with at least a place to start on any syntopical reading project. And it is also true that the books included in the set are ones that you would almost always want to read anyway, in the course of any such project. Thus the Syntopicon should be able to save the mature scholar or reader who is beginning his research into a certain problem much of the preliminary labor of research, and advance him rapidly to the point where he can begin to think independently about it, because he knows what thinking has been done.

Useful as the Syntopicon is for that kind of reader, it is much more useful for the beginner. The Syntopicon can help such a reader in three ways: *initiatively*, *suggestively*, and *instructively*.

It works *initiatively* by overcoming the initial difficulty that anyone faces when confronted by the classical books of our tradition. These works are a little overpowering. We may wish that we had read them, but often we do not do so. We find ourselves advised from all sides to read them, and we are given reading programs, beginning with the easier works and proceeding to the more difficult ones. But all such programs require the reading of whole books or, at least, the integral reading of large parts of them. It is a matter of general experience that this kind of solution seldom achieves the desired result.

A syntopical reading of these major works with the aid of the Syntopicon provides a radically different solution. The Syntopicon initiates the reading of great books by enabling persons to read particular ones on the subjects in which they are interested; and on those subjects, to read relatively short passages from a large number of authors. It helps us to read *in* the great books before we have read *through* them.

Syntopical reading in the great books, with the help of the Syntopicon, may also work *suggestively*. Starting from the reader's existing interest in a particular subject, it may arouse or create other interests in related subjects. And once started on an author, it is hard not to explore the context. Before you know it, you have read a good portion of the book.

Finally, syntopical reading with the aid of the Syntopicon works *instructively*, in three distinct ways. This, in fact, is one of the major benefits of this level of reading.

***First*, the topic in connection with which the passage is being read serves to give direction to the reader in interpreting the passage. But it does not tell him what the passage means, since the passage may be relevant to the topic in several or many different ways. Hence the reader is called upon to *discover precisely what relevance the passage has to the topic*. To learn to do this is to acquire a major skill in the art of reading.**

***Second*, the collection of a number of passages on the same topic, but from different works and different authors, serves to *sharpen the reader's interpretation of each passage read*. Sometimes, when passages from the same book are read in sequence and in the context of one another, each becomes clearer. Sometimes the meaning of each of a series of contrasting or conflicting passages from different books is accentuated when they are read against one another. And sometimes the passages from one author, by amplifying or commenting on the passages from another, materially help the reader's understanding of the second author.**

***Third*, if syntopical reading is done on a number of different subjects, the fact that the same passage will often be found cited in the Syntopicon under two or more subjects will have its instructive effect. The passage has an amplitude of**

meaning that the reader will come to perceive as he interprets it somewhat differently in relation to different topics. Such multiple interpretation not only is a basic exercise in the art of reading but also tends to make the mind habitually alert to the many strains of meaning that any rich or complex passage can contain.

Because we believe that the Syntopicon can be useful to any reader wishing to read in the manner described in this chapter, be he a beginner or a mature scholar and researcher, we have taken the liberty of adopting its name for this level of reading. We hope the reader will forgive us what may seem to be a small self-indulgence. In return for that forgiveness, we would like to point out an important fact. There is a considerable difference between syntopical reading, with a small “s,” and Syntopical reading, where the latter phrase refers to reading the great books with the help of the Syntopicon. Syntopical reading, in the latter sense, can constitute a *part* of any syntopical reading project where the term is used in the former sense, and perhaps it would always be wise to start there. But syntopical reading with a small “s” is a term of much wider application than Syntopical reading.

On the Principles That Underlie Syntopical Reading

There are those who say that syntopical reading (in the broader sense just mentioned) is impossible. It is wrong, they say, to impose a terminology, even a “neutral” one (if there is any such thing), on an author. His own terminology must be treated as sacrosanct, because books should never be read “out of context,” and besides, translation from one set of terms to another is always dangerous because words are not controllable like mathematical symbols. Further, the objectors maintain, syntopical reading involves reading authors widely separated in space and time, and differing radically in style and approach, as if they were members of the same universe of discourse, as if they were talking to one another—and this distorts the facts of the matter. Each author is a little universe in himself, and although connections can be made between different books written by the same author at different times (even here there are dangers, they warn), there are no clear connections relating one author to another. They maintain, finally, that the *subjects* that authors discuss, as such, are not as important as the *ways* in which they discuss them. The style, they say, is the man; and if we ignore *how* an author says something, in the process of trying to discover *what* he says, we will miss both kinds of understanding.

It should be apparent that we disagree with all of those charges, and therefore an answer to each of them is in order. Let us take them one at a time.

First, to the point about *terminology*. To deny that an idea can be expressed in more than one set of terms is similar to denying that translation is possible from one natural language to another. That denial is made, of course. Recently, for example, we read an introduction to a new translation of the Koran that began by saying that to translate the Koran is impossible. But since the author then proceeded to explain how he had done it, we could only assume that he meant that translation is particularly difficult in the case of a

book held to be holy by large numbers of people. We would agree. But the difficult is not the impossible.

In fact, the view that an author's terms must be treated as sacrosanct is probably always merely another way of saying that it is difficult to translate from one terminology to another. We would agree to that, too. But again, the difficult is not the impossible.

Second, to the point about *the separateness and uniqueness of authors*. This comes down to saying that if Aristotle, for example, walked into our office, attired no doubt in robes and accompanied by an interpreter who knew both modern English and classical Greek, we would not be able to understand him or he us. We simply do not believe it. Doubtless Aristotle would be amazed at some of the things he saw, but we are quite confident that within ten minutes we could, if we wanted to, be engaged in a philosophical discussion of problems that we shared. There might be recurrent difficulties about certain conceptions, but as soon as we recognized them as such, we could resolve them.

If that is possible (and we do not really think anyone would deny it), then it is not impossible for one book to "talk" to another through the medium of an interpreter—namely, you, the syntopical reader. Care is required, of course, and you should know both "languages"—that is, both books—as well as you can. But the problem is not insuperable, and it is simply foolish to suggest that it is.

Finally, to the point about the *manner or style*. This is equivalent, we think, to saying that there is no rational communication among men, but that all men communicate at the emotional level, which is the same level at which they communicate with pets. If you say "I love you" to your dog in an angry tone of voice, he will cower; but he does not understand you. Can anyone seriously assert that there is *nothing more* than tone of voice or gesture in vocal communications between two human beings? Tone of voice is important, particularly when emotional relations are the primary content of the communication; and body language probably has things to tell us if we will only listen (look?). But there is something else, too, in human communication. If you ask someone how to reach the exit, and he tells you to follow Corridor B, it does not matter what tone of voice he employs. He is either right or wrong, lying or telling the truth, but the point is that you will soon find that out by following Corridor B. You have understood *what* he said as well as reacting, no doubt in all sorts of ways, to *how* he said it.

Believing, then, that translation is possible (because it is done all the time), that books can "talk" to one another (because human beings do so), and that there is an objective, rational content of communication between human beings when they are trying to be rational (because we can and do learn from each other), we believe that syntopical reading is possible.

Summary of Syntopical Reading

We have now completed our discussion of syntopical reading. Let us therefore display the various steps that must be taken at this level of reading in outline form.

As we have seen, there are two main stages of syntopical reading. One is preparatory, and the other is syntopical reading proper. Let us write out all of these steps for review.

I. SURVEYING THE FIELD PREPARATORY TO SYNTOPICAL READING

1. Create a tentative bibliography of your subject by recourse to library catalogues, advisors, and bibliographies in books.

2. Inspect *all* of the books on the tentative bibliography to ascertain which are germane to your subject, and also to acquire a clearer idea of the subject.

Note: These two steps are not, strictly speaking, chronologically distinct; that is, the two steps have an effect on each other, with the second, in particular, serving to modify the first.

II. Use Rules of Reading by reading by reading the various text. SYNTOPICAL READING OF THE BIBLIOGRAPHY AMASSED IN STAGE I

1. Inspect the books already identified as relevant to your subject in Stage I in order to find the most relevant passages.

2. Use Rules of Reading by reading the various text. Bring the authors to terms by constructing a neutral terminology of the subject that all, or the great majority, of the authors can be interpreted as employing, whether they actually employ the words or not.

3. Use Rules of Reading by reading the various text. Establish a set of neutral propositions for all of the authors by framing a set of questions to which all or most of the authors can be interpreted as giving answers, whether they actually treat the questions explicitly or not.

4. Use Rules of Reading by reading the various text. Define the issues, both major and minor ones, by ranging the opposing answers of authors to the various questions on one side of an issue or another. You should remember that an issue does not always exist explicitly between or among authors, but that it sometimes has to be constructed by interpretation of the authors' views on matters that may not have been their primary concern.

5. Use Rules of Reading by reading the various text. Analyze the discussion by ordering the questions and issues in such a way as to throw maximum light on the subject. More general issues should precede less general ones, and relations among issues should be clearly indicated.

Note: Dialectical detachment or objectivity should, ideally, be maintained throughout. One way to insure this is always to accompany an interpretation of an author's views on an issue with an actual quotation from his text.

Reading and the Growth of the Mind

We have now completed the task that lay before us at the beginning of this book. We have shown that activity is the essence of good reading, and that the more active reading is, the better it is.

We have defined active reading as the asking of questions, and we have indicated what questions must be asked of any book, and how those questions must be answered in different ways for different kinds of books.

We have identified and discussed the four levels of reading, and shown how these are cumulative, earlier or lower levels being contained in later or higher ones. Consequent upon our stated intention, we have laid more stress upon the later and higher levels of reading than upon the earlier and lower ones, and we have therefore emphasized analytical and syntopical reading. Since analytical reading is probably the most unfamiliar kind for most readers, we have discussed it at greater length than any of the other levels, giving its rules and explaining them in the order in which they must be applied. But almost everything that was said of analytical reading also applies, with certain adaptations that were mentioned in the last chapter, to syntopical reading as well.

We have completed our task, but you may not have completed yours. We do not need to remind you that this is a practical book, nor that the reader of a practical book has a special obligation with respect to it. If, we said, the reader of a practical book accepts the ends it proposes and agrees that the means recommended are appropriate and effective, then he must act in the way proposed. You may not accept the primary aim we have endorsed—namely, that you should be able to read as well as possible—nor the means we have proposed to reach it—namely, the rules of inspectional, analytical, and syntopical reading. (In that case, however, you are not likely to be reading this page.) But if you do accept that aim and agree that the means are appropriate, then you must make the effort to read as you probably have never read before.

That is your task and your obligation. Can we help you in it in any way?

We think we can. The task falls mainly on you—it is you who, henceforth, must do all the work (and obtain all the benefits). But there are several things that remain to be said, about the end and the means. Let us discuss the latter first.

What Good Books Can Do for Us

“Means” can be interpreted in two ways. In the previous paragraph, we interpreted the term as referring to the rules of reading, that is, the *method* by which you become a better reader. But “means” can also be interpreted as referring to *the things you read*. Having a method without materials to which it can be applied is as useless as having the materials with no method to apply to them.

In the latter sense of the term, the means that will serve you in the further improvement of your reading are the books you will read. We have said that the method

applies to anything you read, and that is true, if you understand by the statement any *kind* of book—whether fiction or nonfiction, imaginative or expository, practical or theoretical. But in fact, the method, at least as it is exemplified in our discussion of analytical and syntopical reading, *does not apply to every book*. The reason is that some books do not require it.

We have made this point before, but we want to make it now again because of its relevance to the task that lies before you. *If you are reading in order to become a better reader, you cannot read just any book or article*. You will not improve as a reader if all you read are books that are well within your capacity. You must tackle books that are beyond you, or, as we have said, books that are over your head. Only books of that sort will make you stretch your mind. And unless you stretch, you will not learn.

Thus, it becomes of crucial importance for you not only to be able to read well but also to be able to identify those books that make the kinds of demands on you that improvement in reading ability requires. A book that can do no more than amuse or entertain you may be a pleasant diversion for an idle hour, but you must not expect to get anything but amusement from it. We are not against amusement in its own right, but we do want to stress that *improvement in reading skill does not accompany it*. The same goes for a book that merely informs you of facts that you did not know without adding to your understanding of those facts. Reading for information does not stretch your mind any more than reading for amusement. It may seem as though it does, but that is merely because your mind is fuller of facts than it was before you read the book. However, your mind is essentially in the same condition that it was before. There has been a quantitative change, but no improvement in your skill.

We have said many times that the good reader makes demands on himself when he reads. He reads actively, effortfully. Now we are saying something else. The books that you will want to practice your reading on, particularly your analytical reading, *must also make demands on you*. They must seem to you to be beyond your capacity. You need not fear that they really are, because there is no book that is completely out of your grasp if you apply the rules of reading to it that we have described. This does not mean, of course, that these rules will accomplish immediate miracles for you. There are certainly some books that will continue to extend you no matter how good a reader you are. Actually, those are the very books that you must seek out, because they are the ones that can best help you to become an ever more skillful reader.

Some readers make the mistake of supposing that such books—the ones that provide a constant and never-ending challenge to their skill—are always ones in relatively unfamiliar fields. In practice, this comes down to believing, in the case of most readers, that only scientific books, and perhaps philosophical ones, satisfy the criterion. But that is far from the case. We have already remarked that the great scientific books are in many ways easier to read than non-scientific ones, because of the care with which scientific authors help you to come to terms, identify the key propositions, and state the main arguments. These helps are absent from poetical works, and so in the long run they are quite likely to be the hardest, the most demanding, books that you can read. Homer, for

example, is in many ways harder to read than Newton, despite the fact that you may get more out of Homer the first time through. The reason is that Homer deals with subjects that are harder to write well about.

The difficulties that we are talking about here are very different from the difficulties that are presented by a bad book. It is hard to read a bad book, too, for it defies your efforts to analyze it, slipping through your fingers whenever you think you have it pinned down. In fact, in the case of a bad book, there is really nothing *to* pin down. It is not worth the effort of trying. You receive no reward for your struggle.

A good book does reward you for trying to read it. The best books reward you most of all. The reward, of course, is of two kinds. First, there is the improvement in your reading skill that occurs when you successfully tackle a good, difficult work. Second—and this in the long run is much more important—a good book can teach you about the world and about yourself. You learn more than how to read better; you also learn more about life. You become wiser. Not just more knowledgeable—books that provide nothing but information can produce that result. But wiser, in the sense that you are more deeply aware of the great and enduring truths of human life.

There are some human problems, after all, that have no solution. There are some relationships, both among human beings and between human beings and the nonhuman world, about which no one can have the last word. This is true not only in such fields as science and philosophy, where it is obvious that final understanding about nature and its laws, and about being and becoming, has not been achieved by anyone and never will be; it is also true of such familiar and everyday matters as the relation between men and women, or parents and children, or man and God. These are matters about which you cannot think too much, or too well. The greatest books can help you to think better about them, because they were written by men and women who thought better than other people about them.

The Pyramid of Books

The great majority of the several million books that have been written in the Western tradition alone—more than 99 per cent of them—will not make sufficient demands on you for you to improve your skill in reading. This may seem like a distressing fact, and the percentages may seem an overestimate. But obviously, considering the numbers involved, it is true. These are the books that can be read only for amusement or information. The amusement may be of many kinds, and the information may be interesting in all sorts of ways. But you should not expect to learn anything of importance from them. In fact, you do not have to read them—analytically—at all. Skimming will do.

There is a second class of books from which you can learn—both how to read and how to live. Less than one out of every hundred books belongs in this class—probably it is more like one in a thousand, or even one in ten thousand. These are the good books, the ones that were carefully wrought by their authors, the ones that convey to the reader

significant insights about subjects of enduring interest to human beings. There are in all probably no more than a few thousand such books. They make severe demands on the reader. They are worth reading analytically—once. If you are skillful, you will be able to get everything out of them that they can give in the course of one good reading. They are books that you read once and then put away on your shelf. You know that you will never have to read them again, although you may return to them to check certain points or to refresh your memory of certain ideas or episodes. (It is in the case of such books that the notes you make in the margin or elsewhere in the volume are particularly valuable.)

How do you know that you do not ever have to read such books again? You know it by your own mental reaction to the experience of reading them. Such a book stretches your mind and increases your understanding. But as your mind stretches and your understanding increases, you realize, by a process that is more or less mysterious, that you are not going to be changed any more in the future by this book. You realize that you have grasped the book in its entirety. You have milked it dry. You are grateful to it for what it has given you, but you know it has no more to give.

Of the few thousand such books there is a much smaller number—here the number is probably less than a hundred—that cannot be exhausted by even the very best reading you can manage. How do you recognize this? Again it is rather mysterious, but when you have closed the book after reading it analytically to the best of your ability, and place it back on the shelf, you have a sneaking suspicion that there is more there than you got. We say “suspicion” because that may be all it is at this stage. If you knew what it was that you had missed, your obligation as an analytical reader would take you back to the book immediately to seek it out. In fact, you cannot put your finger on it, but you know it is there. You find that you cannot forget the book, that you keep thinking about it and your reaction to it. Finally, you return to it. And then a very remarkable thing happens.

If the book belongs to the second class of books to which we referred before, you find, on returning to it, that there was *less there than you remembered*. The reason, of course, is that you yourself have grown in the meantime. Your mind is fuller, your understanding greater. The book has not changed, but you have. Such a return is inevitably disappointing.

But if the book belongs to the highest class—the very small number of inexhaustible books—you discover on returning that *the book seems to have grown with you*. You see new things in it—whole sets of new things—that you did not see before. Your previous understanding of the book is not invalidated (assuming that you read it well the first time); it is just as true as it ever was, and in the same ways that it was true before. But now it is true in still other ways, too.

How can a book grow as you grow? It is impossible, of course; a book, once it is written and published, does not change. But what you only now begin to realize is that the book was so far above you to begin with that it has remained above you, and probably always will remain so. Since it is a really good book—a great book, as we might say—it is accessible at different levels. Your impression of increased understanding on your

previous reading was not false. The book truly lifted you then. But now, even though you have become wiser and more knowledgeable, it can lift you again. And it will go on doing this until you die.

There are obviously not many books that can do this for any of us. Our estimate was that the number is considerably less than a hundred. But the number is *even less than that for any given reader*. Human beings differ in many ways other than in the power of their minds. They have different tastes; different things appeal more to one person than to another. You may never feel about Newton the way you feel about Shakespeare, either because you may be able to read Newton so well that you do not have to read him again, or because mathematical systems of the world just do not have all that appeal to you. Or, if they do—Charles Darwin is an example of such a person—then Newton may be one of the handful of books that are great for you, and not Shakespeare.

We do not want to state authoritatively that any particular book or group of books must be great for you, in this sense, although in our first Appendix we do list those books that experience has shown are capable of having this kind of value for many readers. Our point, instead, is that *you should seek out the few books that can have this value for you*. They are the books that will teach you the most, both about reading and about life. They are the books to which you will want to return over and over. They are the books that will help you to grow.

The Life and Growth of the Mind

There is an old test—it was quite popular a generation ago—that was designed to tell you which books are the ones that can do this for you. Suppose, the test went, that you know in advance that you will be marooned on a desert island for the rest of your life, or at least for a long period. Suppose, too, that you have time to prepare for the experience. There are certain practical and useful articles that you would be sure to take with you. You will also be allowed ten books. Which ones would you select?

Trying to decide on a list is instructive, and not only because it may help you to identify the books that you would most like to read and reread. That, in fact, is probably of minor importance, compared with what you can learn about yourself when you imagine what life would be like if you were cut off from all the sources of amusement, information, and understanding that ordinarily surround you. Remember, there would be no radio or television on the island, and no lending library. There would be just you and ten books.

This imagined situation seems bizarre and unreal when you begin to think about it. But is it actually so unreal? We do not think so. We are all to some extent persons marooned on a desert island. We all face the same challenge that we would face if we really were there—the challenge of finding the resources within ourselves to live a good human life.

There is a strange fact about the human mind, a fact that differentiates the mind sharply from the body. The body is limited in ways that the mind is not. One sign of this is that the body does not continue indefinitely to grow in strength and develop in skill and

grace. By the time most people are thirty years old, their bodies are as good as they will ever be; in fact, many persons' bodies have begun to deteriorate by that time. *But there is no limit to the amount of growth and development that the mind can sustain.* The mind does not stop growing at any particular age; only when the brain itself loses its vigor, in senescence, does the mind lose its power to increase in skill and understanding.

This is one of the most remarkable things about human beings, and it may actually be the major difference between *Homo sapiens* and the others animals, which do not seem to grow mentally beyond a certain stage in their development. But this great advantage that man possesses carries with it a great peril. *The mind can atrophy*, like the muscles, *if it is not used*. Atrophy of the mental muscles is the penalty that we pay for not taking mental exercise. And this is a terrible penalty, for there is evidence that atrophy of the mind is a mortal disease. There seems to be no other explanation for the fact that so many busy people die so soon after retirement. They were kept alive by the demands of their work upon their minds; they were propped up artificially, as it were, by external forces. But as soon as those demands cease, having no resources within themselves in the way of mental activity, they cease thinking altogether, and expire.

Television, radio, and all the sources of amusement and information that surround us in our daily lives are also artificial props. They can give us the impression that our minds are active, because we are required to react to stimuli from outside. But the power of those external stimuli to keep us going is limited. They are like drugs. We grow used to them, and we continuously need more and more of them. Eventually, they have little or no effect. Then, if we lack resources within ourselves, we cease to grow intellectually, morally, and spiritually. And when we cease to grow, we begin to die.

Reading well, which means reading actively, is thus not only a good in itself, nor is it merely a means to advancement in our work or career. It also serves to keep our minds alive and growing.

Deep Work and Research

Method 24 - The Craft of Research

Part I

Research, Researchers, and Readers

1.1 WHAT IS RESEARCH?

In the broadest terms, we do research whenever we gather information to answer a question that solves a problem:

PROBLEM: Where do I find a new head gasket for my '65 Mustang?

RESEARCH: Look in the yellow pages for an auto-parts store, then call to see if it has one in stock.

PROBLEM: To settle a bet, I need to know when Michael Jordan was born.

RESEARCH: You Google "Michael Jordan birthday."

PROBLEM: I'm just curious about a new species of fish.

RESEARCH: You search the Internet for articles in newspapers and academic journals.

We all do that kind of research every day, and though we rarely write it up, we rely on those who wrote up theirs: Jordan's biographers, the fish discoverers, the publishers of the yellow pages and the catalogs of the auto-parts suppliers—they all wrote up their research because they knew that one day someone would have a question that they could answer.

If you're preparing to do a research project not because you want to but because it's been assigned, you might think that it is just make-work and treat it as an empty exercise. We hope you won't. Done well, your project prepares you to join the oldest and most esteemed of human conversations, one conducted for millennia among philosophers, engineers, biologists, social scientists, historians, literary critics, linguists, theologians, not to mention CEOs, lawyers, marketers, investment managers—the list is endless.

Right now, if you are a beginner, you may feel that the conversation is one-sided, that you have to listen more than you can speak because you have little to contribute. If you are a student, you may feel that you have only one reader: your teacher. All that may be

true, for the moment. But at some point, you will join a conversation that, at its best, can help you and your community free us from ignorance, prejudice, and the half-baked ideas that so many charlatans try to impose on us. It is no exaggeration to say that, maybe not today or tomorrow but one day, the research you do and the arguments you make using it can improve if not the whole world, then at least your corner of it.

1.2 WHY WRITE IT UP?

For some of you, though, the invitation to join this conversation may still seem easy to decline. If you accept it, you'll have to find a good question, search for sound data, formulate and support a good answer, and then write it all up. Even if you turn out a first-rate paper, it may be read not by an eager world but only by your teacher. *And, besides, you may think, my teacher knows all about my topic. What do I gain from writing up my research, other than proving I can do it?* One answer is that we write not just to share our work, but to improve it before we do.

1.2.1 Write to Remember

Experienced researchers first write just to remember what they've read. A few talented people can hold in mind masses of information, but most of us get lost when we think about what Smith found in light of Wong's position, and compare both to the odd data in Brunelli, especially as they are supported by Boskowitz—*but what was it that Smith said?* When you don't take notes on what you read, you're likely to forget or, worse, misremember it.

1.2.2 Write to Understand

A second reason for writing is to see larger patterns in what you read. When you arrange and rearrange the results of your research in new ways, you discover new implications, connections, and complications. Even if you could hold it all in mind, you would need help to line up arguments that pull in different directions, plot out complicated relationships, sort out disagreements among experts. *I want to use these claims from Wong, but her argument is undercut by Smith's data. When I put them side by side, I see that Smith ignores this last part of Wong's argument. Aha! If I introduce it with this part from Brunelli, I can focus on Wong more clearly.* That's why careful researchers never put off writing until

they've gathered all the data they need: they write from the start of their projects to help them assemble their information in new ways.

1.2.3 Write to Test Your Thinking

A third reason to write is to get your thoughts out of your head and onto paper, where you'll see what you really *can* think. Just about all of us, students and professionals alike, believe our ideas are more compelling in the dark of our minds than they turn out to be in the cold light of print. You can't know how good your ideas are until you separate them from the swift and muddy flow of thought and fix them in an organized form that you—and your readers—can study. In short, we write to remember more accurately, understand better, and evaluate what we think more objectively. (And as you will discover, the more you write, the better you read.)

1.3 WHY A FORMAL PAPER?

But even when they agree that writing is an important part of learning, thinking, and understanding, some still wonder why they can't write up their research in their own way, why they have to satisfy demands imposed by a community that they have not joined (or even want to) and conform to conventions they did nothing to create. *Why should I adopt language and forms that are not mine? Aren't you just trying to turn me into an academic like yourself? If I write as you expect me to, I risk losing my identity.*

Such concerns are legitimate (most teachers wish students would raise them more often). But it would be a feeble education that did not change you at all, and the deeper your education, the more it will change the “you” that you are or want to be. That's why it is so important to choose carefully what you study and with whom. But it would be a mistake to think that learning to report sound research must threaten your true identity. It will change the way you think, but only by giving you more ways of thinking. You will be different by being freer to choose whom you want to be and what you want to do with your life.

But the most important reason for learning to write in ways readers expect is that when you write for others, you demand more of yourself than when you write for yourself alone. By the time you fix your ideas in writing, they are so familiar to you that you need help to see them not for what you want them to be but for what they really are. You will understand your own work better when you try to anticipate your readers' inevitable and critical

questions: *How have you evaluated your evidence? Why do you think it's relevant? What ideas have you considered but rejected?*

All researchers, including us, can recall moments when in writing to meet their readers' expectations, they found a flaw or blunder in their thinking or even discovered a new insight that escaped them in a first draft written for themselves. You can do that only once you imagine and then meet the needs and expectations of informed and careful readers. When you do that, you create what we call a *rhetorical community* of shared values.

You might think, *OK, I'll write for readers, but why not in my own way?* The traditional forms that readers expect are more than just empty vessels into which you must pour your ideas. They also help writers think and communicate in ways they might not otherwise, and they embody the shared values of a research community. Whatever community you join, you'll be expected to show that you understand its practices by presenting your research in the standard forms, or *genres*, that a community uses to represent *what* it knows and *how* it knows. The various genres of research-based writing—the research paper, the scholarly article, the research report, the conference paper, the legal brief, and a great many others—have evolved to meet the needs of the communities that use them. Relatively stable, they allow both newcomers and longtime members of a community to come together through shared practices and expectations. Once you know the genres that belong to and define your particular research community, you'll be better able to answer your community's predictable questions and understand what its members care about and why. As you learn to write the genres of a field or profession, you become a member of that research community.

But as different as research communities are, what counts as good work is the same, whether it's in the academic world or the world of government, commerce, or technology. If you learn to do research well now, you gain an immense advantage in the kind of research you will do later, no matter where you do it.

1.4 WRITING IS THINKING

Writing up your research is, finally, thinking with and for your readers. When you write for others, you disentangle your ideas from your memories and wishes, so that you—and others—can explore, expand, combine, and understand them more fully. Thinking for

others is more careful, more sustained, more insightful—in short, more thoughtful—than just about any other kind of thinking.

You can, of course, take the easy way: do just enough to satisfy your teacher. This book will help you do that, but you'll shortchange yourself if that's all you do. If instead you find a topic that *you* care about, ask a question that *you* want to answer, then pursue that answer as best you can, your project can have the fascination of a mystery whose solution richly rewards your efforts. Nothing contributes more to successful research than your commitment to it, and nothing teaches you more about how to think than making a successful (or even unsuccessful) argument using it.

Some of the world's most important research has been done by those who persevered in the face of indifference or even hostility, because they never lost faith in their vision. The geneticist Barbara McClintock struggled for years unappreciated because her research community considered her work uninteresting. But she believed in it and pressed on. When her colleagues finally realized that she had already answered questions that they were just starting to ask, she won science's highest honor, the Nobel Prize.

We wish we could tell you how to balance your belief in the worth of your project with the need to accommodate the demands of teachers and colleagues, but we cannot. If you believe in what you're doing and cannot find anyone else who shares your beliefs, all you can do is put your head down and press on. With our admiration.

2 Connecting with Your Reader

Creating a Role for Yourself and Your Readers

Research counts for little if few read it. Yet even experienced researchers sometimes forget to keep their readers in mind as they plan and draft. In this chapter, we show you how to think about readers even before you begin your project.

Most of the important things we do, we do with others. Some students think research is different. They imagine the lone scholar in a hushed library. But no place is more filled with imagined voices than a library or lab. The view of research you see walking by these sites is only part of the story. When you read a book or a scientific paper, you silently converse with its writers—and through them with everyone else they have read. In fact, every time you go to a written source for information, you join a conversation between writers and readers that began more than five thousand years ago. And when you report your own research, you add your voice and can hope that other voices will respond to you, so that you can in turn respond to them. So it goes and, we hope, will continue for a long time to come.

2.1 CONVERSING WITH YOUR READERS

Conversations are social activities in which we are expected to play our parts. Face-to-face, we can judge how well we and others do that by sensing how a conversation is going. Do we treat each other as equals, speaking and listening civilly, answering each other's questions directly? Or does one of us seem to be playing the role of expert, assigning others the role of audience? We can judge how well a conversation is going as we have it, and we can adjust our roles and behavior to repair mistakes and misunderstandings as they occur. But writing is an *imagined* conversation. Once we decide what role to play and what role to assign our readers, those roles are fixed. If as we read we think, *Well, Abrams acknowledges Stanik's evidence, but he's dogmatic in criticizing it and ignores obvious counterexamples*, Abrams can't change what we read next to recover from our judgment.

Of course, judgments go both ways: just as readers judge writers, so writers also judge readers, but they do so before they write. Consider these two sentences:

Interruption of REM sleep has been shown not only to inhibit memory consolidation, especially for declarative memories, but also to significantly impair cognitive processes dependent on working memory function.

If you don't get enough sleep, not only will you struggle to retain facts and concepts, but your working memory function will also be impaired, making it difficult for you to hold information in mind and consequently to understand, think, and learn.

Both writers make judgments about their readers' needs and goals. The first addresses herself to knowledgeable colleagues interested in learning about the psychology of sleep and memory. She therefore focuses on abstract concepts and freely uses technical terms. The second presents himself as an expert patiently explaining a complicated matter to readers who know little about it, and so he largely avoids technical vocabulary. He also assumes that his readers want practical advice, and so he addresses them directly as "you" and shows them what his information means to them.

The two sentences are very different: the first reads like an excerpt from an advanced textbook; the second, like it comes from a guide on good study habits. But both would be effective if their writers judged their readers correctly.

But suppose the writers switched passages. Readers ignorant of cognitive psychology looking for practical advice would think that the writer of the first was indifferent to their needs; readers knowledgeable about sleep and memory would think that the writer of the second was talking down to them. When writers misjudge their readers in this way, they risk losing them.

In fact, writers can't avoid creating *some* role for themselves and their readers, planned or not. So those roles are worth thinking about from the beginning, before you write a word. If you ignore or miscast your readers, you'll leave so many traces of that mistake in your early drafts that you won't easily fix them in the final one.

In writing this book, we tried to imagine you—what you're like, what you know about research, whether you even care about it. We imagined a *persona* for you, a role we hoped you would adopt: someone who is interested in learning how to do and report research and who shares our belief in its importance (or at least is open to being persuaded). Then we imagined a persona of our own: writers committed to the value of research, interested in sharing how it works, talking not *at* you like a lecturer or *down* to

you like a pedant, but *with* the “you” we hoped you want to become. We tried to speak as easily to those of you starting your first project as to those of you doing advanced work. We hoped that new researchers would not be frustrated when we discussed issues they haven’t yet faced and that more experienced readers would be patient as we covered familiar ground. Only you can judge how well we’ve succeeded.

2.2 UNDERSTANDING YOUR ROLE

Since few people read formal research papers for entertainment, you have to create a relationship that encourages them to see why it’s in their interest to read yours. That’s not easy. Too many beginning researchers offer readers a relationship that caricatures a bad classroom: *Teacher, I know less than you. So my role is to show you how many facts I can dig up. Yours is to say whether I’ve found enough to give me a good grade.* Do that and you turn your project into a pointless drill that demeans both you and your teacher. Worse, you cast yourself in a role exactly opposite to that of a true researcher.

In true research, you must switch the roles of student and teacher. When you do research, you learn something that others don’t know. So when you report it, you must think of your reader as someone who doesn’t know it *but needs to* and yourself as someone who will *give her reason to want to know it*. You must imagine a relationship that goes beyond *Here are some facts I’ve dug up about fourteenth-century Tibetan weaving. Are they enough of the right ones?* There are three better reasons for offering those facts; the third is most common in academic research.

2.2.1 I’ve Found Some New and Interesting Information

You take the first step toward true research when you say to your reader, *Here are some facts about fourteenth-century Tibetan weaving that you do not know and may find interesting.* This offer assumes, of course, that your reader wants to know. But even if not, you must still cast yourself in the role of someone who has found something your reader will find interesting and your reader as someone who wants to know, *whether she really will or not*. Down the road, you’ll be expected to find (or create) a community of readers who not only share an interest in your topic (or can be convinced to), but also have questions about it that you can answer. But even if you don’t have that audience right now, you must write as if you do. You must present yourself as interested in, even enthusiastic about, wanting to share something new, because the interest you show in your work roughly predicts the interest your reader will take in it.

2.2.2 I've Found a Solution to an Important Practical Problem

You take a step toward more significant research when you can say to readers not just *Here are some facts that should interest you*, but *These facts will help you do something to solve a problem you care about*. That is the kind of research that people do every day in business, government, and the professions. They confront practical problems whose solutions require research into the facts of the matter, first to understand the problem, then to figure out how to solve it—problems ranging from insomnia to falling profits to terrorism.

To help new researchers learn that role, teachers sometimes invent “real world” scenarios: an environmental science professor might assign you to write a report for the director of the state Environmental Protection Agency on how to clean up a local lake. In this scenario you are playing the role not of a student delivering data to a teacher, but of a professional giving practical advice to someone who needs it. To make your report credible, however, you must use the right terminology, cite the right sources, find and present the right evidence, all in the right format. But most important, you have to design your report around a specific *intention* that defines your role: to advise a decision maker on what to *do* to solve a problem. That kind of research is typical in the world at large but is less common in academic research than the next one.

2.2.3 I've Found an Answer to an Important Question

Although academic researchers sometimes advise EPA directors on what to do, their more common role is that of scholars who help their research community simply understand something better. Others might use their findings to solve a practical problem—a discovery about the distribution of prime numbers, for example, helped cryptologists design an unbreakable code. But that research itself was aimed at solving not the *practical* problem of keeping secrets, but the *conceptual* problem of not entirely understanding prime numbers. Some researchers call this kind of research “pure” as opposed to “applied.”

Teachers occasionally invent “real world” scenarios involving conceptual problems: a political science professor asks you to play the role of a senator’s intern researching the voting habits of out-of-state college students. But more

typically they expect you to imagine yourself as what you are learning to be: a researcher addressing a community of other researchers interested in issues that they want to understand better. Your report on fourteenth-century Tibetan weaving, for example, could

possibly help rug designers sell more rugs, but its main aim is to help scholars better understand something about Tibetan art, such as *How did fourteenth-century Tibetan rugs influence the art of modern China?*

2.3 IMAGINING YOUR READERS' ROLE

You establish your side of the relationship with your readers when you adopt one of those three roles—*I have information for you; I can help you fix a problem; I can help you understand something better*. You must, however, cast your readers in a complementary role by offering them a social contract: *I'll play my part if you play yours*. But that means you have to understand their role. If you cast them in a role they won't accept, you're likely to lose them entirely. In this case, the old advice to "consider your audience" means that you must report your research in a way that motivates your readers to play the role you have imagined for them.

For example, suppose you're an expert on blimps and zeppelins. You've been asked to share your research with three different groups with three different reasons for wanting to hear about it. How they receive you will depend on how accurately you imagine the role each intends to play and how well you match your role to theirs. For that, you must understand what they want and what they are in return willing *and able* to do for you.

2.3.1 Entertain Me

Imagine the first group that invited you to speak is the local Zeppelin Club. Its members are not experts, but they know a lot about zeppelins. They read about them, visit historic sites, and collect zeppelin memorabilia. You decide to share some new facts you've found in a letter from your Great-Uncle Otto describing his transatlantic zeppelin flight in 1936, along with some photographs and a menu he saved. His letter comments on the grilled oysters he had for dinner and tells a funny story about why he happened to take the trip in the first place.

In planning your talk, you judge that what's at stake is just a diverting hour of zeppelin trivia. You meet your side of the bargain when you share whatever you think might interest them—hunches, speculation, even unsubstantiated rumors. You won't show PowerPoint slides, present data, or cite scholarly sources to substantiate your claims. Your audience will play its role by listening with interest, asking questions, maybe sharing their own

anecdotes. You don't expect them to challenge the authenticity of the letter from Great-Uncle Otto or question how the photos are relevant to the social history of zeppelins, much less of lighter-than-air travel in general. Your job is to give an engaging talk; theirs is to be amiably engaged.

Some beginning researchers imagine their readers belong to a Zeppelin Club, already fascinated by their topic and eager to hear anything new about it. While that sometimes works for experts with the right audience (see the box on page 24), it rarely works for students learning to do and report serious research. Your teachers expect you to report not just *what* you find, but what you can *do* with it.

2.3.2 Help Me Solve My Practical Problem

Imagine that your next meeting is with True-to-Life Films. They plan to make a movie about a zeppelin flight in 1936 and want you to help them get the historical details right, including a scene in the dining cabin. They want to know how the cabin was furnished, what people ate, what the menus looked like, and so on. They don't care whether your facts are new, only whether they are right, so that they can make the scene authentic. You show them your photos and the menu and describe the oysters Great-Uncle Otto ate, but you don't bother with why he took the trip. To succeed in this role, you must help them solve a practical problem whose solution you base not on *all* the data you can find, no matter how new, but on just those *particular* facts that are relevant to the problem of authenticity and whose sources you can show are reliable. Your audience will listen intently and critically, because they want to get the details right.

That's the kind of task you're likely to face if your teacher invents a "real world" assignment—write to an EPA official who needs to *do* something about a polluted lake. Academic researchers sometimes address practical problems like these, but for them another kind of problem is far more common. So pose a practical problem *only if* your teacher creates one; otherwise, check with her first. (We'll discuss practical problems in more detail in [chapter 4](#).)

2.3.3 Help Me Understand Something Better

Now imagine that your audience is the faculty of Zeppo University's Department of Lighter-than-Air Studies. They study all aspects of blimps and zeppelins, do research on their economics and aerodynamics, and participate

in a worldwide conversation about their history and social significance. They compete with other lighter-than-air scholars to produce new lighter-than-air knowledge and theories that they publish in lighter-than-air journals and books read by everyone in their lighter-than-air field.

These scholars have invited you to talk about your specialty: the social history of zeppelin travel in the 1930s. They don't want you just to amuse them with new facts (though they'll be happy if you do) or to help them *do* something (though they'd be pleased if you got them consulting work with True-to-Life Films). They want you to use whatever new facts you have to help them better *understand* the social history of zeppelin travel or, better still, of lighter-than-air culture in general.

Because these lighter-than-air scholars are intensely committed to finding the Truth about zeppelins, you know they expect you to be objective, rigorously logical, and able to examine every issue from all sides. You also know that if you don't nail down your facts, they'll hammer you during the question period and if you don't have good answers, slice you up afterward over the wine and cheese, not just to be contentious or even nasty (though some will be), but to get as close as they can to the Truth about zeppelins in the 1930s. If you offer new data, like Great-Uncle Otto's photos, letter, and menu, they'll be glad to see them, but they'll want to know why they matter and might even question their authenticity.

Above all, they will care about your documents *only if* you can show how they serve as *evidence* that helps you answer a question important to understanding something about zeppelins that is *more important* than your uncle's trip. They will receive you especially well if you can convince them that they do not understand the social history of zeppelins as well as they thought and that your new data will improve their flawed understanding. If you can't do that, they'll respond not with *I don't agree*—we all learn to live with that; some of us even thrive on it—but with a response far more devastating: *I don't care*.

So you begin your talk:

We all have been led to believe by a number of studies on the food service on transatlantic zeppelin flights in the 1930s (especially Schmidt 1986 and Kloepper 1998) that items were never cooked over an open flame because of the danger of explosions. However, I have recently discovered a menu from

the July 12, 1936, crossing of the *Hindenburg* indicating that oysters grilled over charcoal were served. . . . [You then go on to show why that new knowledge matters.]

That is the kind of conversation you join when you report research to a community of scholars. You must imagine them imagining this conversation with you: *Never mind whether your style is graceful (though I will admire your work more if it is); don't bother me with amusing anecdotes about your Great-Uncle Otto (though I like hearing them if they help me understand your ideas better); ignore whether what you know will make me rich (though I would be happy if it did). Just tell me something I don't know so that I can better understand our common interest.*

Who Cares about *That*?

Academic researchers are often scoffed at for studying esoteric topics that matter to no one but themselves. The charge is usually unfair, but some researchers do become fascinated with matters that seem to have little significance. Williams once attended the dissertation defense of a PhD candidate who had discovered reels and reels of film shot by European anthropologists in Africa and Asia in the early twentieth century. This previously unknown footage fascinated the film scholars on the committee. But when Williams asked the candidate, "How do these new films improve our understanding of movies then or now?" she could answer only that "no one has ever seen this footage before." Williams put his question in different ways but never got a better answer. The film scholars, on the other hand, were untroubled (and found Williams's questions naive), because they were already imagining how the footage might change their thinking about early film. And in any event, they all loved old film for its own sake. So sometimes new data alone are enough to interest the right readers. But if that candidate hopes to write anything that interests anyone but a tiny coterie of specialists, she will have to make an offer better than *Here's some new stuff*.

Your academic readers will almost always adopt this third role. They will think you've fulfilled your side of the social contract only when you treat them as who they think they are: scholars interested in greater knowledge and better understanding. To be sure, the faculty over in chemistry or philosophy care little about zeppelins, much less their meal service. (*Can you believe the trivia they study over in Helium Hall?*) But then you don't much care about their issues, either. You are concerned with your *particular* community of readers, with *their* interests and expectations, with improving *their* understanding, based

on the best evidence you can find. That's the social contract that all researchers must establish with their readers.

Quick Tip: A Checklist for Understanding Your Readers

Think about your readers from the start, knowing that you'll understand them better as you work through your project. Answer these questions early on, then revisit them when you start planning and again when you revise.

Who will read my paper?

Professionals who expect me to follow every academic convention and use a standard format?

Well-informed general readers?

General readers who know little about the topic?

What do they expect me to do? Should I

entertain them?

provide new factual knowledge?

help them understand something better?

help them do something to solve a practical problem in the world?

How much can I expect them to know already?

What do they know about my topic?

Is the problem one that they already recognize?

Is it one that they have but haven't yet recognized?

Is the problem not theirs, but only mine?

Will they take the problem seriously, or must I convince them that it matters?

How will readers respond to the solution/answer in my main claim?

Will it contradict what they already believe? How?

Will they make standard arguments against my solution?

Will they want to see the steps that led me to the solution?

PART II

Asking Questions, Finding Answers

Prologue

Planning Your Project—An Overview

If you've skimmed this book once, you're ready to begin your project. If you have a research question and know how to look for its answer, review the next two chapters quickly; then read the remaining ones carefully as they become relevant to your task. You may, however, feel bewildered if you're starting from scratch, without even a topic to guide you. But you can manage if you have a plan and take one step at a time.

If you are starting from scratch, your first task is to find a research question worth investigating that will lead to a research problem worth solving. Here are four steps to that end:

Find a topic specific enough to let you master a reasonable amount of information on it in the time you have: not, for example, *the history of scientific writing* but *essays in the Proceedings of the Royal Society (1675–1750) as precursors to the modern scientific article*; not *doctors in seventeenth-century drama* but *Molière's mockery of doctors in three early plays*.

Question that topic until you find questions that catch your interest. For example, *How did early Royal Society authors demonstrate that their evidence was reliable?* Or, *Why did Molière mock doctors?*

Determine the kinds of evidence your readers will expect you to offer in support of your answer. Will they accept reports of facts from secondary sources, or will they expect you to consult primary sources (see 5.1.1)?

Will they expect quantitative data, quotations from authorities, or firsthand observations?

Determine whether you can find this evidence. There's no point researching a topic unless you have a good chance of finding the right kind of evidence.

Once you think you have enough data to support at least a plausible answer to your question, you'll be ready to assemble an argument that makes your case (see [part III](#)), then to plan, draft, and revise it (see [part IV](#)).

You'll discover, however, that you can't march through those steps in the neat order we present them. You'll think of a tentative answer to your research question before you have all the evidence you need to support it. And when you think you have an argument worth making, you may discover that you need more and maybe different evidence from new sources. You may even modify your topic. Doing research is not like strolling along an easy, well-marked path to a familiar destination; it's more like zigzagging up and down a rocky hill through overgrown woods, sometimes in a fog, searching for something you won't recognize until you see it. But no matter how indirect your path, you can make progress if at each step of the way you plan for predictable detours (and maybe even avoid some of them).

What Is Your Evidence?

No matter their field, researchers collect information to use as evidence to support their claims. But researchers in different fields call that information by different names. We call it *data*. By *data* we mean not just the numbers that natural and social scientists collect, but anything you find "out there" relevant to answering your research question. The term is used less often by researchers in the humanities, but they, too, gather data in the form of quotations, historical facts, and so on. Data are inert, however, until you use them to support a claim that answers your research question. At that point, your data become *evidence*. If you don't have more data than you can use as evidence, you haven't collected enough. (Incidentally, *data* is plural; a single bit of data is a *datum*.)

Resolve to do lots of writing along the way. Much of it will be routine note-taking, but you should also write reflectively, to understand: make outlines; explain why you disagree with a source; draw diagrams to connect disparate facts; summarize sources, positions, and schools; record even random thoughts. Many researchers find it useful to keep a journal for hunches, new ideas, random thoughts, problems, and so on. You might not include much of this writing-to-discover-and-understand in your final draft. But when you *write as you go, every day*, you encourage your own best critical thinking, understand your sources better, and, when the time comes, draft more productively.

Quick Tip: Creating a Writing Group

A downside of academic research is its isolation. Except for group projects, you'll read and write mostly alone. But it doesn't have to be that way. Look for someone other than your instructor or adviser who will talk with you about your progress, review your drafts, even pester you about how much you've written. That might be a generous friend, but even better is another writer so that you can comment on each other's ideas and drafts.

Best of all is a group of four or five people working on their own projects who meet regularly to read and discuss one another's work. Early on, each meeting should start with a summary of each person's project in this three-part sentence: *I'm working on X because I want to find out Y, so that I (and you) can better understand Z* (more about this in 3.4). As your projects advance, develop an opening "elevator story," a short summary of your project that you could give someone on the way to a meeting. It should include your research question, your best guess at an answer, and the kind of evidence you expect to use to support it. The group can then follow up with questions, responses, and suggestions.

Don't limit your talk to just your story, however. Talk about your readers: Why should they be interested in your question? How might they respond to your argument? Will they trust your evidence? Will they have other evidence in mind? Such questions help you plan an argument that anticipates what your readers expect. Your group can even help you brainstorm when you bog down. Later the group can read one another's outlines and drafts to imagine how their final readers will respond. If your group has a problem with your draft, so will those readers. But for most writers, a writing group is most valuable for the discipline it imposes. It is easier to meet a schedule when you know you must report to others.

Writing groups are common for those writing theses or dissertations. But the rules differ for a class paper. Some teachers think that a group or writing partner provides more help than is appropriate, so be clear what your instructor allows.

3 From Topics to Questions

In this chapter, we discuss how to find a topic among your interests, refine it to a manageable scope, then question it to find the makings of a problem that can guide your research. If you are an experienced researcher or know the topic you want to pursue, skip to [chapter 4](#). But if you are starting your first project, you will find this chapter useful.

If you are new to research, the freedom to pick your own topic can seem daunting. Where do you begin? How do you tell a good topic from a bad one? Inexperienced researchers typically wonder, *Will I find enough information on this topic to write about it?* To their surprise they often compile too much information, much of it not very useful. They do so because their topic lacks focus. Without that focus, any evidence you assemble risks appearing to your readers as little more than a mound of random facts. As you begin a research project, you will want to distinguish a topic from a subject. A subject is a broad area of knowledge (e.g., climate change), while a topic is a specific interest within that area (e.g., the effect of climate change on migratory birds). However, finding a topic is not simply a matter of narrowing your subject. A topic is an approach to a subject, one that asks a *question* whose answer solves a *problem* that your readers care about.

In all research communities, some questions are “in the air,” widely debated and researched, such as whether traits like shyness or an attraction to risk are learned or genetically inherited. But other questions may intrigue only the researcher: *Why do cats rub their faces against us? Why does a coffee spill dry up in the shape of a ring?* That’s how a lot of research begins—not with a big question that attracts everyone in a field, but with a mental itch about a small question that only a single researcher wants to scratch. If you feel that itch, start scratching. But at some point, you must decide whether the answer to your question solves a problem significant to some community of researchers or even to a public whose lives your research could change.

Question or Problem?

You may have noticed that we’ve been using the words *question* and

problem almost interchangeably. But they are not quite the same. Some questions raise problems; others do not. A question raises a problem if not answering it keeps us from knowing something more important than its answer. For example, if we cannot answer the question *Are there ultimate particles?*, we cannot know

something even more important: the nature of physical existence. On the other hand, a question does not raise a problem if not answering it has no apparent consequences. For example, *Was Abraham Lincoln's right thumb longer than his nose?* We cannot think of what we would gain by knowing. At least at the moment.

Now, that word *problem* is itself a problem. Commonly, a problem means trouble, but among researchers it has a meaning so special that we devote the next chapter to it. But before you can frame your research problem, you have to find a topic that might lead to one. So we'll start there, with finding a topic.

3.1 FROM AN INTEREST TO A TOPIC

Most of us have more than enough interests, but beginners often find it hard to locate among theirs a topic focused enough to support a substantial research project. They may also believe they lack the expertise for the project. However, a research topic is an interest stated specifically enough for you to imagine *becoming* a local expert on it. That doesn't mean you already know a lot about it or that you'll have to know more about it than others, including your teacher. You just want to know a lot more about it than you do now.

If you can work on any topic, we offer only a cliché: start with what most interests you. Nothing contributes to the quality of your work more than your commitment to it. But also ask yourself: *What interests me about this topic? What would interest others?*

3.1.1 Finding a Topic in a Writing Course

Start by listing as many interests as you can that you'd like to explore. Don't limit yourself to what you think might interest a teacher or make you look like a serious student. Let your ideas flow. Prime the pump by asking friends, classmates, even your teacher about topics that interest them. If no good topics come to mind, consult the Quick Tip at the end of this chapter.

Once you have a list of topics, choose the one or two that interest you most and explore their research potential. Do this:

In the library, look up your topic in a general guide such as *CQ Researcher* and skim the subheadings. In an online database such as Academic Search Premier, you can explore your topic through subject terms. If you have a more narrow focus, you can do the same with specialized guides such as *Women's Studies*

International. While some libraries will have copies of general and specialized guides on the shelf, most now subscribe to their online equivalents, but not all of them let you skim subject headings. (We discuss these resources in [chapter 5](#) and list several in the appendix.)

On the Internet, Google your topic, but don't surf indiscriminately. Look first for websites that are roughly like sources you would find in a library, such as online encyclopedias. Read the entry on your general topic, and then copy the list of references at the end for a closer look. Use *Wikipedia*

to find ideas and sources, but always confirm what you find there in a reliable source. Few experienced researchers trust *Wikipedia*, so *under no circumstances cite it as a source of evidence* (unless your topic is *Wikipedia* itself).

Remember, at this point you are exploring a topic to spur your thinking and to see if that topic is viable. With that in mind, you can also find ideas in blogs, which discuss almost every contentious issue. Since most issues are usually too big for a research paper, look for posts that take a position on narrow aspects of larger issues. If you disagree with a view, investigate it.

3.1.2 Finding a Topic for a First Research Project in a Particular Field

Start by listing topics relevant to your particular class *and* that interest you, then narrow them to one or two promising ones. If the topic is general, such as *religious masks*, you'll have to do some random reading to narrow it. But read with a plan:

Skim encyclopedia entries in your library or online. Start with standard ones such as the *Encyclopaedia Britannica*. Then consult specialized ones such as the *Encyclopedia of Religion* or the *Stanford Encyclopedia of Philosophy*.

Skim headings in specialized indexes such as the *Philosopher's Index*, *Psychological Abstracts*, or *Women's Studies Abstracts*. Use subheadings for ideas of how others have narrowed your topic.

Google your topic, but not indiscriminately. Use Google Scholar, a search engine that focuses on scholarly journals and books. Skim the articles it turns up, especially their lists of sources.

When you know the general outline of your topic and how others have narrowed theirs, try to narrow yours. If you can't, browse through journals and websites until your topic becomes more clearly defined. That takes time, so start early.

3.1.3 Finding a Topic for an Advanced Project

Most advanced students already have interests in topics relevant to their field. Often topics find them as they become immersed in a field. If that is not yet the case, focus on what interests you, but remember that you must eventually show why it should also interest others.

Find what interests other researchers. Look online for recurring issues and debates in the archives of professional discussion lists relevant to your interests. Search online and in journals like the *Chronicle of Higher Education* for conference announcements, conference programs, calls for papers, anything that reflects what others find interesting.

Skim the latest issues of journals in your field, not just for articles, but also for conference announcements, calls for papers, and reviews. Skim recent articles in your library's online databases in your field (e.g., the MLA International Bibliography).

Investigate the resources that your library is particularly rich in. If, for example, it (or a library nearby) holds a collection of rare papers on an interesting topic, you have found not only a topic but a way into it. Many unexpected finds await discovery in your library's archives.

3.2 FROM A BROAD TOPIC TO A FOCUSED ONE

The most useful way to think about a topic is as a starting place for your research. (The word "topic" comes from *topos*, which is Greek for "place.") From this starting place, you can head off in a particular direction and thus narrow an overly broad topic into a productively focused one. At this point, your biggest risk is settling on a topic so broad that it could be a subheading in a library catalog: *spaceflight*; *Shakespeare's problem plays*; *natural law*. A topic is probably too broad if you can state it in four or five words:

Free will in Tolstoy

The history of commercial aviation

A topic so broad can intimidate you with the task of finding, much less reading, even a fraction of the sources available. So narrow it down:

We narrowed those topics by adding words and phrases, but of a special kind: *conflict*, *description*, *contribution*, and *developing*. Those nouns are derived from verbs expressing actions or relationships: *to conflict*, *to describe*, *to contribute*, and *to develop*. Lacking such “action” words, your topic is a static thing.

Note what happens when we restate static topics as full sentences. Topics

and (2) change almost not at all:

Free will in Tolstoy_{topic} → There is free will in Tolstoy’s novels._{claim}

The history of commercial aviation_{topic} → Commercial aviation has a history._{claim}

In reality, (1) and (2) are not topics at all because they do not lead anywhere. But when (3) and (4) are revised into full sentences, they are closer to claims that a reader might find interesting.

The *conflict* of free will and inevitability in Tolstoy’s *description* of three battles in *War and Peace*_{topic} → In *War and Peace*, Tolstoy *describes* three battles in which free will and inevitability *conflict*._{claim}

The *contribution* of the military in *developing* the DC-3 in the early years of commercial aviation_{topic} → In the early years of commercial aviation, the military *contributed* to the way the DC-3 *developed*._{claim}

Such claims may at first seem thin, but you’ll make them richer as you work through your project. And that’s the point: these topics are actually paths to pursue when devising your project.

Caution: Don’t narrow your topic so much that you can’t find information on it. Too much information is available on *the history of commercial aviation* but too little (at least for beginning researchers) on *the decision to lengthen the wingtips on the DC-3 prototype for military use as a cargo carrier*.

3.3 FROM A FOCUSED TOPIC TO QUESTIONS

Once they have a focused topic, many new researchers make a beginner's mistake: they immediately start plowing through all the sources they can find on the topic, taking notes on everything they read. With a promising topic such as *the political origins of legends about the Battle of the Alamo*, they mound up endless facts connected with the battle: what led up to it, histories of the Texas Revolution, the floor plan of the mission, even biographies of generals Santa Anna and Sam Houston. They accumulate notes, summaries, descriptions of differences and similarities, ways in which the stories conflict with one another and with what historians think really happened, and so on. Then they dump it all into a paper that concludes, *Thus we see many differences and similarities between . . .*

Many high school teachers would reward such a paper with a good grade, because it shows that the writer can focus on a topic, find information on it, and assemble that information into a report, no small achievement—for a first project. But in *any* college course, such a report falls short if it is seen as just a pastiche of vaguely related facts. If a writer asks no specific *question* worth asking, he can offer no specific *answer* worth supporting. And without an answer to support, he cannot *select* from all the data he could find on a topic just those relevant to his answer. To be sure, those fascinated by Elvis Presley movie posters or the first generation of video games will read *anything* new about them, no matter how trivial. Serious researchers, however, do not document information for its own sake, but to support the answer to a question that they (and they hope their readers) think is worth asking.

So the best way to begin working on your focused topic is not to find all the information you can on it, but to formulate questions that direct you to just that information you need to answer them.

Start with the standard journalistic questions: *who*, *what*, *when*, and *where*, but focus on *how* and *why*. To engage your best critical thinking, systematically ask questions about your topic's history, composition, and categories. Then ask any other question you can think of or find in your sources. Record all the questions, but don't stop to answer them even when one or two grab your attention. This inventory of possible questions will help to direct your search activities and enable you to make sense of information

you find. (Don't worry about keeping these categories straight; their only purpose is to stimulate questions and organize your answers.) Let's take up the example of masks mentioned earlier.

3.3.1 Ask about the History of Your Topic

How does it fit into a **larger developmental context**? Why did your topic come into being? *What came before masks? How were masks invented? Why? What might come after masks?*

What is its own **internal history**? How and why has the topic itself changed through time? *How have Native American masks changed? Why? How have Halloween masks changed? How has the role of masks in society changed? How has the booming market for kachina masks influenced traditional design? Why have masks helped make Halloween the biggest American holiday after Christmas?*

3.3.2 Ask about Its Structure and Composition

How does your topic fit into the **context of a larger structure or function as part of a larger system**? *How do masks reflect the values of different societies and cultures? What roles do masks play in Hopi dances? In scary movies? In masquerade parties? How are masks used other than for disguise?*

How do its parts **fit together as a system**? *What parts of a mask are most significant in Hopi ceremonies? Why? Why do some masks cover only the eyes? Why do few masks cover just the bottom half of the face? How do their colors play a role in their function?*

3.3.3 Ask How Your Topic Is Categorized

How can your topic be **grouped into kinds**? *What are the different kinds of masks? Of Halloween masks? Of African masks? How are they categorized by appearance? By use? By geography or society? What are the different qualities of masks?*

How does your topic **compare to and contrast with** others like it? *How do Native American ceremonial masks differ from those in Japan? How do Halloween masks compare with Mardi Gras masks?*

3.3.4 Turn Positive Questions into Negative Ones

Why have masks not become a part of other holidays, like Presidents' Day or Memorial Day? How do Native American masks not differ from those in Africa? What parts of masks are typically not significant in religious ceremonies?

3.3.5 Ask *What If?* and Other Speculative Questions

How would things be different if your topic never existed, disappeared, or were put into a new context? *What if no one ever wore masks except for safety? What if everyone wore masks in public? What if it were customary to wear masks on blind dates? In marriage ceremonies? At funerals? Why are masks common in African religions but not in Western ones? Why don't hunters in camouflage wear masks? How are masks and cosmetic surgery alike?*

3.3.6 Ask Questions Suggested by Your Sources

You won't be able to do this until you've done some reading on your topic.

Ask questions that **build on agreement**:

If a source makes a claim you think is persuasive, ask questions that might extend its reach. *Elias shows that masked balls became popular in eighteenth-century London in response to anxieties about social mobility. Did the same anxieties cause similar developments in Venice?*

Ask questions that might support the same claim with new evidence. *Elias supports his claim about masked balls with published sources. Is it also supported by letters and diaries?*

Ask questions analogous to those that sources have asked about similar topics. *Smith analyzes costumes from an economic point of view. What would an economic analysis of masks turn up?*

Now ask questions that reflect **disagreement**:

Martinez claims that carnival masks uniquely allow wearers to escape social norms. But could there be a larger pattern of all masks creating a sense of alternative forms of social or spiritual life?

(We discuss in more detail how to use disagreements with sources in 6.4.) If you are an experienced researcher, look for questions that other

researchers ask but don't answer. Many journal articles end with a paragraph or two about open questions, ideas for more research, and so on (see 4.3.2 for an example). You might not be able to do all the research they suggest, but

you might carve out a piece of it. You can also look for Internet discussions on your topic, then "lurk," just reading the exchanges to understand the kinds of questions those on the list debate. Record questions that spark your interest. You can also post questions to the list if they are specific and narrowly focused.

3.3.7 Evaluate Your Questions

After asking all the questions you can think of, evaluate them, because not all questions are equally good. Look for questions whose answers might make you (and, ideally, your readers) think about your topic in a new way. Avoid questions like these:

Their answers are settled fact that you could just look up. *Do the Inuit use masks in their wedding ceremonies?* Questions that ask *how* and *why* invite deeper thinking than *who*, *what*, *when*, or *where*, and deeper thinking leads to more interesting answers.

Their answers would be merely speculative. *Would church services be as well attended if the congregation all wore masks?* If you can't imagine finding hard data that might settle the question, it's a question you can't settle.

Their answers are dead ends. *How many black cats slept in the Alamo the night before the battle?* It is hard to see how an answer would help us think about any larger issue worth understanding better, so it's a question that's probably not worth asking.

You might, however, be wrong about that. Some questions that seemed trivial, even silly, have answers more significant than expected. One researcher wondered why a coffee spill dries up in the form of a ring and discovered things about the properties of fluids that others in his field thought important—and that paint manufacturers found valuable. So who knows where a question about cats in the Alamo might take you? You can't know until you get there.

Once you have a few promising questions, try to combine them into larger ones. For example, many questions about the Alamo story ask about the interests of the storytellers

and their effects on their stories: *How have politicians used the story? How have the storytellers' motives changed? Whose purposes does each story serve?* These can be combined into a single question:

How and why have users of the Alamo story given the event a mythic quality?

A question like this gives direction to your research (and helps avoid the gathering of endless information). And it begins to imagine readers who will judge whether your question is significant.

3.4 THE MOST SIGNIFICANT QUESTION: SO WHAT?

Even if you are an experienced researcher, you might not be able to take the next step until you are well into your project, and if you are a beginner, you may find it frustrating. Even so, once you have a question that holds your interest, you must pose a tougher one about it: *So what?* Beyond your own interest in its answer, why would others think it a question worth asking? You might not be able to answer that *So what?* question early on, but it's one you have to start thinking about, because it forces you to look beyond your own interests to consider how your work might strike others.

Think of it like this: What will be lost if you *don't* answer your question? How will *not* answering it keep us from understanding something else better than we do? Start by asking *So what?* at first of yourself:

So what if I don't know or understand how butterflies know where to go in the winter, or how fifteenth-century musicians tuned their instruments, or why the Alamo story has become a myth? So what if I can't answer my question? What do we lose?

Your answer might be *Nothing. I just want to know.* Good enough to start, but not to finish, because eventually your readers will ask as well, and they will want an answer beyond *Just curious.* Answering *So what?* vexes all researchers, beginners and experienced alike, because when you have only a question, it's hard to predict whether others will think its answer is significant. But you must work toward that answer throughout your project. You can do that in three steps.

3.4.1 Step 1: Name Your Topic

If you are beginning a project with only a topic and maybe the glimmerings of a good question or two, start by naming your project:

I am trying to learn about/working on/studying _____.

Fill in the blank with your topic, using some of those nouns derived from verbs:

I am studying the *causes* of the *disappearance* of large North American mammals . . .

I am working on Lincoln's *beliefs* about *predestination* and their *influence* on his *reasoning* . . .

3.4.2 Step 2: Add an Indirect Question

Add an indirect question that indicates what you do not know or understand about your topic:

I am studying/working on _____

because I want to find out who/what/when/where/whether/why/how
_____.

I am studying the causes of the disappearance of large North American mammals
because I want to find out whether they were hunted to extinction . . .

I am working on Lincoln's beliefs about predestination and its influence on his reasoning

because I want to find out how his belief in destiny influenced his understanding of the causes of the Civil War . . .

When you add that *because I want to find out how/why/whether* clause, you state why *you* are pursuing your topic: to answer a question important to you. If you are a new researcher and get this far, congratulate yourself, because you have moved beyond the aimless collection of data. But now, if you can, take one step more. It's one that advanced researchers know they must take, because they know their work will be judged not by its

significance to them but by its significance to others in their field. They must have an answer to So what?

3.4.3 Step 3: Answer So *What?* by Motivating Your Question

This step tells you whether your question might interest not just you but others. To do that, add a second indirect question that explains why you asked your first question. Introduce this second implied question with *in order to help my reader understand how, why, or whether*:

I am studying the causes of the disappearance of large North American mammals

because I want to find out whether the earliest peoples hunted them to extinction,

in order to help my reader understand whether native peoples lived in harmony with nature or helped destroy it.

I am working on Lincoln's beliefs about predestination and their influence on his reasoning

because I want to find out how his belief in destiny and God's will influenced his understanding of the causes of the Civil War,

in order to help my reader understand how his religious beliefs may have influenced his military decisions.

It is the indirect question in step 3 that you hope will seize your readers' interest. If it touches on issues important to your field, even indirectly, then your readers should care about its answer.

Some advanced researchers begin with questions that others in their field already care about: *Why did the giant sloth and woolly mammoth disappear from North America? Or: Is risk taking genetically based?* But many researchers, including at times the five of us, find that they can't flesh out the last step in that three-part sentence until they finish a first draft. So you make no mistake *beginning* your research without a good answer to that third question—*Why does this matter?*—but you face a problem when you *finish* your research without having thought through those three steps at all. And if you are doing advanced

research, you *must* take that step, because answering that last question is your ticket into the conversation of your community of researchers.

Regularly test your progress by asking a roommate, relative, or friend to force you to flesh out those three steps. Even if you can't take them all confidently, you'll know where you are and where you still have to go. To summarize: Your aim is to explain

what you are writing about—*I am working on the topic of . . .*

what you don't know about it—*because I want to find out . . .*

why you want your reader to know and care about it—*in order to help my reader understand better . . .*

In the following chapters, we return to those three steps and their implied questions, because they are crucial not just for finding questions but for framing the research problem that you want your readers to value.

Quick Tip: Finding Topics

If you are a beginner, start with our suggestions about exploring the Internet and skimming bibliographical guides (see 3.1). If you still draw a blank, try these steps.

FOR GENERAL INTEREST TOPICS

What special interest do you have—sailing, chess, finches, old comic books? The less common, the better. Investigate something about it you don't know: its origins, its technology, how it is practiced in another culture, and so on.

Where would you like to travel? Surf the Internet, finding out all you can about your destination. What particular aspect surprises you or makes you want to know more?

Wander through a museum with exhibitions that appeal to you—artworks, dinosaurs, old cars. If you can't browse in person, browse a "virtual museum" on the Internet. Stop when something catches your interest. What more do you want to know about it?

Wander through a shopping mall or store, asking yourself, *How do they make that? Or, I wonder who thought up that product?*

Leaf through a Sunday newspaper, especially its features sections. Skim reviews of books or movies, in newspapers or on the Internet.

Browse a large magazine rack. Look for trade magazines or those that cater to specialized interests. Investigate whatever catches your interest.

Tune into talk radio or interview programs on TV until you hear a claim that you disagree with. Or find something to disagree with on the websites connected with well-known talk shows. See whether you can make a case to refute it.

Use an Internet search engine to find websites related to your topic. These include blogs maintained by individuals and organizations. You'll get hundreds of hits, but look only at the ones that surprise you.

Is there a common belief that you suspect is simplistic or just wrong? A common practice that you find pointless or irritating? Do research to make a case against it.

What courses will you take in the future? What research would help you prepare for them?

FOR TOPICS FOCUSED ON A PARTICULAR FIELD

If you have experience in your field, review 3.1.2–3.

Browse through a textbook of a course that is one level beyond yours or a course that you know you will have to take. Look especially hard at the study questions.

Attend a lecture for an advanced class in your field, and listen for something you disagree with, don't understand, or want to know more about.

Ask your instructor about the most contested issues in your field.

Find an Internet discussion list in your field. Browse its archives, looking for matters of controversy or uncertainty.

Surf the websites of departments at major universities, including class sites. Also check websites of museums, national associations, and government agencies, if they seem relevant.

4 From Questions to a Problem

In this chapter, we explain how to turn a question into a problem that readers think is worth solving. If you are an advanced researcher, you know how essential this step is. If you are new to research, we hope to convince you of its importance, because what you learn here will be essential to all your future projects.

In the last chapter, we suggested that you can identify the significance of your research question by fleshing out this three-step formula:

Topic: I am studying _____

Question: because I want to find out what/why/how _____,

Significance: in order to help my reader understand _____.

These steps describe not only the development of your project but your own development as a researcher.

When you move from step 1 to 2, you are no longer a mere data collector but a researcher interested in understanding something better.

When you then move from step 2 to 3, you focus on why that understanding is *significant*.

That significance might at first be just for yourself, but you join a community of researchers when you can state that significance *from your readers' point of view*. In so doing, you create a stronger relationship with readers because you promise something in return for their interest in your report—a deeper understanding of something that matters to *them*. At that point, you have posed a *problem* that they recognize needs a solution.

4.1 UNDERSTANDING RESEARCH PROBLEMS

Too many researchers at all levels write as if their task is to answer a question that interests themselves alone. That's wrong: to make your research matter, you must address a problem that others in your community—your readers— also want to solve. To understand why, you have to understand what research problems look like. And to do that, you have to understand two other kinds of problems, what we'll call practical problems and conceptual problems.

4.1.1 Practical Problems: What Should We Do?

Everyday research usually begins not with dreaming up a topic to think about but with a practical problem that if you ignore it means trouble. When its solution is not obvious, you have to find out how to solve it. To do that, you must pose and solve a problem of another kind, a *research* problem defined by what you *do not know or understand* about your practical problem.

It's a familiar task that typically looks like this:

PRACTICAL PROBLEM: The chain on my bicycle broke.

RESEARCH PROBLEM: Can I find a bike shop that will replace it?

RESEARCH SOLUTION: Here it is: Cycle Source, 1401 East 55th Street.

PRACTICAL SOLUTION: Walk over to get my bike fixed.

Problems like that are in essence no different from more complicated ones.

The National Rifle Association is lobbying me to oppose gun control. *How many votes do I lose if I refuse?* Do a survey. *Most of my constituents support gun control.* I can reject the request.

Costs are up at the Omaha plant. *What changed?* Hire a consulting firm to figure it out. *Increase in turnover.* If we improve training and morale, our workers will stick with us.

Put in general terms, a *practical* problem is caused by some condition in the world (from spam to losing money in Omaha to terrorism) that troubles us because it costs us time, money, respect, security, opportunity, even our lives. We solve a practical problem by

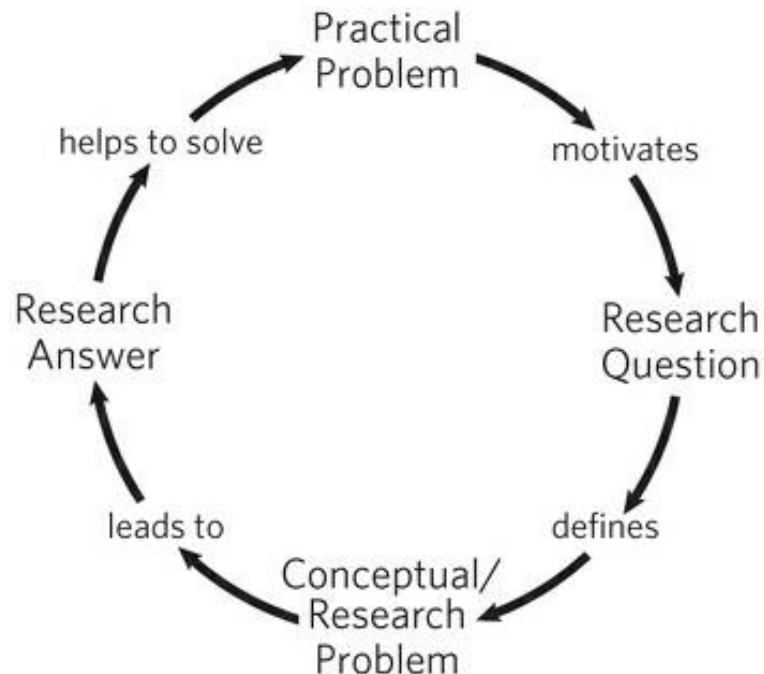
doing something (or by encouraging others to do something) to eliminate or at least mitigate the condition creating these tangible costs.

But to know what to do, someone first has to *understand* something better. That politician being lobbied by the NRA, for example, needs to know how his constituents feel about gun control so he can decide where he stands; the managers of the Omaha plant need to know the cause of their increasing costs so they can address it.

4.1.2 Conceptual Problems: What Should We Think?

That need for knowledge or understanding raises a conceptual problem. In research, a *conceptual* problem arises when we do not understand something about the world as well as we would like. We solve a conceptual problem not by doing something to change the world but by answering a question that helps us understand it better.

We usually answer these questions through research, which is why conceptual problems are also called research problems: the word *conceptual* describes their condition and costs or consequences; the word *research* refers to how we solve them. Graphically, the relationship between practical and conceptual or research problems looks like this:



The term *problem* thus has a special meaning in the world of research, one that sometimes confuses beginners. In our everyday world, a problem is

something we try to avoid. But in academic research, a problem is something we seek out, even invent if we have to. Indeed, a researcher without a good conceptual or research problem to work on faces a bad practical problem because without one a researcher is out of work.

Inexperienced researchers sometimes struggle with these notions because experienced researchers often talk about their work in shorthand. When asked what they are working on, they often answer with what sounds like one of those general topics we warned you about: *adult measles*, *mating calls of Wyoming elk*, *zeppelins in the 1930s*. As a result, beginners sometimes think that having a topic to read about is the same as having a problem to solve.

When they do, they create a big practical problem for themselves, because with only a topic to guide their work, they gather data aimlessly and endlessly. Without a specific question to answer, they have no way of knowing when they have enough. When they write, they struggle to decide what to include, usually throwing in everything just to be on the safe side. So it's not surprising that they feel frustrated when a reader says, *I don't see the point here; this is just a data dump*.

To avoid that judgment, you need a problem that focuses you on finding just those data that will help you solve it. It might take a while to figure out what that problem is, but from the outset you have to think about it. That begins with understanding how conceptual problems work.

4.2 UNDERSTANDING THE COMMON STRUCTURE OF PROBLEMS

Practical problems and conceptual problems have the same two-part structure:

a situation or *condition*, and undesirable *consequences* caused by that condition, *costs* that you (or, better, your readers) don't want to pay

What distinguishes them is the nature of those conditions and costs.

4.2.1 The Nature of Practical Problems

Consider a flat tire. Ordinarily, it would be a practical problem, because it is

a condition in the world (the flat) that imposes (2) a tangible cost that you don't want to pay, like missing a dinner date. But suppose you were bullied into the date and would rather be anywhere else. In that case, the benefit of the flat is more than its cost, so the flat is not a problem but a solution to the bigger problem of an evening spent with someone you don't like. Low cost, big benefit, no problem.

On the other hand, suppose the police set up a sting in which they lure criminals out of hiding by announcing that they have won the lottery. Ordinarily, winning the lottery is not a problem, but here it is, because it has a tangible cost: arrest.

A practical problem has two parts: a condition, which can be anything that imposes intolerable costs, and those costs. To state a practical problem so that others understand it clearly, you must describe both of its parts.

Its **condition**:

I missed the bus.

The ozone layer is thinning

The **costs** of that condition that you (or your reader) don't like: I'll be late for work and lose my job.

Many will die from skin cancer.

But a caution: When you write, readers judge the significance of your problem not by the cost *you* pay, but by the cost *they* pay if you don't solve it. So what *you* think is a problem they might not. To make your problem their problem, you must frame it from

their point of view, so that they see its costs to *them*. To do that, imagine that when you pose the condition part of your problem, your reader responds, *So what?*

The ozone layer is thinning.

So what?

You answer with the cost of the problem:

A thinner ozone layer exposes us to more ultraviolet light.

Suppose he again asks, *So what?*, and you respond with the cost of more ultraviolet light:

Too much ultraviolet light can cause skin cancer.

If, however improbably, he again asks, *So what?*, you have failed to convince him that *he* has a problem. We acknowledge a problem only when we stop asking *So what?* and say, instead, *What do we do about it?*

Practical problems like cancer are easy to grasp because they are concrete: when someone has cancer, we don't ask, *So what?* In academic research, however, your problems will usually be conceptual ones, which are harder to grasp because both their conditions and costs are abstract.

4.2.2 The Nature of Conceptual Problems

Practical and conceptual problems have the same two-part structure, but they have different kinds of conditions and costs.

The condition of a practical problem can be *any* state of affairs that has a tangible cost for you or, better, for your readers.

The condition of a conceptual problem, however, is *always* some version of not knowing or not understanding something.

You can identify the condition of a conceptual problem by completing that three-step sentence (see 3.4): The first step is *I am studying/working on the topic of _____*. In the second step, the indirect question states the condition of a conceptual problem, what you do not know or understand:

I am studying stories of the Alamo, because I want to understand **why voters responded to them in ways that served the interests of Texas politicians.**

That's why we emphasize the value of questions: they force you to state what you don't know or understand but want to.

The two kinds of problems also have two different kinds of costs.

The **cost** of a practical problem is always some tangible thing or situation we don't like.

A conceptual problem does not have such a tangible cost. In fact, we'll emphasize this difference by calling the cost of a conceptual problem its *consequence*.

The **consequence** of a conceptual problem is a particular kind of ignorance: it is a lack of understanding that keeps us from understanding something else even more significant. Put another way, because we haven't answered one question, we can't answer another that is more important.

Researchers often choose projects simply because they are curious. In fact, that's how most of us first become interested in the subjects we study. But to make your research matter to others, you have to say more than *Here is something I find interesting*. You have to show them how solving your problem helps them solve theirs. You do that by explaining your problem's consequence.

You express a problem's consequence in the indirect question in step 3 of our formula:

I am studying stories of the Alamo, because I want to understand why voters responded to them in ways that served the interests of local Texas politicians, in order to help readers understand the bigger and more important question **of how regional self-images influence national politics.**

All of this may sound confusing, but it's simpler than it seems. The condition and the consequence of a conceptual problem are questions that relate to each other in two ways:

The answer to the first question (Q1) helps you answer the second (Q2).

The answer to the second question (Q2) is more important than the answer to the first (Q1).

Here it is again: The first part of a conceptual or research problem is something you don't know but want to. You can phrase that gap in knowledge or understanding as a direct question: *How have romantic movies changed in the last fifty years?* Or as an indirect question: *I want to find out how romantic movies have changed in the last fifty years.*

Now imagine someone asking, *So what if you can't answer that question?* You answer by stating *something else more important* that you can't know until you answer the first question. For example:

If we can't answer the question of how romantic movies have changed in the last fifty years,*condition/first question* **then we can't answer a more**

important question: How have our cultural depictions of romantic love
changed?consequence/larger, more important second question

If you think that it's important to answer that second question, you've stated a consequence that makes your problem worth pursuing, and if your readers agree, you're in business.

But what if you imagine a reader again asking, *So what if I don't know whether we depict romantic love differently than we did?* You have to pose a yet larger question that you hope your readers will think is significant:

If we can't answer the question of how our depictions of romantic love have changed,*second question* **then we can't answer an even more important**

one: How does our culture shape the expectations of young men and
women about marriage and families?consequence/larger, more important

question

If you imagine that reader again asking, *So what?*, you might think, *Wrong audience*. But if that's the audience you're stuck with, you just have to try again: *Well, if we don't answer that question, we can't . . .*

Those outside an academic field often think that its specialists ask ridiculously trivial questions: *How did hopscotch originate?* But they fail to realize that researchers want to answer a question like that so that they can answer a second, more important one. For those who care about the way folk games influence the social development of children, the

conceptual consequences of not knowing justifies the research. *If we can discover how children's folk games originate, we can better understand how games socialize children, and, before you ask, once we know that, we can better understand . . .*

4.2.3 Distinguishing “Pure” and “Applied” Research

We call research *pure* when it addresses a conceptual problem that does not bear directly on any practical situation in the world, when it only improves the understanding of a community of researchers. We call research *applied* when it addresses a conceptual problem that does have practical consequences. You can tell whether research is pure or applied by looking at the last of the three steps defining your project. Does it refer to knowing or doing?

Topic: I am studying the electromagnetic radiation in a section of the universe

Question: because I want to find out how many galaxies are in the sky,

Significance: in order to help readers *understand* whether the universe will expand forever or eventually collapse into a point.

That is pure research, because step 3 refers only to understanding. In applied research, the second step still refers to *knowing* or

understanding, but that third step refers to *doing*:

Topic: I am studying how readings from the Hubble telescope differ from readings for the same stars measured by earthbound telescopes

Question: because I want to find out how much the atmosphere distorts measurements of electromagnetic radiation,

Practical Significance: so that astronomers can use data from earthbound telescopes *to measure* more accurately the density of electromagnetic radiation.

That problem calls for applied research because only when astronomers *know* how to account for atmospheric distortion can they *do* what they want to— measure light more accurately.

4.2.4 Connecting Research to Practical Consequences

Some inexperienced researchers are uneasy with pure research because the consequence of a conceptual problem—merely not knowing something—is so abstract. Since they are not yet part of a community that cares deeply about understanding its part of the world, they feel that their findings aren't good for much. So they try to cobble a practical cost onto a conceptual question to make it seem more significant:

Topic: I am studying differences among nineteenth-century versions of the Alamo story

Research Question: because I want to find out how politicians used stories of such events to shape public opinion,

Potential Practical Significance: in order to protect ourselves from unscrupulous politicians.

Most readers would think that the link between steps 2 and 3 is a bit of a stretch.

To formulate a good applied research project, you have to show that the answer to the indirect question in step 2 *plausibly* helps answer the indirect question in step 3. Ask this question:

If my readers want to achieve the goal of _____ [state your objective from step 3],

would they think that they could do it if they found out _____? [state your question from step 2]

Try that test on this applied astronomy problem:

If my readers want to use data from earthbound telescopes to measure more accurately the density of electromagnetic radiation,

would they think that they could if they knew how much the atmosphere

distorts measurements?

The answer would seem to be Yes.

Now try the test on the Alamo problem:

If my readers want to protect themselves from unscrupulous politicians,

would they think they could if they knew how nineteenth-century politicians used stories about the Alamo to shape public opinion?

The answer would probably be *No*. We may see a connection, but it's a stretch.

If you think that the solution to your conceptual problem *might* apply to a practical one, formulate your project as pure research, then *add* your application as a *fourth* step:

Topic: I am studying how nineteenth-century versions of the Alamo story differ

Conceptual Question: because I want to find out how politicians used stories of great events to shape public opinion,

Conceptual Significance: in order to help readers understand how politicians use popular culture to advance their political goals,

Potential Practical Application: so that readers *might* better protect themselves from unscrupulous politicians.

When you state your problem in your introduction, however, present it as a purely conceptual research problem whose significance is in its conceptual consequences. Then wait until your conclusion to suggest its practical application. (For more on this, see [chapter 16](#).)

Most research projects in the humanities and many in the natural and social sciences have no direct application to daily life. But as the term *pure* suggests, many researchers value such research more than they do applied research. They believe that the pursuit of knowledge “for its own sake” reflects humanity’s highest calling: to know more, not for the sake of money or power, but for the transcendental good of greater understanding and a richer life of the mind.

As you may have guessed, we are deeply committed to pure research, but also to applied—so long as the research is done well and is not corrupted by malign motives. For example, the potential for profit might compromise the integrity of both pure and applied research in the biological sciences, because it can influence not only what problems some researchers choose to address but also their solutions: *Tell us what to look for, and we’ll provide it!* Such situations raise ethical questions that we touch on in our afterword, “The Ethics of Research.”

4.3 FINDING A GOOD RESEARCH PROBLEM

What distinguishes great researchers from the rest of us is the brilliance, knack, or just dumb luck of stumbling over a problem whose solution makes all of us see the world in a new way. It's easy to recognize a good problem when we bump into it, or it bumps into us. But researchers often begin a project without being clear about what their real problem is. Sometimes they hope just to define a puzzle more clearly. Indeed, those who find a new problem or clarify an old one often make a bigger contribution to their field than those who solve a problem already defined. Some researchers have even won fame for *disproving* a plausible hypothesis that they had set out to prove.

So don't be discouraged if you can't formulate your problem fully at the outset of your project. Few of us can. But thinking about it early will save you hours of work along the way (and perhaps panic toward the end). It also gets you into a frame of mind crucial to advanced work. Here are some things you can do to identify and refine a good problem.

4.3.1 Ask for Help

Do what experienced researchers do: talk to colleagues, teachers, classmates, relatives, friends, neighbors—anyone who might be interested. Why would anyone want an answer to your question? What would they do with it? What new questions might an answer raise?

If you are free to work on any problem, look for a small one that is part of a bigger one. Though you won't solve the big one, your small piece of it will inherit some of its larger significance. (You will also educate yourself about the problems of your field, no small benefit.) If you are a student, ask your teacher what she is working on and whether you can work on part of it. Don't let her suggestions define the limits of your research. Nothing discourages a teacher more than a student who does *exactly* what is suggested *and no more*. Teachers want you to use their suggestions to *start* your thinking, not *end* it. Nothing makes a teacher happier than when you use her suggestions to find something she never expected.

4.3.2 Look for Problems as You Read

You can also find research problems in your sources. Where in them do you see contradictions, inconsistencies, incomplete explanations? Tentatively assume that other readers would or should feel the same. Many research projects begin with an imaginary conversation with the author of a source: *Wait a minute, he's ignoring . . .* But

before you set out to correct a gap or misunderstanding, be sure it's real, not just your own misreading. Countless research papers have refuted a point that no one ever made. Before you correct a source, reread it carefully. (In 6.3 we list several common "moves" that writers make to find a problem in a source, variations on *Source thinks X, but I think Y.*)

Once you think you've found a real puzzle or error, do more than just point to it. If a source says X and you think Y, you may have a research problem, but only if you can show that those who think X misunderstand some larger issue as well.

Finally, read the last few pages of your sources closely. That's where many researchers suggest more questions that need answers. The author of the following paragraph had just finished explaining how the life of nineteenth-century Russian peasants influenced their performance as soldiers:

And just as the soldier's peacetime experience influenced his battlefield performance, so must the experience of the officer corps have influenced theirs. Indeed, a few commentators after the Russo-Japanese War blamed the Russian defeat on habits acquired by officers in the course of their economic chores. In any event, to appreciate the service habits of Tsarist officers in peace and war, *we need a structural—if you will, an anthropological—analysis of the officer corps like that offered here for enlisted personnel.* [our emphasis]

That last sentence offers a new problem waiting for you to tackle.

4.3.3 Look at Your Own Conclusion

Critical reading can also help you discover a good research problem in your own drafts. We often do our best thinking in the last few pages that we write, because there we formulate claims we did not anticipate when we started. If in an early draft you arrive at an unanticipated claim, ask yourself what question it might answer. Paradoxical as it might seem, you may have answered a question that you have not yet asked, and thereby solved a problem that you have not yet posed. Your task is to figure out what that problem might be.

4.4 LEARNING TO WORK WITH PROBLEMS

Experienced researchers dream of finding new problems to solve. A still bigger dream is to solve a problem that no one even knew they had. But that new problem isn't worth much until others think (or can be persuaded) that it needs solving. So the first question an experienced researcher should ask about a problem is not *Can I solve it?* but *Will readers think it should be solved?*

No one expects you to do all that the first time out. But you should begin to develop mental habits that will prepare you for that moment. Research is more than just accumulating and reporting facts. Try to formulate a question that *you* think is worth answering, so that down the road, you'll know how to find a problem that *others* think is worth solving. Until you can do that, you risk the worst response a researcher can get: not *I don't agree*, but *I don't care*.

By now, all this talk about airy academic research may seem disconnected from what some call the "real world." But in business and government, in law and medicine, in politics and international diplomacy, no skill is valued more highly than the ability to recognize a problem, then to articulate it in a way that convinces others both to care about it and to believe it can be solved, especially by you. If you can do that in a class on Byzantine pottery, you can do it in an office on Main Street, Wall Street, or Queen's Road in Hong Kong.

Quick Tip: Manage the Unavoidable Problem of Inexperience

We all feel anxious when we start work in a new field whose values, concerns, and ways of thinking and arguing we don't entirely understand. In fact, we authors still experience that newcomer's anxiety again when we begin new kinds of projects on new topics. You can't avoid experiencing that feeling at times, but there are ways to manage it:

Know that uncertainty and anxiety are natural and inevitable. Those feelings don't signal incompetence, only inexperience.

Get control over your topic by writing about it along the way. Don't just

retype or photocopy sources: write summaries, critiques, questions, responses to your sources. Keep a journal in which you reflect on your progress. This kind of writing not only helps you understand what you read but stimulates your thinking

about it. The more you write early on, no matter how sketchily, the easier it will be to face that intimidating first draft.

Break the task into manageable steps and know that they are mutually supportive. Once you formulate a good question, you'll draft and revise more effectively. The more you anticipate how you will write and revise a first draft, the more effectively you will produce it.

If you are a student, count on your teachers to understand your struggles. They want you to succeed, and you can expect their help. (If they don't help, look for others who will.)

Set realistic goals. You do something significant when you wind up your project feeling that it has changed just what *you* think and that your readers think you did it well, even if they don't agree with your claims.

Most important, recognize the struggle for what it is—a learning experience. To overcome the problems that all beginners face, do what successful researchers do, especially when discouraged: review your plan and what you've written, then press on, confident that it will turn out OK. Perhaps only "OK—considering," but probably a lot better than that.

5 From Problems to Sources

If you are a new researcher and expect to find most of your sources in your library or on the Internet, this chapter will help you develop a plan for your research. If you are more experienced, you might skip to the next chapter.

If you have not yet formulated a research question, you may have to spend time reading generally on your topic to find one. But if you have a question and at least one promising answer (the philosopher C. S. Peirce called it a *hypothesis on probation*), you can start looking for data to test it.

To do that efficiently, you need to have a plan. If you plunge into any and all sources on your topic, you risk losing yourself in an endless trail of books and articles. To be sure, aimless browsing can be fun, even productive. We indulge in it a lot. Many important discoveries have begun in a chance encounter with an unexpected idea. But if you have a deadline, you need more than luck to find good sources in time: you have to search systematically for those sources that will help you advance your research project or, just as usefully, challenge you to improve it. In this chapter, we discuss different ways you can use sources in your research, how you can find useful sources, and how you can winnow your sources to a manageable number. In the next chapter, we focus on how to use sources in your writing.

5.1 THREE KINDS OF SOURCES AND THEIR USES

Sources are conventionally categorized into three kinds: primary, secondary, and tertiary. Their boundaries are fuzzy, but knowing these categories can help you plan your research.

5.1.1 Primary Sources

Primary sources are “original” materials that provide you with the “raw data” or evidence you will use to develop, test, and ultimately justify your hypothesis or claim. What kinds of materials count as primary sources vary significantly by field. In history, primary sources are artifacts or documents that come directly from the period or event you are studying: letters, diaries, objects, maps, even clothing. In literature or philosophy, your main primary source is usually the text you are analyzing, and your data are the words on the page. In arts criticism, your primary source would be the work of art you are interpreting. In social sciences, such as sociology or political science, census or survey data would also count

as primary sources. In the natural sciences, reports of original research are sometimes characterized as primary sources (although scientists themselves rarely use that term).

5.1.2 Secondary Sources

Secondary sources are books, articles, or reports that are based on primary sources and are intended for scholarly or professional audiences. The body of secondary sources in a field is sometimes called that field's "literature." The best secondary sources are books from reputable university presses and articles or reports that have been "peer-reviewed," meaning that they were vetted by experts in the field before they were published. Researchers read secondary sources to keep up with developments in their fields and, in this way, to stimulate their own thinking. The standard way of framing new research problems is to challenge or build on the conclusions or methods of others, as presented in secondary sources they have written. You can also borrow evidence from secondary sources to use in your own arguments, but you should do so only if you do not have access to the primary sources from which that evidence was originally taken. Otherwise you risk appearing careless or lazy.

5.1.3 Tertiary Sources

These are books and articles that synthesize and report on secondary sources for general readers, such as textbooks, articles in encyclopedias (including *Wikipedia*), and articles in mass-circulation publications like *Psychology Today*. In the early stages of research, you can use tertiary sources to get a feel for a topic. But if you are making a scholarly argument, you should rely on secondary sources, because these make up the "conversation" in which you are seeking to participate. If you cite tertiary sources in a scholarly argument, you will mark yourself as either a novice or an outsider, and many readers won't take you—or your argument—seriously.

This response may seem unfair, but it's not. Tertiary sources aren't necessarily wrong—many are in fact written by distinguished scholars—but they are limited. Because they are intended for broad audiences who are unfamiliar with the topics that they address, they can sometimes oversimplify the research on which they are based, and they are susceptible to becoming outdated. But if you keep these limitations in mind, tertiary sources can be valuable resources: they can inform you about topics that are new to you, and if they have bibliographies, they can sometimes lead you to valuable secondary sources.

5.1.4 Differentiating Primary, Secondary, and Tertiary Sources

Researchers haven't always divided their sources into these three categories. The distinction between primary and secondary sources originated with historians in the nineteenth century and then spread to other fields. The category of tertiary sources was added later. Although this scheme is now the standard way that students are taught to classify sources, it fits some disciplines better than others: it works very well for history, in which primary sources are materials directly connected to a historical event or moment, and for criticism, in which primary sources are the original works of art, music, or literature that you are interpreting. But it works less well for, say, philosophy, chemistry, or nursing.

It is also important to understand that the classifications of primary, secondary, and tertiary are not absolute but relative to a researcher's project. In most instances, an article in a scholarly journal would generally be considered a secondary source. But it would become a primary source if your research problem concerned its author or the field itself: if, for example, you are writing the author's biography or trying to figure out whether patriotic historians have distorted stories of the Alamo. Likewise, an encyclopedia article would usually be considered a tertiary source, but it would become a primary source if you were studying the way encyclopedias deal with gender issues. T. S. Eliot's essay "Hamlet and His Problems" would be a primary source if you were studying Eliot but a secondary source if you were studying Shakespeare. Change your focus and you change the classification of your sources.

If this is confusing, it need not be. Remember that these classifications are just a means to an end. The important thing, ultimately, is not what you *call* your sources but how well you *use* them to address your research problems, develop new ideas, and make interesting arguments. In the next chapter, we will talk more about how you can use sources in your writing.

5.2 NAVIGATING THE TWENTY-FIRST-CENTURY LIBRARY

Walk into a university library today and you might wonder, "Where are the *books*?" (Answer: they are still there, though many have been moved to off-site storage.) The card catalog has long since been replaced by electronic search engines, and print materials—books, journals, photographs, films, video and audio recordings—are increasingly being

digitized. Today you don't even need to enter the library to use many of its resources. But whether you visit in person or through a website, the library is an indispensable tool for research.

Given the volume of data available on the Internet, you might think that libraries are no longer necessary—except, perhaps, for highly specialized research. We believe the opposite is true. Because *so much* information is now at our fingertips, libraries are more essential than ever when conducting research. Libraries not only let us access information but also ensure that our sources are reliable. Even if your public or academic library is comparatively small, it can serve as a *portal* to a much broader range of resources—research guides, reference works, and online databases—that extends the library's reach. Of course, to benefit from these resources, you must learn to navigate the twenty-first-century library.

5.2.1 Planning Your Library Search

Before you can use sources, you must first find and evaluate them. Some materials that will eventually serve as sources will be physically located in your library, but others are likely to be located elsewhere, whether online or at another library. To take advantage of what libraries have to offer, then, you must *plan* your search. Fortunately, this is where libraries—and librarians—are most useful.

Knowing where to begin your search can be overwhelming at first. It is tempting to simply search a few terms and see what comes up. We do this too, but we also know that the library offers more systematic and productive methods for discovering useful and credible sources. Use the library to learn more about your topic and about promising avenues for exploring your research question.

Ask a Librarian. Perhaps the best advice we can offer is to rely on the research expertise of librarians. Both general reference librarians and (in larger libraries) subject area specialists can help you refine your search parameters and direct you to the right tools for your specific research question. They can help you use the catalog to locate materials held by your library or by other libraries (and obtainable through interlibrary loan). These same librarians typically design research guides that identify reference works and online databases for specific fields.

And don't be shy. Librarians love to assist researchers of all levels and at all stages of the research process. They can help you formulate your research question and plan, develop search terms, and inventory your results to ensure you haven't overlooked something of value. The only embarrassing question is the one you *failed to ask* but should have. Of course, it pays to meet busy librarians halfway by preparing in advance. If you have a well-developed research question ready to share, your librarian will be able to give you better advice. You might describe your project using the three-step rubric from [chapter 3](#):

I am working on educational policy in the 1980s

to find out how school boards in the Midwest dealt with desegregation,

because I want to understand regional differences in race relations.

Consult Reference Works. If you already know a lot about your topic, you probably also know how to find sources on it. But if you are new to a topic, resist the temptation to go straight to primary or secondary sources that strike you as relevant. This approach is unreliable and unpredictable and probably won't save you any time. A more successful strategy is to allow reference works to shape your search efforts. Compiled by experts, both general reference works such as the *Encyclopaedia Britannica* and more specialized works such as the *Encyclopedia of Philosophy* will give you the lay of the land, so that later it will be easier to see how your sources fit within the bigger picture. In addition, reference works often include citations or bibliographies that can lead you to sources you might otherwise overlook.

Especially valuable at early stages of research are bibliographic works, many of which provide abstracts summarizing significant articles or books on a topic. Look, especially, for annotated bibliographies or annual literature reviews that sum up recent books or articles; these offer the most promising leads for your research.

Explore Online Databases. What sets libraries apart from the Internet are their subscriptions to indexes and databases. After books, these are arguably a library's most valuable assets, since they give researchers access to materials they could not obtain otherwise. Each library's subscriptions will differ, with major research libraries offering the most comprehensive access to specialized indexes and databases. However, every academic library and many public libraries offer a powerful set of online tools that greatly

extend their actual collections. You will certainly want to make use of these general and specialized resources in your research. At least become familiar with the major databases to which your library subscribes, such as Academic Search Premier, MLA International Bibliography, or PubMed. Many academic databases either provide abstracts or direct you to articles that include abstracts. Looking at these can help you decide if an article itself is worth reading carefully. Some databases allow you to access full-text articles and even books. But be aware: If your library does not subscribe to a particular journal included in a database, you might be asked to pay a fee to access a full-text article. Before doing so, *always* speak with a librarian about other means of access.

5.2.2 Finding Specific Sources

Having identified a range of search strategies and resources, you are now in a position to look for specific sources in and beyond the library. Of course, this process is not strictly linear. A single source can lead to others and return you to catalogs and databases you have already visited, only this time with new search terms. Novice researchers often rely too heavily on only a few terms or on terms that prove to be too broad—or narrow—to call up relevant sources. Successful researchers know they have to be flexible: searches typically involve trial and error to discover those terms that will yield the most relevant sources.

Search Your Library Catalog. In your research, you will probably need to use your library's catalog in two complementary ways: keyword searching and browsing. When you have examined some sources to identify a list of *keywords* associated with your topic, you are ready to use these terms to search the catalog. In most libraries, you must choose the category (books, articles, journals, etc.) you wish to use for your search.

If your sources include books, you can use Library of Congress subject headings, found either on the back of their title page or on their “details” page in the online catalog, to search for related materials. On the back of this book's title page are the terms

1. Research—Methodology.
2. Technical writing.

If you search an online catalog for those terms, you will find all the books on those subjects in that library. A book may be cross-listed under multiple subject headings. In that case, take a quick look at the titles listed under those headings as well. You may find

useful sources you would have missed otherwise. You can also *browse* the catalog for books with similar *call numbers*. Once you identify a book that seems on target, use its call number to find others shelved along with it. Look for the browse link in your book's catalog entry. This list will be less focused than a keyword list, but it may also contain unexpected gems. So don't restrict yourself to books nearest your target. Invest the time to browse widely.

The problem with any online search is that it may produce an overwhelming number of titles. The University of Chicago library has more than three hundred books on Napoleon and thousands with the word *environment* in their titles. If your search turns up too many sources, narrow it down. Today's online catalogs let you limit searches in many ways: by date of publication, language, subject, resource type (books, articles, databases, etc.), and possibly others depending on the catalog. If you can't decide how to narrow your search, start with the date of publication. Restrict it to those sources published in the last fifteen years; if that still turns up too many, cut to the last ten years.

After you search the Library of Congress or a large university catalog, you may discover that your own library holds only a fraction of what you found, but that it can borrow most of what you need. For books too new to be in a library catalog but crucial to your research, find an online bookseller. Those books might turn up on your library's new acquisitions shelf, and you can always recommend books to your library for acquisition. But if you need those books quickly, you'll probably have to buy them.

On the other hand, if you find nothing, your topic may be too narrow or too far off the beaten track to yield quick results. But you could also be on to an important question that nobody else has thought about, at least not for a while. For example, "friendship" was once an important topic for philosophers, but it was then ignored by major encyclopedias for centuries. Recently, though, it has reemerged as a topic of serious research. Chances are you'll make something of a neglected topic only through your own hard thinking. In the long run, that research might make you famous, but it probably won't work for a paper due in a few weeks.

Prowl the Stacks. Doing research online is faster than on foot, but if you never go into the stacks of your library (assuming you're allowed to), you may miss crucial sources that you'll find only there. More important, you'll miss the benefits of serendipity—a chance

encounter with a valuable source that occurs only when a title happens to catch your eye. (All of us have found important sources in this way.)

If you can get into the stacks, find the shelf with books on your topic, then scan the titles on that shelf, then on the ones above, below, and on either side, especially for books with new bindings published by university presses. Then turn around and skim titles behind you; you never know. When you spot a promising title, skim its table of contents and index for keywords related to your question and answer. Then skim its bibliography for titles that look relevant. You can do all that faster with a book in your hand than you can online. Be suspicious of a book with no index or bibliography. (See 5.4 for more on systematic skimming.)

You can check tables of contents for most journals online, but browsing among shelved journals can be more productive. Once you identify promising journals online or in bibliographies, find them on the shelf. Skim the bound volumes for the last ten years (most have an annual table of contents in front). Then take a quick look at journals shelved nearby. You'll be surprised how often you find a relevant article that you would have missed online.

Follow Bibliographic Trails. Most sources will give you trailheads for bibliographical searches. When you find a book that seems useful, skim its bibliography or works cited. Its index will list the authors cited most often (generally, the more citations, the more important an author is). Journal articles usually begin with a review of previous research, all cited. By following this bibliographic trail, you can navigate the most difficult research territory, because one source always leads to others, which lead to others, which lead to . .

Use Citation Indexing. Many online catalogs and databases let you look up *other* sources that cite one that you already know. This technique, called citation indexing, is like following a bibliographic trail, forward or backward. Instead of searching for sources that a given source cites, *backward* citation, you can search for sources that cite a given source, or *forward* citation. A source's credibility can thus be gauged both by the sources it cites and by the sources that cite it. The more a given source is later cited, the greater its reputation and its impact factor.

To do this kind of research, researchers used to have to consult printed citation indexes, a process that could take hours or even days. But today's online catalogs and

databases make it easy. By following bibliographic trails and using citation indexing in tandem, you can build up a rich network of sources to support your own research.

5.3 LOCATING SOURCES ON THE INTERNET

You probably already know how to search the publicly available Internet: type a few words into the text box of a public search engine like Google, and pages of links—delivered as URLs, or uniform resource locators—arrive on your screen. We use this technique all the time, to find movie times, restaurant reviews, stock prices, news items, and so on. Its ubiquity in our everyday lives is reflected in our language. We've turned the name of a company into a verb: in everyday parlance, to "Google" something is to search for it.

Your practical experience with such everyday research might lead you to regard the Internet as comprehensive and reliable. (You use it to price a smartphone or pair of jeans, so why not for your academic or professional research?) But that would be a mistake. Again, remember that your library's catalogs and databases will allow you to access a great deal of information that you cannot get through a search engine. When using the Internet for research, maintain a healthy skepticism: most of what we retrieve using Google or some other search engine is perfectly reliable, but not everything is. In contrast to your library's catalogs and databases, the Internet is essentially unmonitored. There is no one to vouch for the credibility of materials posted to, and sent from, countless websites. And finally, keep in mind that companies offering free search engines make their money by acquiring data about you through your online behavior and by selling advertising, and that webmasters routinely modify their sites to make them appear higher in search results. These practices are not necessarily nefarious, but you should remember that search engine companies and websites themselves have an interest in where you go and what you see online.

But if you keep these limitations in mind, using the Internet can be a valuable component of your research plan. Here are some ways in which we use the Internet in our own research:

- To get our bearings with respect to a new topic—regarding everything we learn at this stage as provisional

- To explore potential keywords to use in a more systematic search

To remind ourselves of dates or facts—again remembering to check these against more reliable sources

To locate the authors of sources whom we might wish to contact: profiles of many scholars and researchers are available on college and university websites

To get a “ballpark” sense of what we are likely to find through a search of specialized databases by a quick search using Google Scholar

Publicly available general tertiary sources such as *Wikipedia* and specialized ones such as the Victorian Web are often quite reliable. But you should still view them skeptically. In general, don’t use the Internet to find secondary sources, as these depend for their credibility on the checks inherent in the academic publishing system, especially that of peer review. You can, however, use the Internet freely as a primary source. For example, if you study how soap opera story lines respond to their fans’ reactions, fan blogs would be fine primary sources. (We discuss evaluating sources in the next section.)

Respecting Authors’ Rights. Sites such as Project Gutenberg and Google Books can provide reliable online copies of older texts no longer in copyright. But postings of more recent texts (in the United States, those published in 1923 or later) may violate the author’s copyright. Careful readers dislike seeing unauthorized copies cited not only because that breaks the law but also because such texts are often inaccurately reproduced. So unless a recent text is posted with the author’s clear permission (as in a database), use its print rather than its e-version.

5.4 EVALUATING SOURCES FOR RELEVANCE AND RELIABILITY

When you start looking for sources, you'll find more than you can use, so you must quickly evaluate their usefulness. To do so use two criteria: relevance and reliability.

5.4.1 Evaluating Sources for Relevance If your source is a book, do this:

Skim its index for your keywords, then skim the pages on which those words occur.

Skim the first and last paragraphs in chapters that use a lot of your keywords.

Skim prologues, introductions, summary chapters, and so on.

Skim the last chapter, especially the first and last two or three pages.

If the source is a collection of articles, skim the editor's introduction.

Check the bibliography for titles relevant to your topic.

If your source is an e-book, you should still follow these steps, but you can also search the whole text for your keywords.

If your source is an article, do this:

Read the abstract, if it has one.

Skim the introduction and conclusion; or if they are not marked off by headings, skim the first six or seven paragraphs and the last four or five.

Skim for section headings, and read the first and last paragraphs of those sections.

Check the bibliography for titles relevant to your topic.

If your source is online, do this:

If it looks like a printed article, follow the steps for a journal article, and also search on your keywords.

Skim sections labeled "introduction," "overview," "summary," or the like. If there are none, look for a link labeled "About the Site" or something similar.

If the site has a link labeled “Site Map” or “Index,” check it for your keywords and skim the referenced pages.

- If the site has a “search” resource, type in your keywords.

This kind of speedy reading can guide your own writing and revision. If you do not structure your paper so your readers can skim it quickly and see the outlines of your argument, your paper has a problem, an issue we discuss in chapters [12](#) and [13](#).

5.4.2 Evaluating Sources for Reliability

You can’t judge a source until you read it, but there are signs of its reliability:

Is the source published or posted online by a reputable press? Most university presses are reliable, especially if you recognize the name of the university. Some commercial presses, which are presses not associated with a university, are reliable in some fields, such as Norton in literature, Ablex in sciences, or West in law. Be skeptical of a commercial book that makes sensational claims, even if its author has a PhD after his name. Be especially careful about sources on hotly contested social issues such as stem-cell research, gun control, and global warming. Many books and articles are published by individuals or organizations driven by ideology. Libraries often include them for the sake of coverage, but don’t assume they are reliable.

Was the book or article peer-reviewed? Most reputable presses and journals ask experts to review a book or article before it is published; this is called peer review. Essay collections published by university presses are often but not always peer-reviewed; sometimes they are reviewed only by the named editor or editors. Few commercial magazines use peer review. If a publication hasn’t been peer-reviewed, be suspicious.

Is the author a reputable scholar? This is hard to answer if you are new to a field. Most publications cite an author’s academic credentials; you can find more with a search engine. Most established scholars are reliable, but be cautious if the topic is a contested social issue such as gun control or abortion. Even reputable scholars can have axes to grind, especially if their research is financially supported by a special interest group. Go online to check out anyone an author thanks for support, including foundations that supported her work.

If the source is available only online, is it sponsored by a reputable organization? A website is only as reliable as its sponsor. You can usually trust

one that is sponsored and maintained by a reputable organization. But if the site has not been updated recently, it may have been abandoned and may no longer be endorsed by its sponsor. Some

sites supported by individuals are reliable; most are not. Do a web search for the name of the sponsor to find out more about it.

Is the source current? You must use up-to-date sources, but what counts as current depends on the field. In computer science, a journal article can be out-of-date in months; in the social sciences, ten years pushes the limit. Publications have a longer shelf life in the humanities: literary or art criticism, for example, can remain relevant for decades and even centuries. In general, a source that sets out a major position or theory that other researchers accept will stay current longer than those that respond to or develop it. Assume that most textbooks are *not* current. If you are unsure whether a source will be considered current, take your lead from the practice of established researchers in the field. Look at the dates of articles in the works cited lists of a few recent books or articles in the field: a good rule of thumb is that you can cite works as old as the older ones in that list (but to be safe, perhaps not as old as the oldest). Try to find a standard edition of primary works such as novels, plays, letters, and so on: it is usually not the most recent. Be sure that you consult the most recent edition of a secondary or tertiary source: researchers often change their views, even rejecting ones they espoused in earlier editions.

If the source is a book, does it have notes and a bibliography? If not, be suspicious, because you have no way to follow up on anything that the source claims.

If the source is a website, does it include bibliographical data? You cannot judge the reliability of a site that does not indicate who sponsors and maintains it, who wrote what's posted there, and when it was posted or last updated.

If the source is a website, does it approach its topic judiciously? Your readers are unlikely to trust a site that engages in heated advocacy, attacks those who disagree, makes wild claims, uses abusive language, or makes errors of spelling, punctuation, and grammar.

The following criteria are particularly important for advanced students:

If the source is a book, has it been well reviewed? Many fields have indexes to published reviews that tell you how others evaluate a source (see our “Appendix: Bibliographic Resources”).

Has the source been frequently cited by others? You can roughly estimate how influential a source is by how often others cite it. Citation indexing makes this easy to do (see 5.2.2). If you find that a source is cited repeatedly by other scholars, you can infer that experts in the field regard it as reliable and significant. Such sources are said to have a high

“impact factor.” You should keep an eye out for such sources and use them to orient yourself in your field of research.

Whom Can You Trust?

The highly respected *Journal of the American Medical Association* appointed a committee to review articles published by reputable journals for reliability. Even though those papers had been approved by experts in the field, the reviewers reported that “statistical and methodological errors were common” (“When Peer Review Produces Unsound Science,” *New York Times*, June 11, 2002, p. D6). In the face of such revelations, some just dismiss what scientists publish: if the reviewers of scientific articles can’t guarantee reliable data, what is a mere layperson to do? You do what we all do—the best you can: read critically, and when you report data, do so as accurately as you can. We’ll return to this question in [chapter 8](#).

Error is bad, but dishonesty is worse. One of Booth’s students got a summer job with a drug company and was assigned to go through stacks of doctors’ answers to questionnaires and shred certain ones until nine out of ten of those left endorsed the company’s product. These bogus data were then used to “prove” that the product worked. The student quit in disgust and was, no doubt, replaced by someone less ethical.

These indicators do not guarantee reliability. Reviewers sometimes recommend that a reputable press publish something weakly argued or with thin data because other aspects of its argument are too important to miss—we have each done so. So don’t assume that you can read uncritically just because a report is written by a reputable researcher and published by a reputable press.

5.5 LOOKING BEYOND PREDICTABLE SOURCES

For a class paper, you'll probably use the sources typical in your field. But if you are doing an advanced project, an MA thesis, or a PhD dissertation, search beyond them. If, for example, your project were on the economic effects of agricultural changes in late sixteenth-century England, you might read Elizabethan plays involving country characters, look at wood prints of agricultural life, find commentary by religious figures on rural social behavior. Conversely, if you were working on visual representations of daily life in London, you might research the economic history of the time and place. When you look beyond the standard *kinds* of references relevant to your question, you enrich not only your analysis but your range of intellectual reference and your ability to synthesize diverse kinds of data, a crucial competence of an inquiring mind. Don't ignore a work on your topic that is not mentioned in the bibliographies of your most relevant sources—you will get credit for originality if you turn up a good source that others have ignored.

When They Beat You to the Punch

Don't panic if you find a source that seems to pose and solve precisely your problem: "Transforming the Alamo Legend: History in the Service of Politics." At that moment you might think, *I'm dead. Nothing new to say.* (It happened to Williams when he was writing his doctoral dissertation and to Colomb just before his first book came out.) You may be right, but probably not. If the source does in fact settle your exact question, you have to formulate a new one. But the question your source asked is probably not as close to yours as you first feared. And you may find that you can do the source one better: if the author failed to get things entirely right, you have an unwitting ally in formulating your problem.

5.6 USING PEOPLE TO FURTHER YOUR RESEARCH

One of the paradoxes of twenty-first-century research is that even as new technologies allow us to access an unprecedented wealth of materials with unprecedented ease, research has also become more personal. So as you undertake your project, don't forget about the human element.

Most obviously, people can be sources of primary data, collected through observation, surveys, or interviews. Be creative when using people for primary research: don't ignore people in local business, government, or civic organizations. For example, if you were researching school desegregation in your town, you might go beyond the documents to

ask the local school district whether anyone there has memories to share. We can't explain the complexities of interviewing (there are many guides to that process), but remember that the more you plan by determining *exactly* what you want to know, the more efficiently you will get what you need. You don't need to script an interview around a set list of questions—in fact, that can be a bad idea if it makes the interviewee freeze up. But prepare so that you don't question your source aimlessly. You can always reread a book for what you missed, but you can't keep going back to people because you didn't prepare well enough to get what you needed the first time. And always remember that when conducting primary research that involves people, you must adhere to rigorous ethical standards (see the Quick Tip at the end of this chapter).

People can also lead you to good secondary sources or serve as such sources themselves. We noted earlier that the body of secondary sources on a topic constitutes the scholarly “conversation” about it. That was a metaphor. But you can and should have real conversations about your research as well. Above we encouraged you to discuss your research with one kind of expert: your reference librarian. Your librarian is an expert on the processes of library research. You can also benefit from talking directly with experts on your topic. Ask them about the important open questions in the field. Ask them what they think of your project or provisional thesis. Ask them to suggest secondary sources for you to read. This kind of personal guidance can be invaluable to a novice researcher, and many experts will be happy to talk with you (or at least engage in a little e-mail correspondence).

All of us have made these kinds of queries with great success in our own research, and all of us have responded to them in turn, by helping those who have contacted us. One of us once invited an eminent scholar to talk about his research process to a group of first-year college students. He began his talk by saying, “I don't really have a research process; I just ask my smart friends what I should read.” This scholar was being at least a bit tongue in cheek, but we could all do worse than to rely on such smart friends, at least to get us started.

Quick Tip: The Ethics of Using People as Sources of Data

In recent years we have become increasingly aware that research using people may inadvertently harm them—not just physically but by embarrassing them, violating their privacy, and so on. So every college or university now has a committee that reviews all research directly or indirectly involving people, whether done by students or professional researchers. These committees go by different names—Human Subjects Committee, Institutional Review Board, Ethics Research Board, and so on—but they all aim to ensure that researchers follow the maxim that should govern research as it does medicine: *Do no harm*. Consult with that committee if you use people as sources of data—whether by interviewing, surveying, perhaps even just observing them. Jumping through these hoops may feel like bureaucratic make-work, but if you don't, you could harm those who help you and may even damage your institution.

6 Engaging Sources

To make your research reliable, you must use your sources fairly and accurately. In this chapter, we explain how to engage your sources productively and how to take notes so that readers can trust you when you rely on or critique a source.

In this chapter, we show you how to get the most out of your sources, especially your secondary sources. We've chosen that focus for a simple reason: it's a topic on which we can offer useful, general advice. The ways that researchers find or create their data, and the kinds of data readers expect as evidence, vary wildly from field to field. Historians and literary critics typically comb primary sources for passages they can use as evidence. Other researchers, however, don't use primary sources at all: depending on their fields, they might analyze soil samples in a lab, or conduct a survey, or build a computer model. But every field has its body of secondary sources, sometimes called its *literature*, that document the field's conversation. And researchers in all fields engage these sources in similar ways.

How you use your secondary sources depends on where you stand in your search for a project. Experienced researchers read secondary sources regularly to keep up with work in their fields, and so they usually begin their projects with a question or problem in mind. But if you are new to a subject or you still have only a topic, you may have to read a lot of sources to find a problem to pursue, and then even more to figure out how to solve it. In this chapter, we show you how to read secondary sources as experienced researchers do: not just for data you can use in your own argument but more importantly for questions, problems, and arguments that spur your own thinking.

6.1 RECORDING COMPLETE BIBLIOGRAPHICAL INFORMATION

First things first: once you decide a source is worth reading, record *all* of its bibliographical information. Do this before you do anything else: it only takes a moment, and we promise that no habit will serve you better for the rest of your career.

You need the bibliographic information for your sources not only so that you can recall what you have read, but also so that you can credit your sources when you write. In your own notes, you can record bibliographic data in whatever format you like—so long as your records are complete; when you cite sources in your writing, you should follow the citation style of your field (see 14.5).

For printed books, record

author(s)

title (including subtitle)

editor(s) and translator(s) (if any)

edition

volume

place published (only the first city if more than one is listed)

publisher

date published

page numbers of articles or chapters consulted

library call number (if any)

ISBN

For electronic books, record everything you would record for a printed book plus

URL (if any)

name of database (if any)

date of access

electronic format of the book

For journal articles, record

author(s)

title (including subtitle) of article

title of journal

volume and issue number

date

page numbers of article

library call number (if any)

For online sources, record as much of the above as applies. Also record

URL

name of database (if any)

date of access

Webmaster (if identified)

If you access a printed text online, record bibliographical data from the original printing as well as your source of online access.

If you scan or photocopy a passage from a book, also scan or photocopy its title page and the bibliographic information on the reverse side. Then add the library call number if you know it. You won't need to include the call number when you cite the source, but knowing it will allow you to find the source again easily if you need it.

You may think this advice is overly cautious, but it isn't. Nothing is more frustrating than having the perfect quotation or bit of data in your notes and being unable to use it in your writing, because you didn't completely document your source and can't find it again.

Williams once had to withhold a publication on Elizabethan social history for more than a year because he failed to document a source fully. Years earlier he had come across some data—a list of renters in London in 1638—he thought he would someday find useful. But he had failed to record complete information on his source, so when that day came, he could not use its data. He searched the library

at the University of Chicago for hours, until one night he sat up in bed, realizing that the source was in a different library!

6.2 ENGAGING SOURCES ACTIVELY

Experienced researchers don't read passively; they engage their sources actively, entering into conversation with them. If you can, read important sources twice. First, read generously. Pay attention to what sparks your interest. Reread passages that puzzle or confuse you. Don't look for disagreements right away, but read in ways that help the source make sense. Otherwise, you'll be tempted to emphasize its weaknesses if it presents an argument that rivals yours. Resist that temptation, at least at first.

Then, if your source seems important or seems to challenge your own position, read it a second time slowly and more critically. When you read a passage, think not only about what it says but about how you would respond. Record those responses in your notes or—if you own the source or are working from a copy—in the margins of the source itself. Test your understanding by summarizing: if you can't sum up a passage in your mind, you don't understand it well enough to disagree.

Don't accept a claim just because an authority asserts it. For decades, researchers cited the "fact" that the Inuit people of the Arctic had many terms for types of snow. But another researcher found that they have just three (or so she claims). And understand that experts frequently disagree. If Expert A says one thing, B will assert the opposite, and C will claim to be an expert but is not. When some students hear experts disagree, they become cynical and dismiss expert knowledge as just opinion. But don't mistake informed and thoughtful debate over legitimately contested issues for mere opinion. In fact, it's the mark of an active field.

If you are an advanced researcher, check the accuracy of everything important to your argument. Researchers whose work has been used by others will tell you, as often as not, that it was reported inaccurately, summarized carelessly, or criticized ignorantly. Writers regularly write to the *New York Review of Books* and the "Book Review" of the *New York Times*, pointing out how reviewers distorted their ideas or made factual errors criticizing them.

Check—and Check Again

Researchers rarely misrepresent sources deliberately, but they are occasionally careless or intellectually lazy. Colomb heard a prominent researcher confess after her talk that she had never read the work she had just discussed. One of Booth's books was "refuted" by a critic who apparently read only the title of a section, "Novels Must Be Realistic." Failing to read beyond it, he didn't know that Booth himself was attacking the claim in the title, along with other misconceptions about fiction. One reviewer of a book by Williams misquoted him and then, thinking he was disagreeing with him, argued for the point Williams made in the first place!

6.3 READING FOR A PROBLEM

Once you have a research problem, use it to guide your search for evidence, models, and arguments to respond to. But if you don't yet have one, you won't know which data, models, or arguments might be relevant. So read sources not randomly but deliberately to find a problem. Look for claims that seem puzzling, inaccurate, or simplistic—anything you can disagree with. You're more likely to find a research problem when you disagree with a source, but you can also find one in sources you agree with.

6.3.1 Look for Creative Agreement

If you believe what a source claims, try to extend that claim: What new cases might it cover? What new insights can it provide? Is there confirming evidence the source hasn't considered? Here are some ways to find a problem through creative agreement.

Offer additional support. You can offer new evidence to support a source's claim.

Smith uses anecdotes to show that the Alamo story had mythic status beyond Texas, but editorials in big-city newspapers offer better evidence.

Source supports a claim with old evidence, but you offer new evidence.

Source supports a claim with weak evidence, but you offer stronger evidence.

Confirm unsupported claims. You can prove something that a source only assumes or speculates about.

Smith recommends visualization to improve sports performance, but MRI studies of the mental activities of athletes offer evidence that shows why that is good advice.

Source speculates _____ might be true, but you offer evidence to show that it is.

Source assumes _____ is true, but you can prove it.

Apply a claim more widely. You can extend a position.

Smith argues that medical students learn physiological processes better when they are explained with many metaphors rather than with just one. The same seems true for engineering and law students.

Source correctly applies _____ to one situation, but you apply it to new ones.

Source claims that _____ is true in a specific situation, but you show it's true in general.

6.3.2 Look for Creative Disagreement

If you read actively, you'll inevitably find yourself disagreeing with your sources. Don't brush those disagreements aside, because they often point to new research problems. Look for these types (the list is not exhaustive, and some kinds overlap):

Contradictions of kind. A source says something is one kind of thing, but it's another.

Smith says that graffiti is merely vandalism, but it is better understood as a form of public art.

Source claims that _____ is a kind of _____, but it's not.

Source claims that _____ always has _____ as one of its features or qualities, but it doesn't.

Source claims that _____ is normal/good/significant/useful/moral/interesting, but it's not.

You can reverse those claims and the ones that follow to state the opposite:

Though a source says _____ is *not* a kind of _____, you can show that it is.

Part-whole contradictions. You can show that a source mistakes how the parts of something are related.

Smith has argued that coding is irrelevant to a liberal education, but in fact, it is essential.

Source claims that _____ is a part of _____, but it's not.

Source claims that one part of _____ relates to another in a certain way, but it doesn't.

Source claims that every _____ has _____ as one of its parts, but it doesn't.

Developmental or historical contradictions. You can show that a source mistakes the origin or development of a topic.

Smith argues that the world population will rise, but it won't.

Source claims that _____ is changing, but it's not.

Source claims that _____ originated in _____, but it didn't.

Source claims that _____ develops in a certain way, but it doesn't.

External cause-effect contradictions. You can show that a source mistakes a causal relationship.

Smith claims that legalizing marijuana will increase its use among teenagers, but evidence shows that it doesn't.

Source claims that _____ causes _____, but it doesn't/they are both caused by _____.

Source claims that _____ is sufficient to cause _____, but it's not.

Source claims that _____ causes only _____, but it also causes _____.

Contradictions of perspective. Most contradictions don't change a conceptual framework, but when you contradict a "standard" view of things, you urge others to think in a new way.

Smith assumes that advertising has only an economic function, but it also serves as a laboratory for new art forms.

Source discusses _____ from the point of view of _____, but a new context or point of view reveals a new truth [the new or old context can be social, political, philosophical, historical, economic, ethical, gender specific, etc.].

Source analyzes _____ using theory/value system _____, but you can analyze it from a new point of view and see it in a new way.

6.4 READING FOR ARGUMENTS

6.4.1 Read for Arguments to Respond To

No argument is complete until it acknowledges and responds to its readers' predictable questions and disagreements. You can find some of those competing views in secondary sources. What alternatives to your claims do they offer? What evidence do they cite that you must acknowledge? Some new researchers think that they weaken their case if they mention any views opposing their own. The opposite is true. When you acknowledge the views of others, you show that you not only know those views, but have carefully considered and can confidently respond to them (for more on this, see [chapter 10](#)).

Experienced researchers also use those competing views to improve their own. You can't really understand what you think until you understand why a rational person might think differently. So as you look for sources, don't look just for those that support your claims. Be alert for sources that contradict them, because they are sources that your readers are likely to know.

6.4.2 Read for Models of Reasoning and Analysis

You can use secondary sources in another way as well: as models of reasoning and analysis. If you have never made an argument like the one you plan to, you might follow the pattern of other arguments that you find in your secondary sources. You can't use specific ideas (that would be plagiarism), but you do not plagiarize a source when you borrow its ways of arguing or of analyzing data. (Don't worry that using a source as a model will make your research seem unoriginal. Research arguments are often unoriginal in their methods and ways of reasoning. Readers will look for originality in your problem, claim, and evidence.)

Suppose you want to argue that the Alamo legend thrived because it served the political interests of those who created it and satisfied the emotional needs of those who repeated it. You will need reasons and evidence unique to your claim, but you can raise the *kinds* of issues that readers see in similar arguments about other legends, real or fictional. If, for example, a source shows how the King Arthur legend helped to shape English society and politics, you might make a similar argument about the Alamo and the Republic of Texas. You are not obliged to cite your model, but to gain credibility, you might note that it makes an argument similar to yours:

Just as the Arthurian legends helped to forge a definitively English social and political identity (Weiman 1998), so the legend of the Alamo . . .

6.5 READING FOR DATA AND SUPPORT

Analysis of Logic.

Analysis of Grammar.

Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

6.5.1 Read for Data to Use as Evidence

New researchers regularly mine secondary sources for data, but if you can, check the primary source. If an important quotation is available in its original form and context, it is risky and intellectually lazy not to look it up. You don't have to agree with a source to use its data; in fact, its argument does not even have to be relevant to your question, so long as its data are. However, use statistical data only if you can judge for yourself whether they were collected and analyzed appropriately. (You serve yourself well if you take a course or two in statistics and probability, an area where most Americans are shamefully ignorant.)

6.5.2 Read for Claims to Use as Support

Researchers often use the results they find in secondary sources to bolster their own arguments. If you find a useful claim, you can cite it to support your own, especially if it has been well supported and widely accepted. But many claims show nothing more than that another researcher agrees with you. To use such claims as evidence, you have to report not only the conclusion of the source but its reasoning and supporting evidence as well.

6.6 TAKING NOTES

Once you find a source that you think you can use, you must read it purposefully and carefully. But that will do you little good if you can't locate it again or remember it well enough to use. So again, before you do anything else, record the source's full bibliographic information. Then take notes in a way that will help you not only to remember and use what you have read but also to further your own thinking.

You can take notes on index cards or in a notebook, or you can use your computer or handheld device. You can even take notes online, using any number of web-based solutions, from word processors to elaborate reference-management systems. Each of these approaches has its advantages and disadvantages. You need to understand them and pick the approach that will work best for you.

6.6.1 Taking Notes on Paper

Years ago, the standard way to take notes on sources was to create a file of index cards: At the top left is the author, short title, and page number. At the top right are keywords that let the researcher sort and re-sort notes into different categories and orders. The body of

the card summarizes the source, records a direct quotation, and includes a comment or thought about further research that is clearly distinguished from the quotation. At bottom left is the call number of the source.

Although few researchers use this method extensively today, we can still learn important principles from it:

Record complete bibliographic information for each source so that you can cite it properly and find it again easily.

Separate notes on different topics: don't jumble together your notes on different topics, even if they come from the same source.

Make sure your notes are accurate, because you need to be able to rely on them later. (If you want to quote more than a few lines, consider photocopying, scanning, or cutting-and-pasting the passage, or simply saving the whole document.)

Perhaps most important: clearly distinguish (1) what you quote from a source, (2) what you paraphrase or summarize from a source, and (3) your own thoughts. If you are writing on paper, use headings or brackets or different colors of ink to differentiate these different kinds of note. If you are using a computer or taking notes online, use different fonts or different colors of type. We stress that you must *unambiguously* distinguish your own words from those of your sources because it is so easy to confuse the two.

Compared to computer files, paper notes can be cumbersome to store, back up, index, and access, and they are susceptible to transcription errors: when hand-copying quotations, it is surprisingly easy to alter their wording, even when you think you are being careful. Still, paper notes have their uses. For example, a notebook or pack of index cards is cheap and portable, and paper can sometimes go where technology cannot—some archives still require patrons to take notes with paper and pencil. The main reason some researchers still rely on paper notes is that they help with thinking. Since you can't write out everything, using paper forces you to think about what's most important. Likewise, if your notes are on cards or sheets of paper, you can group them, shuffle them, or lay them out on a desk, a table, or even the floor. And the very act of *writing out* your notes can help you not only remember what's in them but also see connections and develop your own ideas. Still, few researchers today rely on paper notes alone. Most use their computers.

6.6.2 Taking Notes on a Computer

When you take notes using a computer, you have several options:

Most simply, you can use a word processor. Create a separate file (or at least a separate page) for each source, and be sure to unambiguously distinguish your own words from those of your source. Word processors are easy to use, but they also limit your ability to index, organize, sort, and search your notes. So for long or complex projects especially, you may want to consider other options.

You can use a dedicated note-taking application to create and organize your notes for a project. Such applications can help you to index, sort, and access your notes, but since they sometimes use proprietary formats, they can make it difficult for you to share your notes or use them with other programs.

You can use a full reference-management system. Such systems do much more than help you organize and access your notes. They can often pull information directly from online library catalogs and databases, and they can format and update your citations and bibliographies when you write. Some will even store full electronic copies of your sources within the reference management system, helping you build and maintain your personal library of sources. But like note-taking programs, these systems sometimes use proprietary formats, and you have to learn to use them.

All three types of application are also available in web-based versions, meaning that the application and your notes reside not on your own computer but in the “cloud.” This protects your data from inadvertent loss or corruption (you don’t have to worry about your hard drive crashing) and can help you share information and collaborate with other researchers.

But whatever technology you use, you have to consider some basic questions:

How will you stay organized? For example, if you plan to create a separate word-processing document for each source, you then need a system for naming and storing your files. Without such a system, it is very easy to “lose” your notes on your hard drive.

How will you use your notes? You may decide to store your notes differently for small projects and large ones, for discrete projects and ongoing ones, for individual projects and collaborative ones.

What applications are available through your school or library? Many schools offer note-taking or reference-management systems to faculty and students, sometimes integrating these tools with their catalogs. If your school offers such resources, consider using them.

Most important: what approach best suits your own ways of writing, thinking, and working? As you grow as a writer and researcher, you will develop ways of working that are particular to you. Others may find them cumbersome or confusing or even incomprehensible. No matter. Remember that your goal is not to create an elaborate set of notes but to research and write capably and intelligently. If a piece of software doesn't help you do that, it isn't useful—to you.

6.6.3 Decide Whether to Quote, Paraphrase, or Summarize

If you can photocopy, scan, or download your source, or you know that you can access it online when you write, you can focus less on preserving its exact words than on your own engagement with it. That's a great advantage. Summarize the source, which will also help you understand it, and note passages you may want to quote or paraphrase when you write. Note also your own responses to the source. Where did you find yourself agreeing with it? Disagreeing? Wanting to say, *Yes, but . . .* ?

If you can't preserve your source and you don't know whether you will be able to access it later, you have a tougher choice. It takes too long to transcribe the exact words of every passage that's interesting or potentially useful, but it's a nuisance when you realize later that you want to quote something you only summarized. So when taking notes, you must choose as you go whether to quote, paraphrase, or summarize. In general, researchers in the humanities quote most often; social and natural scientists usually paraphrase and summarize. But every choice depends on how you plan to use your source:

Summarize when you need only the point of a passage, section, or even whole article or book. Summary is useful for context or views that are related but not specifically relevant. A summary of a source never serves as good evidence.

Paraphrase when the specific words of a passage are less important than its meaning. Paraphrasing doesn't mean changing just a word or two. You must

replace most of the words and phrasing of the original with your own. A paraphrase is never as good evidence as a direct quotation.

Record exact quotations for these purposes:

—The quoted words are evidence that backs up your reasons. If, for example, you claimed that different regions responded to the Battle of the Alamo differently, you would quote exact words from different newspapers. You would paraphrase them if you needed only their general sentiments.

—The words are from an authority you plan to rely on or challenge. —The words are strikingly original or so compelling that the quotation can frame the rest of your discussion.

—The source makes a claim that you disagree with, and to be fair you want to state that claim exactly.

Never abbreviate a quotation thinking you can accurately reconstruct it later. You can't. And if you misquote, you'll undermine your credibility.

6.6.4 Get the Context Right

Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context?

You can't record *everything*, but you have to record *enough* to ensure that you accurately capture the source's meaning. As you use material from your sources, record not just what they say but how they use the information.

When you quote, paraphrase, or summarize, be careful about context. You cannot entirely avoid quoting out of context, because you cannot quote all of an original. So when you draft a paraphrase or summary or copy a quotation, do so within the context that matters most—that of your own grasp of the original. When you record a part of an argument, note the line of reasoning that the author was pursuing:

NOT: Bartolli (p. 123): The war was caused by Z.

NOT: Bartolli (p. 123): The war was caused by X, Y, and Z.

BUT: Bartolli: The war was caused by X, Y, and Z (p. 123). But the most important cause was Z (p. 123), for three reasons: reason 1 (pp. 124–26); reason 2 (p. 126); reason 3 (pp. 127–28).

Sometimes you will care only about the conclusion, but readers usually want to see how a conclusion emerges from the argument supporting it. So when you take notes, record not only conclusions but also the arguments that support them.

When you record a claim, note its role in the original. Is it a main point? A minor point? A qualification or concession? By noting these distinctions you avoid this kind of mistake:

ORIGINAL BY JONES: “Researchers recognize that lung cancer has a number of causes, including genetic predisposition and exposure to environmental factors such as asbestos, radon, and fine particulates. But no one who has studied the data doubts that lung cancer’s leading cause is smoking.”

MISLEADING REPORT ABOUT JONES: Smoking is just one cause of lung cancer among many. Jones, for example, claims that “lung cancer has a number of causes, including genetic predisposition and exposure to environmental factors such as asbestos, radon, and fine particulates.”

Jones did not make that point at all. He *conceded* a point to set up the point he wanted to make. Anyone who deliberately misreports in this way violates basic standards of truth. But you can make such a mistake inadvertently if you note only a source’s words and not their role in an argument.

To avoid such mistakes, distinguish statements that are central to an argument from qualifications or concessions that the author acknowledges but downplays. Unless you are reading “against the grain” of the writer’s intention—to expose hidden tendencies, for example—do not report minor aspects of a source as though they were major or, worse, as if they were the source’s whole point.

3. Record the scope and confidence of a claim. These are not the same:

Chemicals in french fries cause cancer.

Chemicals in french fries may be a factor in causing cancer.

Some chemicals in french fries correlate with a higher incidence of some cancers.

Don’t mistake a summary of another writer’s views for those of an author summarizing them. Some writers do not clearly indicate when they summarize another’s argument, so it is easy to quote them as saying what they set out to disprove rather than what they in fact believe.

Note why sources agree and disagree. Two social scientists might claim that a social problem is caused by personal factors, not by environmental forces, but one might cite evidence from genetic inheritance while the other points to religious beliefs. How and why sources agree is as important as the fact that they do. In the same way, sources might disagree because they interpret the same evidence differently or take different approaches to the problem.

It is risky to attach yourself to what any one researcher says about an issue. It is not “research” when you uncritically summarize another’s work. Even if your source is universally trusted, be careful. If you rely on at least two sources, you’ll usually find that they do not agree entirely, and that’s where your own research can begin. *Which has the better argument? Which better respects the evidence?* In fact, you have a research problem right there—whom should we believe?

Facts within The Context.

Do the Fact Checking. Checking Facts, If they are correct or incorrect.

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:
- Wikipedia
 - E-book
 - Books about autobiography and Biography
 - Websites
 - University
 - Books
 - Audiobooks
 - Handbooks
 - Dictionary
 - Cross References
 - Atlas
 - Commentaries
 - Articles
 - Journals
 - Newspapers
 - Websites

- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social

- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information

- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

C. Do full fact checking of the facts the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

D. Do full fact checking of the figures the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

E. Do full fact checking of the statistics the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

F. Do full fact checking of the formulas the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?

G. Do full fact checking of the mathematical results the author provided.

- Are The Facts Provided are Trustworthy?
- Are the FACTS are True or Wrong?
- Has the Author Did a Full Fact Checks on either side?
-

- H. Do full fact checking of the evidences the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?
- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?

- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing views? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing views to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

6.7 Annotating Your Sources

6.7.1 Marginal Annotations

As an alternative to taking notes on paper or a computer, you can directly annotate many sources in print or digital form. Annotation is a technique of marking up a text through comments, questions, and cross-references to other texts. Annotating in the margins is generally more productive than simply highlighting because it brings into relief the relevance of a source to your project.

In annotating, you document the active reading practices discussed in this chapter. You can use annotations to identify a source's claims and keywords or "argue" with a source by questioning (or extending) its reasons, evidence, and warrants (see [part III](#)). As your project develops, you can return to an annotated text to see what you were thinking earlier.

Of course, not every text is equally available for annotation. You can't write in the margins of library books or other texts you do not own. Many texts are accessible only (or most conveniently) in digital form. Fortunately, however, there are digital annotation tools that let you document your reading in digital environments. You can use these tools to annotate a wide range of texts, including images, and to link your readings of various texts to create a searchable database for later retrieval.

The Value of Reading Widely

We have emphasized how important it is to have a good question to focus your research. Don't think, however, that you waste time reading sources that turn out to be irrelevant. In fact, when you read and record more than you use, you build up a base of knowledge crucial to the exercise of good thinking. Good thinking is a skill that you can learn, but you can exercise it only when you have a deep and wide base of knowledge to work on. So read sources not just to answer the question you ask today, but to help you think better about every question you'll ask for the rest of your research career. To that end, everything you read is relevant.

6.7.2 Annotated Bibliography

One approach to engaging sources is an annotated bibliography—a list of possible sources featuring both a citation and a brief descriptive summary of each source. (For more on citations, see 14.5.) There are multiple types of annotations based on the motive for creating them. For a research project, an annotated bibliography offers a bird's-eye view of a range of sources and the roles they might play in your paper. Often the

assembling of an annotated bibliography is a distinct stage in a research process, one that allows you (and your teacher) to reflect on the sources you have collected. Each annotation is an opportunity to evaluate the credibility of a source, summarize its argument, and explain its relevance to your project.

Compiling an annotated bibliography can serve as a checkpoint to gauge how thoroughly you have conducted your research and how deeply you have engaged the sources you have collected. If you can't summarize your sources or explain their relevance, you are likely not ready to write your paper.

Quick Tip: Manage Moments of Normal Anxiety

As you get deeper into your project, you may experience a moment when everything seems to run together into a hopeless muddle. That usually happens when you accumulate notes faster than you can sort them. Such moments can be stressful, but they can also be a sign that you are on the verge of a new insight or discovery.

You can minimize the panic by taking every opportunity to organize and summarize what you have gathered by *writing as you go* and by returning to the central questions: *What question am I asking? What problem am I posing?* Keep rehearsing that formula, *I am working on X to learn more about Y, so that my readers can better understand Z.* Writing regularly about these questions does more than help you stay focused; it also helps you think.

You can also turn to friends, classmates, teachers—anyone who will serve as a sympathetic but critical audience. Explain how what you have learned bears on your question and helps you resolve your problem. Ask them, *Does this make sense? Am I missing anything important? What else would you like to know?* You will profit from their reactions, but even more from the mere act of explaining your ideas to non-specialists.

Checking Each Fact's Sources, If they Are Reliable or Unreliable.

Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Is the Source Reliable or Unreliable?

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 4. Is the primary source reliable, fair, ethical and trustworthy?
 5. Is the primary source sloppy, biased, unethical?
 6. Is the primary source objective when they speaking about certain subject?
 7. Are the primary source present facts carefully or careless?
 8. Is the primary source truthfully presenting the facts, opinions and data?
 9. Who is the writer? Is he /she qualified expert to write about this topic?
 10. Did the write done proper research regarding the topic?
 11. What is the tone?
 12. What is the purpose of publication?
 13. What assumption does the author make?
 14. What are the bases of author's conclusions?
 15. Does the author agree or disagree with other authors on the subject?
 16. Was this written in regards of the counterargument other authors who have opposite views?
 17. Does the content agree or disagree with author/authors on the subject?
 18. Does the content agree or disagree with what you know or have learned about the issue?
 19. Where was the source made?
 20. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.
 34. Eyewitness.

- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original format and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website

8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories
 8. Is the Source Reliable or Unreliable?

PART III

Making an Argument

Prologue

Assembling a Research Argument

You can't wait to plan your argument until after you've gathered every last bit of data and found every last relevant source. In the first place, you'll never get them all. In the second, you'll end up researching mechanically or aimlessly, accumulating more and more stuff with no sense of what you'll do with it or following trails of bread crumbs who knows where. Of course, you have to do some research to get a handle on your project. But as soon as you have a sense of your problem and its likely solution, you should begin planning your argument. Your plan will change as your research progresses—if it doesn't, you probably aren't doing your best thinking—but making a plan early and modifying it as you go will help you grasp your material better and research more purposefully: only when you try to make a *research argument* that answers your readers' predictable questions can you see what research you have yet to do.

A research argument is not like the heated exchanges we hear every day. Those arguments usually involve a dispute: children argue over a toy, roommates over what music to play, drivers over who had the right-of-way. Such arguments can be polite or nasty, but most involve conflict, with winners and losers. To be sure, researchers sometimes wrangle over each other's reasoning and evidence and occasionally erupt into charges of carelessness, incompetence, and even fraud. But that kind of argument is not what made them researchers in the first place.

In the next five chapters, we examine a kind of argument that is less like a prickly dispute with winners and losers and more like a lively conversation with amiable and sometimes skeptical colleagues. It is a conversation in which you and your imagined readers *cooperatively* explore an issue that you both think is important to resolve, a conversation that aims not at coercing each other into agreement, but at cooperatively finding the best answer to an important but challenging question.

Getting to Know You

You've been told endlessly to think about your audience, but nothing is

harder than imagining questions from someone you don't know. Experienced researchers have the advantage of knowing many of their readers personally. They talk with them about research projects, trying out ideas before writing them up. If you are a beginning researcher or a student, you may not yet know your readers in this personal way. But you can do some homework to understand how they write, argue, and think:

Read journals that publish research like yours. Notice the kinds of questions the articles acknowledge and respond to.

Rehearse your argument with a more experienced researcher or a teacher. After you have a plan but before you draft, talk over your ideas, asking whether any seem doubtful or confusing.

Ask a few people you trust to read your drafts and indicate where they have questions or see alternatives. Find people as much like your intended readers as possible.

You can even try to get to know some actual readers. For example, a group of physicists once wanted biologists to notice their research but were unhappy when the first manuscript they sent to a biology journal was rejected. So they started attending biology conferences, reading biology journals, even hanging around the biology department's faculty lounge. After they figured out how biologists think, they rewrote their arguments and published papers that influenced the field. You may not be able to travel to conferences or hang out in a faculty lounge, but you can still get to know faculty and students on your campus working in your field. The better you know them, the better you will be able to imagine questions they might ask you.

In that conversation, though, you do more than politely trade opinions. We are all entitled to our opinions, and no law requires us to explain or defend them. But in a research argument, we are expected to show readers why our claims are important and then to support our claims with good reasons and evidence, as if our readers were asking us, quite reasonably, *Why should I believe that?*

In fact, although we more easily notice the heated disputes, we have these collaborative arguments every day, each time we trade good reasons for deciding what to do—when discussing with a friend what cell phone to buy, what books to read, even whether to get pizza or Chinese food. Like those friendly discussions, a research argument doesn't force a claim on readers. Instead, you start where your readers do, with their predictable questions about why they should accept your claim, questions they ask not to sabotage your argument but to test it, to help both of you find and understand a truth worth sharing. Of course, when you *write* an argument, no one is there to ask you those questions in person. So you must imagine them on your readers' behalf. It's those imagined questions and your answers that make your argument part of an ongoing conversation. In [chapter 7](#) we survey the elements that constitute a research argument. In [chapters 8–11](#) we explain each element in detail. In [part IV](#), we show you how to put that argument into writing.

7 Making Good Arguments

Use Logic.

Use Grammar.

Use Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

An Overview

In this chapter, we explain what a research argument is and the five questions whose answers constitute one.

In [part II](#), we argued that real research involves more than just amassing information on a topic; we argued that it means developing solutions to problems you and your readers care about. Likewise, sharing the results of your research involves more than just giving your readers a “data dump” that says, *Here are some facts about my topic*; it means explaining your problem and justifying your solution in a *research argument*.

7.1 ARGUMENT AS A CONVERSATION WITH READERS

In a research argument, you make a *claim*, back it with *reasons* supported by *evidence*, *acknowledge* and *respond* to other views, and sometimes explain your *principles* of reasoning. There’s nothing arcane about these things: you do them in every conversation that inquires thoughtfully into an unsettled issue:

Abby: I hear last semester was a little rocky. How do you think this term will go?
[*Abby poses a problem that interests her, put in the form of a question.*]

Brett: Better, I hope. [*Brett makes a claim that answers the question.*]

Abby: Why is that? [*Abby asks for a reason to believe Brett’s claim.*]

Brett: I’ll finally be taking courses in my major. [*Brett offers a reason.*]

Abby: Why will that make a difference? [*Abby doesn’t see how Brett’s reason is relevant to his claim that he will do better.*]

Brett: When I take courses I'm interested in, I work harder. [*Brett offers a general principle that relates his reason to his claim.*]

Abby: What courses? [*Abby asks for evidence to back up Brett's reason.*]

Brett: History of architecture, introduction to design. [*Brett offers specific instances on which he based his reason.*]

Abby: But what about that calculus course you have to take again? [*Abby offers a point that contradicts Brett's reason.*]

Brett: I know I had to drop it last time, but I found a really good tutor. [*Brett acknowledges Abby's objection and responds to it.*]

Abby: But won't you be taking five courses? [*Abby raises another reservation.*]

Brett: I know. It won't be easy. [*Brett concedes a point he cannot refute.*]

Abby: Will you pull up your GPA? [*Abby asks about the limits of Brett's claim.*]

Brett: I should. I'm hoping for a 3.0, as long as I don't have to get a part-time job. [*Brett limits the scope of his claim and adds a condition.*]

If you can imagine yourself in that conversation, you'll find nothing strange about assembling a research argument. That's because the five elements of any argument are just answers to the kinds of questions Abby asks Brett—and that you must ask yourself on your reader's behalf:

Claim: What do you want me to believe? What's your point?

Reasons: Why do you say that? Why should I agree?

Evidence: How do you know? Can you back it up?

Acknowledgment and Response: But what about . . . ?

Warrant: How does that follow? What's your logic? Can you explain your reasoning?

In fact, you can think of your research as the process of figuring out answers to these questions.

7.2 SUPPORTING YOUR CLAIM

At the core of every research argument is the answer to your research question, the solution to your problem—your main claim. You have to back up that claim with two kinds of support: reasons and evidence.

7.2.1 Support Claims with Reasons

The first kind of support, a reason, is a statement that leads readers to accept your claim. We often join a reason to a claim with *because*: Elementary schools should make teaching foreign languages a priority *claim* because we acquire languages best and most easily when we are young. *reason*

Clarifying Some Terms

So far, we've used two terms to name the statement that sums up the results of your research. In the context of questions, we called it your *answer*. In the context of problems, we called it your *solution*. Now in the context of an argument, we'll call it your *claim*.

A *claim* is an assertion (which can be a single sentence or more) that demands support: *Climate change is threatening coastal cities*; *Toni Morrison's most important novel is Beloved*. Your *main claim* is the assertion your whole research argument supports. Some call this assertion your *thesis*.

A *reason* is an assertion that supports a claim: *[Because] climate change is causing ocean levels to rise*; *[Because] in Beloved, Morrison's major themes find their fullest development*.

Evidence is data deployed to support a reason. Unlike a claim or a reason, evidence is not always framed as an assertion: a data table documenting rising ocean levels over the past decade or quotations from *Beloved* illustrating Morrison's major themes would be forms of evidence.

These terms can be confusing, because a reason is also a subclaim that can be supported by more reasons and because both reasons and evidence are kinds of support. But if you stick with us, you'll see why these distinctions are important.

You often need more than one reason to support a claim, and in a complex argument, your reasons themselves will usually require further support:

Elementary schools should make teaching foreign languages a priority *claim 1* because we acquire languages best and most easily when we are young. *reason 1 supporting claim 1/claim 2* In fact, those who begin second languages as adults rarely attain the level of fluency of those who learn them as children. *reason 2 supporting reason 1 and claim 2/claim 3* Teaching foreign

languages at the elementary-school level also contributes to children's ethical development, *reason 3 supporting claim 1/claim 4* because it fosters an awareness of cultures and societies beyond their own. *reason 4 supporting reason 3 and claim 4/claim 5.*

7.2.2 Base Reasons on Evidence

The second kind of support is the evidence on which you base your reasons. We've said that reasons can be supported by still more reasons, but these chains don't go on forever. Eventually you have to show some data. That's your evidence. This distinction between reasons and evidence can seem just a matter of semantics, and in some contexts the words do seem interchangeable:

You have to base your claim on good reasons.

You have to base your claim on good evidence.

But they are not synonyms, and distinguishing them is crucial in making sound arguments. Compare these two sentences:

What evidence do you base your reason on?

What reason do you base your evidence on?

That second sentence seems odd: we don't base evidence on reasons; we base reasons on evidence.

There are other differences:

We use our minds to think up reasons.

We have to search for evidence "out there" in the world, then make it available for everyone to see.

It makes no sense to ask, *Where do I go to see your reasons?* It does make sense to ask, *Where do I go to see your evidence?*

In casual conversation, we usually support a claim with just a reason:

We should leave.*claim* It looks like rain.*reason*

Few ask, *What's your evidence that it looks like rain?* But when you address serious issues, readers expect you to base each reason on its own foundation of evidence, because careful readers don't accept reasons at face value. They ask for the evidence, the data, the facts on which you base those reasons:

Elementary schools should make teaching foreign languages a priority^{*claim 1*} because we acquire languages best and most easily when we are young.^{*reason 1 supporting claim 1/claim 2*} In fact, those who begin second languages as adults rarely attain the level of fluency of those who learn them as children.^{*reason 2 supporting reason 1/claim 3*} In a study of over one hundred second-language learners, Jones (2013) identified an inverse correlation between second-language proficiency and . . . (see table 1).^{*evidence supporting*}

reason 2

With reasons and evidence, we have the core of a research argument:

But in most cases, this core alone isn't enough: you also have to flesh out your research argument by *acknowledging and responding* to other points of view and, sometimes, by offering *warrants* that show how a reason is *relevant* to a claim.

7.3 ACKNOWLEDGING AND RESPONDING TO ANTICIPATED QUESTIONS AND OBJECTIONS

Careful readers will question every part of your argument, so you must anticipate as many of their questions as you can, and then acknowledge and respond to the most important ones. For example, when readers consider the claim that schools should make foreign-language instruction a priority, they may wonder if doing that might detract from the teaching of other subjects. If you think readers might ask that question, you would be wise to acknowledge and respond to it:

Elementary schools should make foreign languages a priority^{claim 1} because we acquire languages best and most easily when we are young.^{reason 1 supporting claim 1/claim 2 . . .} Of course, if schools increase the attention they give to foreign languages, quality of instruction in other subjects might decline.^{acknowledgment} But little evidence exists to support that fear and much dispels it. . . .^{response}

The challenge all researchers face, however, is not just responding to readers' questions, alternatives, and objections, but imagining them in the first place. (We'll address that issue in [chapter 10](#).)

Since no research argument is complete without acknowledgments and responses, we add them to our diagram to show how they relate to all the other parts of an argument:

7.4 CONNECTING CLAIMS AND REASONS WITH WARRANTS

Even when your readers agree that a reason is true, they may still object that it's not *relevant* to your claim. Consider this argument:

We are facing significantly higher health care costs in Europe and North America^{claim} because climate change is moving the line of extended hard freezes steadily northward.^{reason}

Readers might accept the *truth* of that reason but question its *relevance* to the claim, asking: *What do higher health costs have to do with hard freezes? I don't see the connection.* To answer, you must offer a *general* principle that justifies relating your *particular* reason to your *particular* claim:

When an area has fewer hard freezes, it must pay more to combat new diseases carried by subtropical insects no longer killed by those freezes.

Like all warrants, this one says that if a general circumstance exists (an area has fewer hard freezes), then we can infer a general consequence (that area will have higher costs to combat new diseases). The logic behind all warrants is that if a generalization is true or reasonable, then so must be specific instances of it.

But for that logic to work, readers must agree with four things. Two are easy to understand:

The warrant is true or reasonable: fewer hard freezes in fact mean higher medical costs.

The reason is true or reasonable: hard freezes in fact are moving north.

The next two are more difficult:

The specific circumstance in the reason qualifies as a *plausible instance* of the general circumstance in the warrant.

The specific consequence in the claim qualifies as a *plausible instance* of the general consequence in the warrant.

We can illustrate that logic like this: As we'll see, it's not easy to decide when you even need a warrant. Experienced researchers usually state them on only two occasions: when they think readers in their fields might ask how a reason is relevant to a claim or when they are explaining their fields' ways of reasoning to general readers. If you think your readers might not see the connection between a claim and reason, you must add a warrant to justify it:

When an area has fewer hard freezes, it can expect higher medical costs to cope with diseases carried by subtropical insects that do not survive freezes.
warrant Europe and North America must thus expect higher health care costs *main claim* because climate change is moving the line of extended hard freezes steadily north. *reason* In the last one hundred years, the line of hard freezes lasting more than two weeks has moved north at the rate of roughly . . . *evidence*

We can add warrants to our diagram to show that they connect a claim and its supporting reason:

(We know this matter of warrants is not easy to grasp; we explain it again in more detail in [chapter 11](#).)

7.5 BUILDING A COMPLEX ARGUMENT OUT OF SIMPLE ONES

Those five elements constitute a “basic” argument, but research arguments are more complex.

We almost always support a claim with two or more reasons, each of which must be supported by its own additional reasons and evidence and perhaps justified by its own warrant.

Since readers think of many alternatives and objections to any complex argument, careful researchers typically have to respond to a number of them.

Moreover, each reason, warrant, or response to an objection (all of which are statements or assertions) may itself have to be treated as a subclaim and supported by its own argument. Only the evidence “stands alone,” but even then you may have to explain where you got it, why you think it’s reliable, and how it supports your reason—and that may require yet another argument.

Cognitive Overload: Some Reassuring Words

It’s at about this point that many students new to research begin to feel overwhelmed. If so, your anxieties have less to do with your intelligence than with inexperience. One of us was explaining to teachers of legal writing how being a novice makes many first-year law students feel like incompetent writers. At the end of the talk, one woman reported that she had been a professor of anthropology whose published work was praised for the clarity of her writing. Then she switched careers and went to law school. She said that during her first six months, she wrote so incoherently that she feared she was suffering from a degenerative brain disease. Of course, she was not: she was going through the painful transition most of us experience when we try to write about matters we do not entirely understand for an audience we understand even less. She was relieved to find that the better she understood the law, the better she wrote about it.

If you feel overwhelmed, you can take comfort in that story, as did one reader who e-mailed us this:

In *Craft of Research* you write about a woman who switched from anthropology to law and suddenly found herself unable to write clearly.

After being an assistant professor of graphic design for five years, I recently switched to anthropology and suddenly found that writing anthropology papers is like pulling teeth. I thought to myself that I might have a degenerative brain disorder! I laughed out loud when I read about the anthropologist who switched to law. It made me feel a bit better.

And finally, most arguments also include background, definitions, explanations of issues that readers might not understand, and so on. If, for example, you were making an argument about the relationship between inflation and money supply to readers not familiar with economic theory, you would have to explain how economists understand those concepts. Serious arguments are complex constructions. ([Chapters 8–11](#) explain them in detail.)

7.6 CREATING AN ETHOS BY THICKENING YOUR ARGUMENT

Readers judge your arguments not just by the reasons and evidence you offer but also by how well you anticipate and address their questions and concerns. By “thickening” your argument in this way, you earn the confidence of your readers, building up what is traditionally called your *ethos*: the character you project in your argument. Do you seem to be the sort of person who considers issues from all sides, who supports claims with evidence that readers accept, and who thoughtfully considers other points of view? Or do you seem to be someone who sees only one point of view and dismisses or even ignores the views of others?

When you acknowledge other views and explain your principles of reasoning in warrants, you give readers good reason to work *with* you in developing and testing new ideas. In the long run, the *ethos* you project in individual arguments hardens into your reputation, something every researcher must care about, because your reputation is the tacit sixth element in every argument you write. It answers the unspoken question, *Can I trust you?* That answer must be *Yes*.

Quick Tip: A Common Mistake—Falling Back on What You Know

If you are an inexperienced researcher, you may be tempted to rely too heavily on what feels familiar. For example, you might embrace a claim too early, perhaps even before you have done much research, because you “know” you can prove it. But falling back on that kind of certainty will just keep you from doing your best thinking. Being a researcher means allowing yourself to be surprised by your discoveries and insights. So when you start a project, begin not with a claim you know you can prove but with a problem you want to explore and solve.

Likewise, when you are new to a field, you may be tempted to rely on ways of arguing that are familiar to you from your education or experience. If, for example, you learned in a literature class how to present and analyze

quotations, do not assume that you can do the same in fields that emphasize “objective data,” such as biology or experimental psychology. On the other hand, if as a biology or psychology major you learned to gather hard data and perform statistical analyses, do not assume that you can do the same in art history. This does not mean that what you learn in one class is useless in another. All fields share the elements of argument we describe here. But you have to learn what’s distinctive in the way a field handles those elements and be flexible enough to adapt, trusting the skills you’ve learned.

And when you become familiar with your field, you may be tempted to oversimplify in a different way. When some beginning researchers succeed at making one kind of argument, they just keep making it over and over. Their mastery of one kind of complexity blinds them to another: they fail to see that their field, if it is an active one, is marked by competing methodologies, competing solutions, competing goals and objectives. Don’t fall into this trap. If you’ve mastered one type of argument, try others: seek out alternative methods, formulate not only multiple solutions but multiple ways of supporting them, ask whether others would approach your problem differently.

When you are new to a topic or a field, you need ways to manage the complexity of new ideas and new ways of thinking. But guard against uncritically imposing familiar methods on new problems. As you learn more, you’ll recognize that things are neither as blindingly complex as you first feared nor as simple as you then hoped.

8 Making Claims

In this chapter, we discuss how to recognize the kind of claim that answers your research question and how to tell if your claim is specific and significant enough to serve as the main point of your argument.

You need a tentative answer to your research question to focus your search for evidence that will test and support its answer. As you test it, you will likely revise it, but as you assemble your argument, you must understand the kind of claim you are making. You must also be sure that your claim is not just sound, but significant enough to need an argument in the first place. Ask yourself three questions:

What kind of claim should I make?

Is it specific enough?

Will my readers think it is significant enough to need an argument supporting it?

When you can answer those three questions, you're ready to assemble your argument.

8.1 DETERMINING THE KIND OF CLAIM YOU SHOULD MAKE

The kind of problem you pose determines the kind of claim you make and the kind of argument you need to support it. As we saw in [chapter 4](#), academic researchers usually pose not *practical* problems but *conceptual* ones, the kind whose solution asks readers not to *act* but to *understand*:

The Great Recession of 2008–2011 was caused largely by negligent financial regulation that let banks take on too much risk.

8.1.1 Making Conceptual Claims

Beyond distinguishing between practical and conceptual claims, it is useful to recognize that claims address a range of questions: *Does a thing or a situation exist? If so, how should we characterize it? How did it get this way? Is it good or bad? What can or should be done about it?* Depending on the question or questions implicit in a claim, different

kinds of evidence will be required to support it. The claims you make on a topic will fall into one (or more) of the following classes:

- Claims of fact or existence:

Average global temperatures have risen to unprecedented levels within the past decade.

- Claims of definition and classification:

Birds, not reptiles, are the direct descendants of dinosaurs.

- Claims of cause and consequence:

Exposure to asbestos is a leading contributor to lung cancer.

- Claims of evaluation or appraisal:

Shakespeare's greatest comedy is *As You Like It*.

- Claims of action or policy:

Pennsylvania should increase extraction fees on natural gas drilling to fund education.

The first four classes—fact, definition, cause, and value—concern conceptual claims. For claims of fact or existence, you must provide evidence that a situation is, in fact, as you characterize it. Claims of definition or classification depend on reasoning about similarities or differences that assigns an entity to some broader class or distinguishes it from other entities. Effective claims of evaluation or appraisal depend on criteria of judgment to justify why something is good or bad (or better or worse than something else). Finally, claims of cause or consequence connect sets of facts to show that some situation does (or doesn't) follow from or lead to another.

8.1.2 Making Practical Claims

A practical claim is one that argues for (or against) some action or policy. It is usually built from a chain of conceptual claims: one that demonstrates that a problem exists, another that shows what causes the problem, and still another that explains how doing what you propose will fix it. Readers may also expect you to explain the following:

Why your solution is feasible; how it can be implemented with reasonable time and effort.

Why it will cost less to implement than the cost of the problem.

Why it will not create a bigger problem than the one it solves.

Why it is cheaper or faster than alternative solutions—a claim often difficult to support.

If you advance a practical claim but don't make those four sub-arguments, your readers may reject your whole argument. So as you assemble your argument, be clear about the kinds of claims you are making, whether conceptual or practical. Don't inflate the importance of a conceptual claim by tacking on a practical action, at least not early in your paper. If you want to suggest a practical application of your conceptual claim, do so in your conclusion. There, you can offer it as an action worth considering without having to develop a case for it (we return to this in [chapter 16](#)).

8.2 EVALUATING YOUR CLAIM

We can't tell you how to find a good claim, but we can show you how to evaluate the one you have from the point of view of your readers. Above all, they expect your claim to be both specific and significant.

8.2.1 Make Your Claim Specific

Vague claims lead to vague arguments. The more specific your claim, the more it helps you plan your argument and keep your readers on track as they read it. You make a claim more specific through precise language and explicit logic.

Precise Language. Compare these two claims:

TV inflates estimates of crime rates.

Graphic reports of violence on local TV news lead regular viewers to overestimate by as much as 150 percent both the rate of crime in their neighborhood and the personal danger to themselves and their families.

The first claim is so vague that we have little idea about what's to come. The second has more specific concepts that not only help readers understand the claim more clearly, but also give the writer a richer set of concepts to develop in what follows. Indeed, the precision of the claim signals how the argument is likely to proceed.

We do *not* recommend long, wordy claims for their own sake. But you benefit when you include in early versions of your claim more terms than you might ultimately use. That final claim should be only as specific as your readers need and should include only those concepts that you develop as themes in your argument.

Explicit Logic. You can also be explicit in the logic of your claim. Even with its relatively precise language, this claim offers only a single proposition:

Regular TV viewers overestimate both the rate of crime in their neighborhood and the personal danger to themselves and their families.

In the natural and social sciences, claims like that are common, even preferred. But in the humanities, such a claim might seem a bit thin. As you draft your working claim, try elaborating its logic in two ways:

Introduce it with a qualifying clause beginning with *although* or *even though*.

Conclude it with a reason-clause beginning with *because*.

For example:

Although violent crime is actually decreasing, regular TV viewers overestimate their neighborhood crime rate by 150 percent and therefore misjudge personal danger to themselves and their families **because local TV evening news regularly opens with graphic reports of mayhem and murder in familiar locations, making many believe that crime happens nightly outside their front door.**

While that claim may seem overwritten, it foreshadows three of the five elements that you need for a full argument: (1) *Although I acknowledge X*, (2) *I claim Y* (3) *because of reason Z*.

You can use an introductory *although* clause to acknowledge three kinds of alternative views:

- Something that your readers believe but your claim challenges:

Although most people believe they are good judges of their security, regular TV viewers overestimate . . .

- A point of view that conflicts with yours:

Although many security professionals see fear as the best motivation for safety precautions, regular TV viewers overestimate . . .

- A condition that limits the scope or confidence of your claim:

Although it is difficult to gauge their real feelings about personal security, regular TV viewers overestimate . . .

If readers might think of those qualifications, acknowledge them first. You not only imply that you understand their views, but commit yourself to

responding to them in the course of your argument.

When you add a final *because* clause, you forecast some of the reasons that support your claim:

Although many believe that school uniforms help lower the incidence of violence in public schools,^{qualification} the evidence is at best weak^{claim}

because researchers have not controlled for other measures that have been instituted at the same time as uniforms^{reason 1} and because the data reported are statistically suspect.^{reason 2}

Again, we don't suggest that your final draft should offer a claim as bloated as these. But the richer your *working* claim, the more satisfying your argument is likely to be.

8.2.2 Make Your Claim Significant

After the specificity of a claim, readers look most closely at its *significance*, a quality they measure by how much it asks them to change what they think. While we can't quantify significance, we can roughly estimate it: *if readers accept a claim, how many other beliefs must they change?* The most significant claims ask a research community to change its deepest beliefs (and it will resist such claims accordingly).

Some research communities consider a claim significant enough if it asks them only to accept new evidence on a topic of common interest:

I describe here six thirteenth-century Latin grammars of the Welsh language. Found just recently, these grammars are the only examples of their kind. They help us better appreciate the range of grammars written in the medieval period.

(Recall those reels of newly discovered film in 2.3.3.)

Readers value research more highly when it not only offers new data but *uses* those data to settle what seems puzzling, inconsistent, or otherwise problematic:

There has been a long debate about how fluctuations in consumer confidence affect the stock market, but new statistical tools suggest little relationship between . . .

But readers value most highly when new facts or conjectures *upset* what seems long settled:

It has long been an article of faith in modern physics that the speed of light is constant everywhere at all times, under all conditions, but new data suggest it might not be.

A claim like that would be contested by legions of physicists because if true, it would mean that physicists would have to change their minds not just about the speed of light but about lots of other things as well.

Early in your career, you won't be expected to know what those in a field think should (or even could) be revised. But you can still gauge the significance of your claim by asking how strongly readers might *contest* it. One way to do that is by considering *opposite* claims:

Hamlet is not a superficial character.

This report summarizes recent research on the disappearance of bees.

To assess how much either claim is worth contesting, change an affirmative claim into a negative one and vice versa:

Hamlet *is* a superficial character.

This report does *not* summarize recent research on the disappearance of bees.

If the reverse of a claim seems obviously false (like the first one) or trivial (like the second), then readers are likely to think the original claim is not worth an argument. (Of course, some great thinkers have successfully contradicted apparently self-evident claims, as Copernicus did when he asserted foolishly—or so it seemed at the time—that *the sun does not go around the earth.*)

If you are an advanced researcher, you measure the significance of your claim by how much it changes what your community thinks and how it does its research. Few discoveries have been as significant as Crick and Watson's structure of DNA. Not only did it make biologists think about genetics differently, but it opened up new lines of research.

But you don't have to make big claims to make a useful contribution: small findings can open up new lines of thinking. If, for example, you discovered that Abraham Lincoln read some obscure philosopher, historians would comb Lincoln's texts for traces of that influence.

If you are new to research, of course, your claim doesn't have to challenge the experts, just impress your teacher. If you can't predict whether it will, imagine your reader is someone like yourself. What did *you* think before you began your research? How much has your claim changed what *you* now think? What do *you* understand now that you didn't before? That's the best way to prepare for readers who will someday ask you the most devastating question any researcher can face: not *Why should I believe this?* but *Why should I care?*

8.3 QUALIFYING CLAIMS TO ENHANCE YOUR CREDIBILITY

Some new researchers think their claims are most credible when they are stated most forcefully. But nothing damages your ethos more than arrogant certainty. As paradoxical as it seems, you make your argument stronger and more credible by modestly acknowledging its limits. You gain the trust of your readers when you acknowledge and respond to their views, showing that you have not only understood but considered their position (for more, see [chapter 10](#)). But you can lose that trust if you then make claims that overreach. Limit your claims to what your argument can actually support by qualifying their scope and certainty.

8.3.1 Acknowledge Limiting Conditions Every claim has limiting conditions:

We conclude that the epicenter of the earthquake was fifty miles southwest of Tokyo, **assuming the instrumentation was accurately calibrated.**

We believe that aviation manufacturing will not match its late twentieth-century levels, **unless new global conflicts increase military spending.**

But every claim is subject to countless conditions, so mention only those that readers might plausibly think of. Scientists rarely acknowledge that their claims depend on the accuracy of their instruments, because everyone expects them to ensure that they are. But economists often acknowledge limits on their claims, both because their predictions are subject to changing conditions and because readers want to know which conditions to watch for.

Consider mentioning important limiting conditions even if you feel readers would not think of them. For example, in this next example, the writer not only shows that she was careful but gives a fuller and more accurate statement of the claim:

Today Franklin D. Roosevelt is revered as one of our most admired historical figures, but toward the end of his second term, he was quite unpopular, **at least among certain segments of American society**.^{claim} Newspapers, for example, attacked him for promoting socialism, a sign that

a modern administration is in trouble. In 1938, 70 percent of Midwest newspapers accused him of wanting the government to manage the banking system. . . . Some

have argued otherwise, including Nicholson (1983, 1992) and Wiggins (1973), both of whom offer anecdotal reports that Roosevelt was always in high regard,^{acknowledgment} but these reports are supported only by the memories of those who had an interest in deifying FDR.^{response}

Unless it can be shown that the newspapers critical of Roosevelt were controlled by special interests,^{limitation on claim} their attacks demonstrate significant popular dissatisfaction with Roosevelt's presidency.^{restatement of claim}

8.3.2 Use Hedges to Limit Certainty

Only rarely can we state in good conscience that we are 100 percent certain that our claims are unqualifiedly true. Careful writers qualify their certainty with words and phrases called *hedges*. For example, if anyone was entitled to be assertive, it was Crick and Watson, the discoverers of the helical structure of DNA. But when they announced their discovery, they hedged the certainty of their claims (hedges are boldfaced; the introduction is condensed):

We **wish to suggest a** [note: not *state the*] structure for the salt of deoxyribose nucleic acid (D.N.A.). . . . A structure for nucleic acid has already been proposed by Pauling and Corey. . . . **In our opinion**, this structure is unsatisfactory for two reasons: (1) **We believe** that the material which gives the X-ray diagrams is the salt, not the free acid. . . . (2) **Some** of the van der Waals distances **appear** to be too small. (J. D. Watson and F. H. C. Crick, "Molecular Structure of Nucleic Acids")

Without the hedges, Crick and Watson would be more concise but more aggressive. Compare that cautious passage with this more forceful version (much of the aggressive tone comes from the *lack* of qualification):

We **announce** here **the** structure for the salt of deoxyribose nucleic acid (D.N.A.). . . . A structure for nucleic acid has already been proposed by Pauling and Corey. . . . Their structure **is** unsatisfactory for two reasons: (1) The material which gives their X-ray diagrams is the salt, not the free acid. . . . (2) Their van der Waals distances **are** too small.

Of course, if you hedge too much, you will seem timid or uncertain. But in most fields, readers distrust flatfooted certainty expressed in words like *all*,

no one, every, always, never, and so on. Some teachers say they object to all hedging, but what most of them really reject are hedges that qualify every trivial claim. And some fields do tend to use fewer hedges than others. It takes a deft touch. Hedge too much and you seem mealy-mouthed; hedge too little and you can seem overconfident. Unfortunately, the line between the two is thin. So watch how those in your field manage uncertainty and do likewise.

9 Assembling Reasons and Evidence

In this chapter, we discuss two kinds of support for a claim: reasons and evidence. We show you how to distinguish between the two, how to use reasons to organize your argument, and how to evaluate the quality of your evidence.

Readers look first for the core of an argument, a claim and its support. They look particularly at its set of reasons to judge its plausibility and their order to judge its logic. If they think those reasons make sense, they will look at the evidence you present, the bedrock of every argument. If they don't believe the evidence, they'll reject the reasons and, with them, your claim.

So as you assemble your argument, you must offer readers a plausible set of reasons, in a clear, logical order, based on evidence they will accept. This chapter shows you how to do that.

9.1 USING REASONS TO PLAN YOUR ARGUMENT

When you order your reasons, you build a logical structure for your argument. To test that structure, you can make a traditional outline or visualize your plan in other ways. You might find it useful to create a chart-like outline known as a "storyboard." To start a storyboard, write your main claim and each reason (and subreasons) at the top of separate index cards or pages. Then below each reason (or subreason), list the evidence that supports it. If you don't have the evidence yet, note the *kind* of evidence you'll need. Finally, arrange the pages or index cards on a table or wall to make their logical relationships visible at a glance.

Read just the reasons, not the details, to see if that order makes sense. If it doesn't, try out different orders until it does. At this point, you are outlining only your argument, not

your paper. When you turn to a first draft, you will reconsider your reasons in light of your readers' understanding (and yours) and perhaps arrange a new order (for more on ordering parts, see 12.1.3).

9.2 DISTINGUISHING EVIDENCE FROM REASONS

Once you've arranged your reasons in a plausible order, be sure you have sufficient evidence to support each one. Readers will not accept a reason until they see it anchored in what *they* consider to be a bedrock of established fact. The problem is, you don't get to decide that; your readers *do*. To count as evidence, a statement must report something that readers agree not to question, at least for the purposes of the argument. But if they do question it, what you think is hard factual evidence is for them only a reason, and you have not yet reached that bedrock of evidence on which your argument must rest.

Consider this argument:

American higher education must curb escalating tuition costs,*claim* because the price of college is becoming an impediment to realizing the American dream.*reason* **Today a majority of students leave college with a crushing debt burden.***evidence*

In that last sentence, the writer offers what she believes is a "fact" hard enough to serve as evidence to support her reason.

But a skeptical reader might ask, *That's just a generalization. What hard numbers do you have to back up "a majority of students" or "crushing debt burden"?* Such a reader treats that statement not as an unquestioned fact but as a soft reason still in need of hard evidence. The writer would have to add something like this:

In 2013, nearly 70 percent of students borrowed money for college with loans averaging \$30,000, a debt that prevents many from buying a home, beginning a family, or pursuing a higher degree.*evidence*

Of course a *really* skeptical reader could again ask, *What backs up those numbers? What justifies the claim that this situation is a crisis?* If so, the writer would have to provide still harder data, breaking down those numbers to document the consequences of debt for recent graduates. If she did her own research, she could show her raw data. If she found her data in a secondary source, she could cite it, but she might then be asked to prove that her source is reliable. Really skeptical readers just never give up.

If you can imagine readers plausibly asking, not once but many times, *How do you know that? What facts make it true?*, you have not yet reached what readers want—a bedrock of uncontested evidence. And at a time when so-called experts are quick to tell us what to do and think based on studies whose data we never see, careful readers have learned to view reports of evidence skeptically. Even when you think you have good evidence, be clear how it was collected and by whom. If it was collected by others, find and cite a source as close to the evidence as you can get.

Our Foundational Metaphors for Evidence

When we talk about evidence, we typically use foundational metaphors: good evidence is *solid, hard, the bedrock foundation* on which we *build* arguments, something we can *see for ourselves*. Bad evidence is *flimsy, weak, or thin*. Language like that encourages readers to think of evidence as a reality independent of anyone's interpretation and judgment. But data are always constructed and shaped by those who collect and use them as evidence. As you build your argument, keep in mind that your evidence will *count* as evidence only if your readers accept it without question, at least for the moment.

9.3 DISTINGUISHING EVIDENCE FROM REPORTS OF IT

Now a complication: researchers rarely include in any report *the evidence itself*. Even if you collect your own data, counting rabbits in a field or interviewing the unemployed, your paper can only *refer to* or *represent* those rabbits and unemployed in words, numbers, tables, graphs, pictures, and so on. For example, when a prosecutor says in court, *Jones was a drug dealer, and here is the evidence to prove it*, he can hold up a bag of cocaine, even let jurors hold it in their own hands. (Of course, both he and the jurors must believe the officer who says it's the same bag he took from Jones and the chemist who says that the white stuff really is cocaine.) But when he *writes* a brief on the case, he cannot staple that bag to the page; he can only refer to or describe it.

In the same way, researchers cannot share with their readers “the evidence itself.” For example:

Emotions play a larger role in rationality than many think.*claim* In fact, without the emotional centers of the brain, we could not make rational decisions.*reason 1 supporting claim* Persons whose brains have suffered physical damage to their emotional

centers cannot make the simplest decisions.*reason 2 supporting reason 1* For example, consider the case of Mr. Y, who . . . *report of evidence*

That argument doesn't offer as evidence real people with damaged brains; it can only report observations of their behavior, copies of their brain scans, tables of their reaction times, and so on. (In fact, we prefer to read reports of others than to have to test brains and read MRI scans ourselves.)

We know this distinction between evidence and reports of evidence must seem like a fine one, but it emphasizes two important issues. First, data you take from a source have invariably been shaped by that source, not to misrepresent them, but to put them in a form that serves that source's ends. For example, suppose you want to show that the cult of celebrity distorts rational compensation, and you need evidence that athletes and entertainers are paid far more than top doctors, generals, and government officials. You could find government salaries in official reports. But unless you can peek at the tax returns of Oprah and Tiger Woods (and who knows how reliable they would be), you would have to depend on reports of those incomes that may or may not have been systematically collected and compiled from still more distant reports. Unless you can talk to those who counted, organized, and reported the original data, you'll be at three or four removes from the evidence itself before you use it for your own purposes. (And at least one reporter in that chain of reports almost certainly miscopied some of the data.)

Second, when you in turn report those data as your own evidence, you cannot avoid manipulating them once again, at least by putting them in a new context. Even if you collected the data yourself, you tidied them up, making them seem more coherent than what you actually saw, counted, and recorded in your notes. In fact, even before you started collecting any facts at all, you had to decide what to count, how to categorize the numbers, how to order them, whether to present them in the form of a table, bar chart, or graph. Even photographs and video recordings reflect a particular point of view. In short, facts are shaped by those who collect them and again by the intentions of those who use them.

This often squishy quality of reports of reports (of reports of reports) is why people who read lots of research are so demanding about the reliability of evidence. If you collect data

yourself, they'll want to know how you did it. If you depend on sources, they'll expect you to use primary sources, and if you didn't, to get as close to primary sources as you can. And they want complete citations and a bibliography so that they could, if they wanted to, look at your sources themselves. In short, they want to know that they can trust the complete chain of reports between what's "out there" and what they are reading.

Trusting Evidence Three Hundred Years Ago and Now

In the early days of experimental science, researchers conducted experiments before what they called "witnesses," reputable scientists who observed the experiments so that they could attest to the accuracy of the reported evidence. Researchers don't rely on witnesses anymore. Instead, each area of study has standardized its methodologies for collecting and reporting evidence to ensure that it is reliable (though some researchers still get away with fraud). When you observe the standard procedures in your field, you encourage readers to accept your evidence at your word,

without their needing to see it themselves. So as you read secondary sources, note the kind of evidence they cite, how they cite it, then do likewise. When in sociology, do as sociologists do.

We live in an age where we are all subjected to research reports and opinion surveys that are at best dubious and at worst faked, so you have to assure your readers that they can trust your data. The last link in that chain of credibility is you, so be thoughtful about whose data you use and how you use them.

9.4 EVALUATING YOUR EVIDENCE

Once you know the kind of evidence your readers expect, you must test the reliability of yours: is it *sufficient* and *representative*, reported *accurately* and *precisely*, and taken from an *authoritative* source? These are not exotic criteria unique to academic research. We all apply them in our most ordinary conversations, even with children. In the following, “Parent” faults “Child” on all those criteria:

Child: I need new sneakers.*claim* Look. These are too small.*evidence*

Parent: Your feet haven’t grown that much in a month, and they don’t seem to hurt you much [*i.e., your evidence could be relevant, but I reject it because it is not accurate and because even if it were accurate, “too small” is not sufficiently precise*].

Child: But they’re too grungy for school.*reason* Look at this dirt and these raggedy laces.*evidence*

Parent: The dirt will wash off and the laces can be replaced. That’s not enough to buy new sneakers [*i.e., you may be factually correct, but dirt and raggedy laces alone are not sufficient evidence that they are unfit for school*].

Child: They hurt.*reason* Look at how I limp.*evidence*

Parent: You were walking fine a minute ago [*i.e., your evidence is not representative*].

Child: Everybody thinks I should get new sneakers.*reason* Harry said
so.*evidence*

Parent: Harry’s opinion doesn’t matter in this house [*i.e., Harry may have said that, but his opinions are not authoritative*].

Readers judge reports of evidence by the same criteria a parent uses with a child. They want evidence to be accurate, precise, sufficient, representative, and authoritative. (Readers also expect evidence to be *relevant*, but we’ll discuss that in [chapter 11](#).) As you assemble your evidence, screen it for those criteria before you add it to your storyboard.

9.4.1 Report Evidence Accurately

Careful readers are predisposed to be skeptical, so they will seize on the most trivial mistake in your evidence as a sign of your unreliability in everything else. Whether your research argument depends on data collected in a lab, in the field, in the library, or

online, record those data completely and clearly, then double-check them before, as, and after you write them up. Getting the easy things right shows respect for your readers and is the best training for dealing with the hard things. You can sometimes use even questionable evidence, *if you acknowledge its dubious quality*. In fact, if you point to evidence that seems to support your claim but then reject it as unreliable, you show yourself to be cautious, self-critical, and thus trustworthy.

9.4.2 Be Appropriately Precise

Your readers want you to state your evidence precisely. They hear warning bells in words that hedge your claim in such a way that they cannot assess its substance:

The Forest Service has spent **a great deal** of money to prevent forest fires, but there is still **a high probability** of **large, costly** ones.

How much money is *a great deal*? How probable is *a high probability*—30 percent? 80 percent? What counts as *large* and *costly*? Watch for words like *some*, *most*, *many*, *almost*, *often*, *usually*, *frequently*, *generally*, and so on. Such words can appropriately limit the breadth of a claim (see 8.3), but they can also fudge it if the researcher didn't work hard enough to get the precise numbers.

What counts as precise, however, differs by field. A physicist measures the life of quarks in fractions of a nanosecond, so the tolerable margin of error is vanishingly small. A historian gauging when the Soviet Union was at the point of collapse would estimate it in months. A paleontologist might date a new species give or take tens of thousands of years. According to the standards of their fields, all three are appropriately precise. (Evidence can also be too precise. Only a foolhardy historian would assert that the Soviet Union reached its point of inevitable collapse at 2:13 p.m. on August 18, 1987.)

9.4.3 Provide Sufficient, Representative Evidence

Beginners typically offer too little evidence. They think they prove a claim with one quotation, one number, one personal experience (though sometimes only one bit of evidence is sufficient to *disprove* it). For example:

Shakespeare must have hated women because those in *Hamlet* and *Macbeth* are evil or weak.

Readers need more than that to accept such a significant claim. Even if you offer lots of evidence, your readers still expect it to be

representative of the full range of variation in what's available. The women in one or two Shakespearean plays do not represent all his women, any more than Shakespeare represents all Elizabethan drama. Readers are especially wary when your evidence is a small sample from a large body of data, as in surveys. Whenever you use sampled data, not only must your data *be* representative, but you must *show* that it is.

A charge related to the claim that your evidence is unrepresentative is that it is *anecdotal*. It *might* be representative but, then again, it might not. If your claim depends on one or two examples, however well-chosen to be representative, there is a risk that your evidence will be dismissed as a form of cherry-picking. Of course, anecdotal evidence can be persuasive in ways that statistical representations of data are not. The very persuasiveness of the telling example, the case study, or the exception that proves the rule makes argument by anecdote attractive but also risky because an argument is only as strong as its evidence.

9.4.4 Consider the Weight of Authority

Different fields define and evaluate evidence differently. If you're a beginner, you'll need time to learn the kinds of evidence that readers in your field accept and reject. The most painful way to gain that experience is to be the object of their criticism. Less painful is to seek examples of arguments that failed because their evidence was judged unreliable. Listen to lectures and class discussions for the kinds of arguments that your instructors criticize because they think that the evidence is weak. Failed arguments help you understand what counts as reliable better than do successful ones.

A particular kind of weak evidence comes from sources that readers do not consider authoritative. Early in the twentieth century, New Yorkers accepted the word of a local newspaper: "If you see it in the *Sun*, it's so." In general, readers assign degrees of authority to sources based on their reputation for rigor and objectivity. For example, most people will accept data on the transmission of viruses that a researcher obtains from the U.S. Centers for Disease Control as credible evidence, even allowing for the possibility of error. However, evidence from *Wikipedia* will not be accepted in many circles because

Wikipedia is not regarded as authoritative. “Consider the source” is the skeptic’s rebuttal to evidence dismissed for lack of authority.

10 Acknowledgments and Responses

An argument is not complete if it fails to recognize other points of view. This chapter shows how you can make your argument more convincing by acknowledging and responding to questions, objections, and alternatives your readers might raise.

The core of your argument is a claim backed by reasons based on evidence. You thicken it with more reasons, perhaps supporting each with additional subreasons and evidence. But if you give your readers only claims, reasons, and evidence—no matter how compelling these are to you—they may still find your argument thin or, worse, ignorant or dismissive of their views. To craft a successful argument, you must do more than assemble a sound edifice of claims, reasons, and evidence; you must also position those claims as contributions to an ongoing conversation in which your readers are invested (see [chapter 7](#)).

You can do this in your introduction by presenting your main claim as a solution to a problem your readers care about (we'll talk more about introductions in [chapter 16](#)). But you can do it throughout your argument as well by anticipating, acknowledging, and responding to questions, objections, and alternatives that your readers are likely to raise along the way. As you plan and draft your paper, your readers won't be there to question you or to offer their own views. So you have to *imagine* their questions and views and take them into account. That's how you establish a cooperative relationship with readers, by imagining yourself conversing with them.

In this chapter, we show you how to imagine and address two kinds of questions that readers may ask about your argument:

They may question its *intrinsic* soundness by challenging the clarity of your claim, the relevance of your reasons, or the quality of your evidence.

They may question its *extrinsic* soundness by asking you to consider alternatives—different ways of framing the problem, evidence you've overlooked, or what others have written on your topic.

When you anticipate, acknowledge, and respond to both kinds of questions, you create an argument that readers are more likely to trust and accept.

10.1 QUESTIONING YOUR ARGUMENT AS YOUR READERS WILL

When planning and drafting your argument, you may freeze up if you try from the outset to imagine every possible reaction to it. Therefore, focus first on what you yourself want to say, on the claims, reasons, and evidence that make up your argument's core. Once you have that core, try to imagine readers' responses to it. Doing this may be hard, because you know your own argument too well and may believe in it too much to seriously challenge it. If you can share the core of your argument with a friend, mentor, or colleague you trust, do it. That will help you identify questions, objections, and alternatives that other readers might raise. If you can't, then imagine a group of particularly skeptical hypothetical readers questioning your argument more sharply than you hope your actual readers will.

For this exercise, you might suspend your conception of argument as collaborative inquiry and imagine it not quite as warfare, but as something close to a warm debate. View your argument through the eyes of someone who has a stake in a different outcome, someone who *wants* you to be wrong.

First, examine your problem. Here are some questions with possible answers from an imagined reader:

Why do you think there's a problem at all? "The costs or consequences of the situation you are responding to don't seem that significant."

Have you properly defined the problem? Is it practical or conceptual? "Maybe the problem involves not the issue you raise but another one."

Then consider your solution:

Is your solution practical or conceptual? That is, does it ask readers to do something or to understand something? And does it match the problem (practical problems demand practical solutions; conceptual problems conceptual ones)? "You explain what's wrong, but you don't say how we can change it." "You assert that our current understanding falls short, but you don't offer a new way of looking at the issue."

Have you stated your claim too strongly? "I can think of exceptions and limitations."

5a. *Why is your practical solution better than others?* “I think that what you propose will cost too much and create new problems.”

5b. *Why is your conceptual solution better than others?* “It doesn’t seem to fit with all this other well-established knowledge.”

If you come up with a question that you can’t answer, decide whether you can find the answer before you go on. Don’t go easy on yourself with this one: the time to fix a problem with your argument is when you find it.

Note where your argument might seem weak but actually isn’t. If, for example, you anticipate that readers will think your solution has costs that it does not, you can defuse that concern by acknowledging and responding to it:

It might seem that by focusing on the actions of specific banks, we are minimizing the systemic forces that contributed to the financial crisis, but, in fact, our case studies will show . . .

Next, question your support. Imagine a reader challenging your evidence.

A reader might question its nature:

“I want to see a different *sort* of evidence—hard numbers, not anecdotes (or stories about real people, not cold numbers).”

If you present the right kind of evidence, a reader might still question its quality:

“It isn’t accurate. The numbers don’t add up.”

“It isn’t precise enough. What do you mean by ‘many’?”

“It isn’t current. There’s newer research than this.”

“It isn’t representative. You didn’t get data on all the groups.”

“It isn’t authoritative. Smith is no expert on this matter.”

The toughest objection, however, is usually this one:

“You need more evidence. One data point (quotation/number/anecdote) is not sufficient.”

Most researchers have difficulty finding enough good evidence to make a solid case, especially those working on short deadlines. But teachers grumble most about students who seem to think that the evidence they find first is all they need.

Readers can be particularly skeptical when they have a stake in a solution that differs from yours. So if you feel your evidence is less than unassailable, you may want to admit its limitations candidly, before readers reject your argument because you overstated it.

Finally, readers may not see how your reasons support your claims, or how your claim follows from your reasons. We devote all of [chapter 11](#) to this problem.

In sum, when assembling your argument, test your claims, reasons, and evidence as your most skeptical readers will—and even in ways they might not. You can then address at least the most important objections that you can imagine them raising. Show readers that you put your argument through your own wringer before they put it through theirs.

10.2 IMAGINING ALTERNATIVES TO YOUR ARGUMENT

When you recognize your own argument's limitations, you build credibility by showing readers that you are making an honest case and dealing with them fairly. But that's just a defensive move. You will seem even more credible if you show not just that you understand the strengths and limitations of your own argument, but that you also understand and have thought about the alternatives to it. To do that, you have to bring those alternative views into your argument by acknowledging and responding to them.

If you know your subject and readers very well, you can try to imagine those alternatives yourself. But usually the best way to identify alternative views is to look to your sources. In [chapter 6](#), we encouraged you to actively *engage* your sources during your research, to use them not just for data but to stimulate your own thinking. Your sources also offer a ready supply of alternative views that you can respond to in your own argument.

You can think of your secondary sources as a written record of the conversation about your topic, question, or problem. Knowing that conversation allows you to contribute to it. When you read your sources, note where they advance claims different from yours, take different approaches, focus on different aspects of the problem, and so on. Note especially where—and why—you and your sources disagree. Also note where one source disagrees with another. All those disagreements can help you identify alternatives to acknowledge in

your own argument. If you know how you would respond to a particular source, add that response to your notes as you read.

You can respond not only to your sources' claims but also to their evidence. If you find a source's evidence unreliable or irrelevant, don't simply ignore it. If your readers might take it seriously, you can acknowledge it but explain why you didn't use it.

Finally, your sources also help you imagine your readers and anticipate their reactions to your argument. Often your readers will be like your sources' authors; sometimes they may even include them.

10.3 DECIDING WHAT TO ACKNOWLEDGE

If you can imagine just a few of the questions, alternatives, and objections that your readers might have, you'll face a Goldilocks moment: acknowledge too many and you distract readers from the core of your argument; acknowledge too few and you seem indifferent to or even ignorant of their views. You need to figure out how many acknowledgments will feel "just right."

10.3.1 Choosing What to Respond To

To narrow your list of alternatives or objections, consider these priorities:

- plausible charges of weaknesses that you can rebut

- alternative lines of argument important in your field

- alternative conclusions that readers *want* to be true

- alternative evidence that readers know

- important counterexamples that you have to address

Look for alternatives that let you repeat a part of your argument. For example, if readers might think of exceptions to a definition that in fact are not, acknowledge them and use the response to reinforce your point:

Some have argued that even food can be addictive, but remember we are concerned here only with substances for which addiction is the norm, not those . . .

Or if readers might think of an alternative solution close to yours, use it to reiterate the virtues of your solution:

Most researchers argue that rules and other forms of formal writing advice degrade rather than improve performance because writing “is a non-conscious act of making meaning, not a conscious process of following rules.” That is true for parts of the process: writers should not consult rules as they draft sentences. But writing involves not just drafting but many conscious processes as well. What we show here is what kinds of formal advice do and do not work for *conscious* aspects of writing. . . .

Finally, acknowledge alternatives that may particularly appeal to your readers, but only if you can respond without seeming to be dismissive. Better to ignore what your readers like than to disparage it.

10.3.2 Acknowledging Flaws in Your Argument

If you discover a flaw in your argument that you cannot fix or explain away, try to redefine your problem or rebuild your argument to avoid it. But if you cannot, you face a tough decision. You could just ignore the flaw and hope your readers don’t notice it. But that’s dishonest. If they do notice it, they will doubt your competence, and if they think you tried to hide it, they will question your honesty. Our advice may seem naive, but it works: candidly acknowledge the issue and respond that

the rest of your argument more than balances the flaw.

while the flaw is serious, more research will show a way around it.

while the flaw makes it impossible to accept your claim fully, your argument offers important insight into the question and suggests what a better answer would need.

Occasionally researchers turn failure into success by treating a claim they wanted to support but couldn’t as a hypothesis that others might find reasonable. Then they show why it isn’t:

It might seem that when jurors hear the facts of a case in a form that focuses on the victim and emphasizes her suffering, they will be more likely to blame the accused. That is, after all, the standard practice of plaintiffs’ lawyers. But in fact, we found no correlation between . . .

10.3.3 Acknowledging Questions You Can't Answer

Beginning researchers sometimes think that their goal is to have the last word on a topic, that is, to make an argument that allows for no response but total assent. But that's a mistake. Experienced researchers and teachers understand that no argument is entirely unassailable and that any one version of the truth is often complicated and always contestable. In fact, the most stimulating research is often that which provides not answers to questions we already know, but new sets of questions we haven't yet thought to ask. This is especially true for research addressing conceptual problems, but it can be true for applied research as well.

Knowledgeable readers will think better of your argument and of you if, rather than pretending you have all the answers, you acknowledge your argument's limits, especially those that squeeze you more than you like. Concessions invite readers into the conversation by legitimizing their views, always a gesture that helps sustain a community of researchers. And they will be especially grateful if you can give them new and interesting questions to think about. That's what keeps the conversation going.

10.4 FRAMING YOUR RESPONSES AS SUBORDINATE ARGUMENTS

Acknowledging alternatives and objections gives you an opportunity to respond. But you can't just offer a competing claim. Even a minimal response gives a reason to limit or reject what you have acknowledged:

Some have argued that food can be addictive,,acknowledgment of objection but we are concerned here only with substances for which addiction is the norm.reason why objection is irrelevant

That initial response may be enough, but only if readers recognize the basis for it, either because it's obvious or because you've made the argument before. Otherwise, explain its basis using additional reasons and evidence:

Some have argued that food can be addictive,,acknowledgment of objection but we are concerned here only with substances for which addiction is the norm.reason why objection is irrelevant Some who taste chocolate once may be unable to resist it thereafter, but their number is a fraction of those who are immediately addicted to crack cocaine

after a single exposure^{.subreason} Chernowitz (1998) found that just one exposure resulted in . . .^{report of} *evidence*

For more substantial responses, you need a full argument, with multiple reasons, evidence, and perhaps even warrants and additional acknowledgments and responses. (At this point, add acknowledgments and responses to the appropriate places in the working plan of your argument. In [chapter 12](#) we'll discuss where to put them in the plan of your first draft.) Again, when responding to alternatives, you face a Goldilocks choice: not too much, not too little. Only experience can teach you how to find this balance. So notice how experts achieve it and do likewise.

10.5 THE VOCABULARY OF ACKNOWLEDGMENT AND RESPONSE

Some writers fail to acknowledge alternatives because they can't think of any. The strategies in this chapter will help you overcome that problem. Others can think of views to acknowledge, but fear that if they do, they weaken their argument. In fact, most readers think that such acknowledgments enhance a writer's credibility. Writers also shy away from acknowledging and responding to objections and alternatives because they don't know how to do those things in writing, on the page or screen. This section shows you how.

When you want to acknowledge and respond to an objection or alternative, you have to decide how much credence to give it: options range from just mentioning an objection and dismissing it to addressing it at length. We present our advice roughly in that order, from most dismissive to most respectful. (Brackets and slashes indicate alternative choices.)

10.5.1 Acknowledging Objections and Alternatives

Acknowledge an objection or alternative in language that shows how much weight you give it. Here are some options.

You can downplay an objection or alternative by introducing it with *despite*, *regardless of*, or *notwithstanding*:

[Despite/Regardless of/Notwithstanding] Congress's claims that it wants to cut taxes^{,acknowledgment} the latest budget proposals suggest that .
^{. .response}

Use *although*, *while*, and *even though* in the same way:

[Although/While/Even though] Hong Kong is experiencing economic problems,*acknowledgment* Southeast Asia remains a strong . . . *response*

You can signal an acknowledgment indirectly with *seem*, *appear*, *may*, or *could*, or with an adverb like *plausibly*, *justifiably*, *reasonably*, *surprisingly*, or even *certainly*:

In his letters Lincoln expresses what **[seems/appears]** to be depression.*acknowledgment* But those who observed him . . . *response*

This proposal **[may have/plausibly has]** some

merit,*acknowledgment* but we . . . *response*

You can attribute an objection or alternative to an unnamed source, which gives it a little weight:

It is easy to **[think/imagine/say/claim/argue]** that taxes should . . . *acknowledgment* But there is

[another/alternative/possible] **[explanation/line of argument/account/possibility]**.*response*

Some evidence **[might/may/can/could/does]**

[suggest/indicate/point to/lead some to think] that we should . . . *acknowledgment* but . . . *response*

You can attribute an objection or alternative to a generic interlocutor, giving it more weight:

There are **[some/many/a few]** who **[might/may/could/would]** **[say/think/argue/claim/charge/object]** that Cuba is ^{not} . . . *acknowledgment*
But, in fact, . . . *response*

Although **[some researchers/critics/scholars]** have argued that . . . ,*acknowledgment* our research shows . . .

Note that you can weaken your case if you prematurely denigrate those you disagree with:

Some **naïve** researchers have claimed that . . .

The **occasionally careless** historian H has even claimed that . . .

Save criticism for the response, and direct it at the work rather than the person.

You can acknowledge an objection or alternative in your own voice, using *I* or *we*, a passive verb, or a word or phrase such as *admittedly*, *granted*, *to be sure*, and so on, which concedes it some validity:

I [**understand/know/realize**] that liberals believe
in . . . ,*acknowledgment* but . . . *response*

It is [**true/possible/likely**] that electronic cigarettes are less
carcinogenic than conventional cigarettes. *acknowledgment*
However, . . . *response*

It [**must/should/can**] be

[**admitted/acknowledged/noted/conceded**] that no good evidence
proves that . . . *acknowledgment* Nevertheless, . . .

[**Granted/Certainly/Admittedly/True/To be sure/Of course**], Adams
has claimed . . . *acknowledgment* However, . . . *response*

We [**would/could/can/might/may**] [**say/argue/claim/think**] that public
health programs such as needle exchanges
encourage . . . ,*acknowledgment* but these effects are outweighed
by . . . *response*

10.5.2 Responding to Objections and Alternatives

Begin your response with a term or phrase that signals disagreement, such as *but*, *however*, or *on the other hand*. If readers do not already know the basis for that response, support it with at least one reason or even with a complete subordinate argument.

You can respond in ways that range from tactful to blunt.

You can regret not that the source is unclear, but that *you* don't entirely understand:

But [**I do not quite understand how/I find it difficult to see how/It is not clear to me how**] X can claim that, when . . . *response*

2. Or you can note that there are unsettled issues:

But there are **other issues here** . . . /But there **remains the problem**

of . . . *response*

You can respond more forcefully, claiming the acknowledged position is irrelevant or unreliable:

But as insightful as that may be, *acknowledgment* it **[ignores/is irrelevant to/does not bear on]** the issue at hand. *response*

But the **[evidence/reasoning]** is **[unreliable/shaky/thin]**. *response*

But the argument is **[untenable/weak/confused/simplistic]**. *response*

But the argument **[overlooks/ignores/misses]** key factors. *response*

You have to decide how blunt your response should be. If an alternative seems obviously flawed, say so, but focus on the work rather than the person.

When you think another researcher seems to have not thought through an issue carefully, you usually should say so civilly. Here are a few possibilities:

Smith's evidence is important, *acknowledgment* **but we must look at all the available evidence**. *response*

That explains some of the problem, *acknowledgment* **but it is too complex for a single explanation**. *response*

That principle holds in many cases, *acknowledgment* **but not in all**. *response*

[Quick Tip: Three Predictable Disagreements](#)

There are three kinds of alternatives that at least some readers are likely to think of.

There are causes in addition to the one you claim. If your argument is about cause and effect, remember that no effect has a single cause and no cause has a single effect. If you argue that X causes Y, every reader will think of other causes. European honeybee colonies may be collapsing because of pesticide use, but an informed reader could also list other possible factors, including loss of habitat, disease, genetically modified crops, and parasites. So if you focus on one cause out of many, acknowledge the others. And if you feel readers might think that some cause deserves more attention than you give it, acknowledge that view and explain why you deemphasized it.

What about these counterexamples? No matter how rich your evidence, readers are likely to think of exceptions and counterexamples that they believe undermine your argument. So you must think of them first, acknowledge the more plausible ones, especially if they are vivid, and then explain why you don't consider them as damaging as your reader might. Be particularly wary when you make claims about a phenomenon with a wide range of variation, such as the climate. Readers who do not understand statistical reasoning will focus on an aberrant case, even though it falls within a normal distribution: a cold Fourth of July in Florida does not disprove a claim about global warming, any more than a warm New England Christmas proves it.

I don't define X as you do. To me, X means . . . To accept your claim, readers must accept your definitions, because definitions are crucial warrants (see the next chapter): if you are researching nicotine addiction,

your readers must understand what you mean by that term. Does it mean just a strong craving, a craving that some people can't resist, or a craving that *no one* can? You can find definitions ranging from a few lines in a dictionary to pages in a medical reference work. But regardless of what those sources say, readers tend to redefine terms they encounter to suit their own views. Cigarette manufacturers long argued that cigarettes are not addictive because some people can quit; their critics argued that cigarettes are addictive because more people can't.

When your argument hinges on the meaning of a term, define it to support your solution and offer a subordinate argument for your definition. Don't treat a dictionary definition as authoritative (never begin, "According to *Webster's*, 'addiction' means . . ."). Be aware of plausible alternative definitions that you may need to acknowledge. If you use a technical term that also has a common meaning (like *social class* or *theory*), acknowledge that common meaning and explain why you have adopted the technical one. Conversely, if you do not use a technical term as expert readers expect you to, acknowledge that and explain why you've opted for another meaning.

11 Warrants

Warrants are general principles that connect reasons to claims. This chapter explains when and how to use them. In general, you should state your warrants only when your readers will not understand your argument without them or when you expect your readers to challenge your reasoning. When you write for experts in

a field, you can leave most of your warrants unstated, because your readers will usually know them already and take them for granted.

Consider this argument:

The Russian Federation faces a falling standard of living,*claim* because its birthrate is only 13.2 per 1,000 and life expectancy for men is only about 63 years.*reason*

Someone responds:

Well, you're right about Russia's birthrate and life expectancy, but I don't see how that's relevant to your claim that its standard of living will fall. What's the connection?

How would the person making the argument answer? More important, if that argument were in writing, how would she know that she had to answer that question *before it was asked*? Such questions address the fifth and most complex element of an argument: its warrants. A warrant is a principle that connects a reason to a claim. Warrants are important because readers may challenge not just the validity of a reason but its *relevance* as well.

In this chapter, we explain how warrants work, how to test them, and when and when not to state them. The basic principle is this: state your warrants only if your readers will not be able to understand your reasoning without them, or if you anticipate that your reasoning will be challenged.

But as we get started, a word of caution: everyone struggles to understand warrants—including, from time to time, all of us. So if at the end of this chapter you still have questions, you're not alone.

11.1 WARRANTS IN EVERYDAY REASONING

Warrants are hard to grasp, but we understand them easily enough when people offer proverbs to justify their reasoning. That's because proverbs are warrants that we all know. For example, someone says:

I hear the FBI has been questioning the mayor's staff.*reason* He must be involved in something crooked.*claim*

Another person might object, *You're right. The FBI has been questioning his staff, but why does that mean he's crooked?* To explain the reasoning that led to that conclusion, the first person might offer the proverb, *Well, where there's smoke, there's fire*. That is, when we see a sign of something wrong, we can infer that something is in fact wrong.

The logic behind that reasoning is this. Most proverbs describe a situation made up of two distinct parts: a circumstance (*Where there's smoke, . . .*) and its consequence (*. . . there's fire*). If the connection between the circumstance and consequence is true or reasonable in general, it must also be true or reasonable in specific instances. In the case of smoke, fire, the FBI, and the mayor, that logic looks like this:

We use proverbs to justify many kinds of everyday reasoning: cause and effect (*Haste makes waste*); rules of behavior (*Look before you leap*); reliable inference (*One swallow does not a summer make*). But such proverbs are not our only examples of everyday warrants. We use warrants everywhere: in sports (*Defense wins championships*); in cooking (*Serve oysters only in months with an "r"*); in definitions (*A prime number can be divided only by itself and one*); even in research (*When readers find an error in one bit of evidence, they distrust the rest*).

11.2 WARRANTS IN ACADEMIC ARGUMENTS

In academic arguments, warrants work in exactly the same way. But in contrast to proverbs and other everyday warrants, academic warrants can be difficult to manage—especially for researchers new to a field—for three reasons.

First, academic warrants aren't commonplaces we all share. They are specific principles of reasoning that belong to particular communities of researchers, and they are countless. A fact of life is that it just takes time for new researchers to grasp the warrants of their fields.

Second, experienced researchers rarely state their warrants explicitly when they write for specialized readers in their fields because they can safely assume that these readers already know them. (To state the obvious would seem not helpful but condescending.) This practice serves specialized readers well. But it poses a challenge to novices, who have to figure out what makes some reasons relevant to claims and others not, something those experts take for granted. That's why beginners in any field struggle with the *logic* of arguments written for specialists.

Here's an example of an academic warrant at work. Assuming the available evidence supported the reason, biologists would accept this argument:

A whale is more closely related to a hippopotamus than to a cow,*claim* because it shares more DNA with a hippopotamus.*reason*

No biologist would ask, *What makes DNA relevant to measuring relationship?* So no biologist writing for her colleagues would offer a warrant answering that question. If, however, a non-biologist asked that question, the biologist would answer with a warrant other biologists take for granted:

When a species shares more DNA with one species than it does with another,*circumstance* we infer that it is more closely related to the first.*consequence*

Of course, the biologist would probably then have to explain that warrant as well. The point is this: whether or not a warrant gets stated explicitly depends not only on the argument but also on the audience. Experts state principles that are obvious to other experts only when they communicate with non-experts—or when challenged.

Third, academic warrants are often stated in ways that compress their circumstances and consequences. In most proverbs, these parts are distinct: *Where there's smoke*,*circumstance* *there's fire*.*consequence* But we can also compress those two parts into one short statement: *Smoke means fire*. That's something we rarely do with proverbs but that experts often do with their specialized warrants:

Shared DNA is the measure of the relationship between species.

Phrased this way, our biologist's warrant doesn't explicitly distinguish a circumstance from its predictable consequence. But however compressed a warrant might be, we can always infer those two parts. For purposes of clarity, we'll state warrants in their most explicit two-part form: *When X, then Y*.

11.3 UNDERSTANDING THE LOGIC OF WARRANTS

Here again is that argument about Russia's economic future:

The Russian Federation faces a falling standard of living,^{claim} because its birthrate is only 13.2 per 1,000 and life expectancy for men is only about 63 years.^{reason}

If someone objects that the reason seems *irrelevant* to the claim, the person making the argument would have to justify the connection with a warrant consisting of two parts: (1) a general circumstance that lets us draw a conclusion about (2) a general consequence.

When a nation's labor force shrinks,^{general circumstance} its economic future is
grim.^{general consequence}

Both the circumstance and consequence have to be more general than the specific reason and claim. Visually, that logic looks like this:

That's the same pattern we saw in the argument about smoke, fire, and the crooked mayor.

11.4 TESTING WARRANTS

Readers challenge warrants in predictable ways. Consider this argument:

Contrary to popular belief, gun ownership in America was probably not widespread in the first half of the nineteenth century and before,^{claim} because guns were rarely mentioned in wills.^{reason} A review of 4,465 wills filed in seven states from 1750 to 1850 shows that only 11 percent mention a long gun or handgun.^{report of evidence}

Such a claim is likely to be resisted by those who believe that those who founded the United States owned guns. So even if they accept that the reason is true—that guns were in fact rarely mentioned in wills—they may still object: *But I don't see how that counts as a reason to believe that few people owned a gun. It's irrelevant.*

If a writer anticipated that readers would raise that objection, she would offer a warrant to link the specific reason to the specific claim before she stated them:

In the eighteenth and early nineteenth centuries, valuable objects were listed in wills, **so when someone failed to mention a valuable object in his will, he did not own one.**^{warrant} Since guns were valuable but were rarely mentioned in wills before 1850,^{reason} gun ownership must not have been widespread.^{claim}

But if she wants her readers to accept that warrant, she must ask herself five questions before her readers do:

Is that warrant reasonable?

Is it sufficiently limited?

Is it superior to any competing warrants?

Is it appropriate to this field?

Is it able to cover the reason and claim?

11.4.1 Is Your Warrant Reasonable?

A warrant seems reasonable when readers can accept that its consequence follows from its circumstance. If readers don't accept that, you must first convince them to accept your warrant by treating it as a claim in its own argument, supported by its own reasons and evidence:

In the eighteenth and early nineteenth centuries, valuable objects were listed in wills, so when a will failed to mention such a valuable object, the person did not own one.*.warrant/claim* Watson (1989) confirmed that to be the case.*.reason* In a study of 1,356 wills filed in Cumberland County between 1750 and 1825, he found . . .*.evidence*

11.4.2 Is Your Warrant Sufficiently Limited?

Most warrants are reasonable only within certain limits. For example, that warrant about gun ownership seems to allow no exceptions:

In the eighteenth and early nineteenth centuries, valuable objects were listed in wills.

That version is too broad; it might seem more plausible if it were qualified:

In the eighteenth and early nineteenth centuries, **most** household objects **considered valuable by their owners** were **usually** listed in wills.

But once you start qualifying a warrant with words like *most* and *usually*, you then have to show that its exceptions do not exclude your reason and claim: *What frequency are most and usually? Were guns always considered valuable?*

11.4.3 Is Your Warrant Superior to Any Competing Warrants?

You may think your warrant is reasonable and sufficiently limited, but others might contradict it. Here are two more competing warrants, both arguably reasonable:

When parents believe a medical procedure may harm their children, they have a right to refuse it. Taylor and Chris believe the measles vaccine causes autism, so they can refuse to have it administered to their daughter.

When medical decisions concern matters of public health, the state has a right to regulate them. When most children in a population are vaccinated against measles, everyone is safer, so the state can compel Taylor

and Chris to allow their daughter to be vaccinated.

Which warrant should prevail? That's a matter for yet another argument. You can sometimes reconcile competing warrants by limiting them:

When parents believe a medical procedure may harm their children, they have a right to refuse it, so long as that does not jeopardize the health of others.

When medical decisions concern matters of public health, the state has a right to regulate them, so long as the state encroaches as little as possible on parents' prerogative to make medical decisions for their children.

Finding the right balance is not easy. Again, it's a matter for argument.

11.4.4 Is Your Warrant Appropriate to This Field?

Your warrant may be reasonable, sufficiently limited, and superior to others, but your readers might still reject it if it is not appropriate to their particular research community. Law students get a painful lesson in the law when they find that many warrants they take for granted have no place in legal arguments. For example, like most of us, they start law school holding this commonsense belief:

When a person is wronged, the law should correct it.

But law students have to learn that legal warrants may trump such commonsense ideas. For example:

When one ignores legal obligations, even inadvertently, one must suffer the consequences.

Therefore:

When elderly home owners forget to pay real estate taxes, others can buy their houses for back taxes and evict them.

Against their most decent instincts, law students must learn to argue that justice is not the outcome they believe to be ethical but the one that the law and the courts support.

11.4.5 Is Your Warrant Able to Cover Your Reason and Claim?

Finally, you must be sure that your reason and claim are good instances of your warrant's general circumstance and general consequence. For example:

Ahmed: You should buy a gun,*claim* because you live alone.*reason*

Beth: Why does living alone mean I should buy a gun?

Ahmed: When you aren't safe,*general circumstance* you should protect yourself.*general consequence*

Beth: But living alone doesn't make me unsafe.

Beth objects not that Ahmed's reason is false but that it is not a valid *instance* of his warrant's general *circumstance*. So to her, Ahmed's reason isn't covered by his warrant and is therefore not *relevant*. Beth might also have responded that owning a gun would make her home less safe (rather than more). In that case, she would be objecting that Ahmed's claim isn't a good instance of the warrant's *consequence*, that is, that it doesn't *follow* from his reason: even if she was unsafe, a gun would not allow her to protect herself.

If all this seems complicated, know that you are in good company: the relationship of warrants to claims and reasons has vexed logicians since at least the time of Aristotle. But just knowing the ways that readers typically challenge warrants will help you write better arguments, which is why we've listed those five questions above.

11.5 KNOWING WHEN TO STATE A WARRANT

An argument in any field depends on countless principles of reasoning, but most of these principles are so deeply embedded in our tacit knowledge that we rarely state them. There are three occasions, however, when you may have to:

Your readers are outside your field. When you write as an expert for non-expert readers, you may need to explain how experts draw conclusions and support their claims, especially if these ways of reasoning are unusual.

You use a principle of reasoning that is new or controversial in your field. When you rely on unconventional principles of reasoning, you can anticipate that at least some of your readers will be skeptical. So defuse that skepticism by stating your warrant and then justifying it. Refer to others in your field who also use it. If you can't do that, make an argument of your own defending your reasoning.

You make a claim that readers will resist because they just don't want it to be true. In this case, a good strategy is to start with a warrant that you hope readers will accept *before* you lay out a reason and claim that you fear they will resist. They may not like the claim any better, but you will at least encourage them to see that it is not unreasonable. For example:

We should accept that human actions are largely responsible for climate change,*claim* because virtually all climate scientists hold that view.*reason*

What You Don't Say Says Who You Are

You treat readers courteously when you state and support warrants to explain principles of reasoning that they may not recognize. But you make an equally strong (though less friendly) gesture when you keep silent about warrants you should state for readers not in the know. One way or the other, warrants significantly affect how readers perceive the ethos you project through your arguments.

Some readers may resist that claim because it threatens other strong convictions they hold. A writer confronting such readers might encourage them at least to consider that claim by giving them a warrant that they should be able to accept:

When an overwhelming majority of competent experts arrive at the same conclusion, we can probably trust it.*warrant* We should therefore accept that human actions are largely responsible for climate change,*claim* because virtually all climate scientists hold that view.*reason*

When readers accept that a warrant is reasonable, that a reason is true, and that the reason and claim are good instances of the warrant's general circumstance and consequence, then they are logically obliged at least to consider the claim. If they don't, no rational argument is likely to change their minds.

11.6 USING WARRANTS TO TEST YOUR ARGUMENT

All arguments rely on warrants, even if they aren't stated explicitly. You can test the soundness of an argument by trying to imagine a warrant for it. Here is a flawed argument about how violent video games affect children:

Children aged 12–16 today are significantly more violent than their counterparts from a generation ago.*reason* Brown (2013) has shown

that . . .*evidence* Given these facts, it seems highly likely that violent video games are exerting a destructive influence on today's youth.*claim*

To understand what's wrong here, we can imagine a warrant that would allow us to draw a conclusion about the effect of video games on children:

When children are constantly exposed to images of sadistic violence, they are influenced for the worse.*warrant* Children aged 12–16 today are

significantly more violent than their counterparts from a generation ago.^{reason} Brown (2013) has shown that . . .^{evidence} Given these facts, it seems highly likely that violent video games are exerting a destructive influence on today's youth.^{claim}

Now we can see the problem: the specific circumstance—rising violence among children aged 12–16—is not a valid instance of the warrant's general circumstance: children being exposed to images of sadistic violence.

So even if that statement about rising violence among children is true, it can't justify the claim. To fix that argument, we have to revise the reason to be a good instance of the warrant's general circumstance, which may also mean producing new evidence to support that new reason:

When children are constantly exposed to images of sadistic violence, they are influenced for the worse.^{warrant} Over the past decade, video games have become a major source of children's exposure to violent imagery.^{new reason} Jones (2014) shows that . . .^{new evidence} Given these facts, it seems highly likely that violent video games are exerting a destructive influence on today's youth, making them significantly more violent than their counterparts from a generation ago.^{claim}

Now the reason and claim seem closer to what the warrant covers or include

But a reader keen to derail the argument might still object:

Wait. All those images aren't "sadistic." Much of it is cartoon violence. And children aren't *constantly* exposed to it.

In response, the writer would have to deal with those issues.

Now you understand why important issues are so endlessly contested, why, even when you feel your case is airtight, your readers can still say, *Wait a minute. What about . . . ?* Readers can challenge reasons in two ways. They can object that your reasons are not grounded on sound evidence or that they seem irrelevant to a claim. To answer the first sort of objection, you must find better evidence. To answer the second sort, you must provide a warrant that makes your reasons relevant. If you can't, you must revise your argument.

11.7 CHALLENGING OTHERS' WARRANTS

The most difficult arguments to make are those that challenge not just the claims and evidence that a research community accepts but also the warrants it embraces. No argumentative task is harder, because when you challenge a community's warrants, you ask readers to change not just *what* they believe but *how* they reason. To challenge a warrant successfully, you must first imagine how those who accept it would defend it. Warrants can be based on different *kinds* of supporting arguments, so you have to challenge them in different ways.

11.7.1 Challenging Warrants Based on Experience

We base some warrants on our experience or on reports by others.

When people habitually lie, we don't trust them.

When insecticides leach into the ecosystem, eggshells of wild birds become so weak that fewer chicks hatch and the bird population falls.

To challenge those warrants, you have two choices, both difficult: (1) challenge the reliability of the experience, which is rarely easy; (2) find counterexamples that cannot be dismissed as special cases.

11.7.2 Challenging Warrants Based on Authority

We believe some people because of their expertise, position, or charisma.

When authority X says Y, Y must be so.

The easiest—and friendliest—way to challenge an authority is to argue that, on the matter in question, the authority does not have all the evidence or reaches beyond its expertise. The most aggressive way is to argue that the source is in fact not an authority at all.

11.7.3 Challenging Warrants Based on Systems of Knowledge

These warrants are backed by systems of definitions, principles, or theories:

FROM MATHEMATICS: When we add two odd numbers, we get an even one.

FROM BIOLOGY: When an organism reproduces sexually, its individual offspring differ.

FROM LAW: When we drive without a license, we commit a misdemeanor.

When you challenge these warrants, “facts” are largely irrelevant. You must either challenge the system, always difficult, or show that the case does not fall under the warrant.

11.7.4 Challenging General Cultural Warrants

These warrants are backed not by individual experience but by the common experience of an entire culture. To members of that culture, they seem unassailable “common sense.”

Out of sight, out of mind.

An insult justifies retaliation.

Handling toads causes warts.

Warrants like these may change over time, but slowly. You can challenge them, but readers will resist, because you seem to be challenging their heritage.

11.7.5 Challenging Methodological Warrants

Think of these as “meta-warrants,” general patterns of thought with no content until applied to specific cases. We use them to explain abstract reasoning (they are the source of many proverbs):

GENERALIZATION: When every known case of X has quality Y, then all Xs probably have quality Y. (*Seen one, seen them all.*)

ANALOGY: When X is like Y in most respects, then X will be like Y in other respects. (*Like father, like son.*)

SIGN: When Y regularly occurs before, during, or after X, Y is a sign of X. (*Cold hands, warm heart.*)

Philosophers have questioned these warrants, but in matters of practical argumentation, we challenge only their application or point out limiting conditions: *Yes, we can analogize X to Y, but not if . . .*

11.7.6 Challenging Warrants Based on Articles of Faith

Some warrants are beyond challenge: Jefferson invoked one when he wrote, *We hold these truths to be self-evident, that all men are created equal. . . .*

Others include

When a claim is experienced as revealed truth, it must be true.

When a claim is based on divine teaching, it must be true.

Such warrants are backed not by evidence but by the certainty of those who espouse them. It is pointless to challenge them, because they are statements of faith, impervious to argument or evidence. If you encounter them as you gather your data, ignore them or treat them not as a subject for research but as an inquiry into the meaning of life.

Quick Tip: Reasons, Evidence, and Warrants

You can justify your reasons in two ways: by offering evidence to support them or by deriving them from a warrant. Each of these ways leads to a different kind of argument. Researchers generally trust the first kind more than the second, so base your reasons on solid evidence when you can. Compare these two arguments:

We should do what we can to discourage teenagers from texting and driving,^{*claim*} because distracted driving is a leading cause of teenage deaths.^{*reason*} According to the CDC, motor vehicle accidents are responsible

for over a third of all fatalities among people aged 12–19, and texting while

driving exponentially increases the likelihood that any driver will be involved in one. Moreover, . . .^{*evidence*}

We should do what we can to discourage teenagers from texting and driving,^{*claim*} because when they do, their risk of having an accident increases.^{*reason 1*} Driving is difficult and texting a distraction,^{*reason 2*}

supporting reason 1 and we know that when people are distracted while performing complex tasks, their performance suffers.*warrant linking reason 2 and reason 1*

If you are like most contemporary readers, you probably preferred the first of these arguments. That's because its warrant is not controversial (and therefore goes without saying) and its claim is supported by a reason based on solid evidence. That second argument is plausible because reason 1 and reason 2 are good instances of that warrant's general consequence and condition. But most readers still want evidence.

In particular, you can't support a claim of fact (see 8.1) with a warrant and reason alone:

Texting and driving is a leading cause of teenage deaths,*claim of fact* because texting while driving is very distracting.*reason* When drivers are distracted, they increase their risk of having serious even fatal accidents.*warrant*

Are you thinking, *I could believe that, but I'd like some proof?* That commonsense response is telling. We can't just *reason* our way to the conclusion that texting while driving is a *leading* cause of teen fatalities, or even that it causes teen fatalities *at all*. Except in a few fields—some branches of mathematics, philosophy, theology—the way to demonstrate a claim of fact is to show with evidence that what you are claiming is, *in fact*, the case.

The lesson is this: whenever you can, rely not on elaborate lines of reasoning based on warrants but on hard evidence.

PART IV

Writing Your Argument

Prologue

Planning Again

No formula can tell you when to start drafting. Many writers begin without a full plan, and as things become clearer, they have to discard good but irrelevant pages. Others can't get going without multiple outlines and summaries. And some of us compose drafts in our heads well before turning to a serious draft in writing. You have to find your own way to start a first draft, but you can prepare for that moment if you keep writing your way toward the paper from the start through summaries, analyses, and critiques.

Here's how you know when you're ready to plan a draft:

You know who your readers are, what they know, and why they should care about your problem.

You know the kind of ethos or character you want to project.

You can sketch your question and its answer in two or three sentences.

You can sketch the reasons and evidence supporting your claim.

You know the questions, alternatives, and objections that your readers are likely to raise, and you can respond to them.

You know when your readers may not see the relevance of a reason to a claim and can state the warrant that connects them.

Even when they have a plan and are ready to draft, though, experienced writers know that they won't march straight through to a finished product. They know they'll go down blind alleys, but also make new discoveries, maybe even rethink their whole project. They also know that a lot of their early drafting will not make it into their final draft, and so they start early enough to leave time for revision.

Sorting Out Terms: Hypothesis, Answer, Solution, Claim, Point

In [part II](#) we used the terms *answer*, *hypothesis*, and *solution* to name the sentence that resolved the central issue of your research. In [part III](#) we used the term *main claim* to refer to the answer, hypothesis, or solution that constitutes the key assertion that the rest of your argument supports. Here in [part IV](#) we use *point* to name the sentence that states the main claim in a paper (some use the term *thesis*). *Hypothesis*, *answer*, *solution*, *claim*, and

point—all those terms refer to the same sentence. We use different terms because each defines the role of that sentence from a different angle.

[Part IV](#) will lead you through the process of creating your final paper. In [chapter 12](#) we walk through planning and drafting, then in [chapter 13](#) organizing your argument. In [chapter 14](#) we discuss the demanding task of incorporating and citing sources. In [chapter 15](#) we discuss how to present quantitative data in visual form, and in [chapter 16](#) how to write effective introductions and conclusions. Finally, in [chapter 17](#) we deal with problems of writing in a clear and direct style.

[12 Planning and Drafting](#)

Once you've assembled your argument, you might be ready to draft it. But experienced writers know that time spent planning a first draft more than pays off when they start writing it. A plan helps you organize the elements of your argument into a form that will be both coherent and persuasive to your readers.

Some fields stipulate the plan of a research report. In the experimental sciences, for example, readers expect reports to follow a plan something like this:

Introduction – Methods and Materials – Results – Discussion – Conclusion

If your field requires you to follow a conventional plan, ask your teacher for a model or find one in a secondary source. In most fields, however, you have to create a plan of your own, but that plan must still help readers find what they are looking for.

12.1 PLANNING YOUR PAPER

12.1.1 Sketch a Working Introduction

Writers are often advised to write their introductions last. A few writers can wait until they've written their last words before they write their first ones, but most of us need a working introduction to start us on the right track.

Expect to write your introduction twice, a sketchy one for yourself right now, then later a final one for your readers. That final introduction will usually have three parts (see [chapter 16](#)), so you might as well sketch your working introduction to anticipate them.

At the top of the first page of your storyboard, sketch a *brief* summary of *only* the key points in *only* those sources most relevant to your argument.

An account of marginally relevant references has no place in your introduction. Summarize only the sources that you intend to challenge, modify, or expand on. Then order those sources in a way that is useful to your readers: chronologically, by quality, significance, point of view, and so on. Under *no* circumstances follow the order in which you happened to read them or record them in your notes. If you're sure what will go into this summary, just list the sources in a useful order.

After your summary of sources, rephrase your question as a statement about a flaw or gap that you see in them:

Why is the Alamo story so important in our national mythology?

Few of these historians, however, have explained why the Alamo story has become so important in our national mythology.

Sketch an answer to *So what if we don't find out?* You may be only guessing but try to find *some* answer.

If we understood how such stories become national legends, we would better understand our national values, perhaps even what makes us distinct.

If you can't think of any answer to *So what?*, skip it; we'll return to it in [chapter 13](#).

State the answer to your question as your point, or promise an answer in a launching point. You have two choices here:

State the point of your paper at the end of your introduction to frame what follows and again near the beginning of your conclusion.

State it only in your conclusion, as a climax to your reasoning.

This is a crucial choice, because it creates your social contract with your readers. If you state your main point toward the end of your introduction, you put your readers in charge: *Reader, you control how to read this paper. You know my problem and its solution, my point. You can decide how—even whether—to read on. No surprises.* On the other hand, if you wait until your conclusion to state your main claim, you create a more controlling relationship: *Reader, you must follow me through every twist and turn until we reach the end, where I will finally reveal my point.* Most readers prefer to see your main point at the end of your introduction, because that lets them read what follows faster, understand its relevance better, and remember it all longer. Stating your claim early also helps keep you on track.

Some new researchers fear that if they reveal their main point too early, readers will be “bored” and stop reading. Others worry about repeating themselves. Both fears are baseless. If you ask an interesting question, readers will want to see how well you can answer it.

If you decide to announce your claim only in your conclusion, you still need a sentence at the end of your introduction that launches your reader into the body of your paper. That sentence should include terms that name the key concepts that will run through your paper (see 6.6.1, 8.2.1, 12.1.2). You’ll be better prepared to write that launching sentence after you draft your final introduction. So for purposes of planning, put your main claim at the bottom of your storyboard’s introduction page; you can move it later.

Some writers add a “road map” at the end their introduction:

In part 1, I discuss the issue of . . . Part 2 addresses . . . Part 3 examines . . .

Road maps are common in the social sciences, but many in the humanities find them clumsy. You can add a road map to your storyboard to guide your drafting, then cut it from your final draft. If you keep it, make it short,

Here is how the first page of your storyboard might now look:

Research has shown that female athletes under eighteen have almost twice the risk of sustaining concussions as male athletes of the same age who play

the same sports.*context* [Summary of key sources follows.]

But that research reveals little about the causes of this discrepancy.*question*

rephrased as gap in research

Until we understand why female athletes suffer proportionally more concussions than their male counterparts, we can't know the most effective ways to protect them.*consequences of question*

The discrepancy appears to be due in part to differences in the protective equipment worn by male and female athletes as well as to different standards of monitoring, reporting, and care when injuries occur.*your tentative*

main point

Sketchy as it is, this introduction is enough to start you on track. In your final draft, you'll revise it to state your problem more completely (see [chapter 16](#)).

12.1.2 Identify Key Concepts That Will Run Through Your Whole Paper

For your paper to seem coherent, readers must see a few key concepts running through all of its parts. You might find them among the terms you used to categorize your notes, but they must include keywords from the sentences stating your problem and main point. On the introduction page, circle four or five words that express those concepts. Ignore words that name your general topic; focus on those relevant to your specific question:

employment, job satisfaction, recent SE Asian immigrants, cross-cultural, length of residence, prior economic level

If you find few key terms, your topic and point may be too general (review 8.2.1). List those key terms at the top of each storyboard page, and keep them in mind as you draft.

12.1.3 Plan the Body of Your Paper

Sketch background and define terms. After the introduction page of your storyboard, add a page on which you outline necessary background. You may have to define terms, spell out your problem or review research in more detail, set limits on your project, locate your problem in a larger historical or social context, and so on. Keep it short.

Create a page for each major section of your paper. At the top of each of these pages, write the point that the rest of that section supports, develops, or explains. Usually, this will be a reason supporting your main claim.

Find a suitable order. When you assembled your argument (see 9.1), you ordered its parts in a way that may have been clear to you. But when you plan a draft, you must order them in a way that meets the needs of your readers. When you're not sure what that order should be, consider these options. The first two are based on your topic:

Part-by-part. If you can break your topic into its parts, you can deal with each in turn, but you must still order those parts in a way that helps readers understand them—by their functional relationships, hierarchy, and so on.

Chronological. This is the simplest: earlier to later or cause to effect.

These next six are based on your readers' knowledge and understanding.

Short to long, simple to complex. Most readers prefer to deal with simple issues before they work through more complex ones.

More familiar to less familiar. Most readers prefer to read about more familiar issues before they read about new ones.

Less contestable to more contestable. Most readers move more easily from what they agree with to what they don't.

More important to less important (or vice versa). Readers prefer to read more important reasons first (but those reasons may have more impact if they come last).

Earlier understanding to prepare for later understanding. Readers may have to understand some events, principles, definitions, and so on before they understand something else.

General analysis followed by specific applications. Readers may have to understand the outlines of your overall position before they can follow how you apply it to specific texts, events, situations, and so on.

Often these principles cooperate: what readers agree with and easily understand might also be short and familiar. But these principles may also conflict: readers might reject most quickly reasons that are most important. Whatever your order, it must reflect *your readers'* needs, not the order that the material seems to impose on itself (as in an obvious compare-contrast organization), least of all the order in which those reasons occurred to you.

Finally, make the principle of order you choose clear by sketching at the top of each page words that show it: *First . . . , second . . . ; Later . . . , finally . . . ; More important . . . ; A more complex issue is . . . ; As a result . . .* Don't worry if these terms feel awkward. At this point, they're for your benefit, not your readers'. You can revise or even delete them from your final draft.

12.1.4 Plan Each Section and Subsection

Highlight the key terms in each section and subsection. Just as your paper needs an introduction, so does each of its sections. Earlier we told you to state the point of each section at the top of its storyboard page. Now, just as you picked out key terms to run through your whole paper, circle the ones that uniquely distinguish this section from all the others; they should be in the sentence that states the point of that section. If you cannot find terms to distinguish a section, look closely at how it contributes to the whole. It may offer little or nothing.

Indicate where to put evidence, acknowledgments, warrants, and summaries. Add these parts to the storyboard page for each section. They may, in turn, need to be supported by their own arguments.

Evidence. Most sections consist of evidence supporting a reason. If you have different kinds of evidence supporting the same reason, group and order them in a way that makes sense to readers. Note where you may have to explain your evidence—where it came from, why it's reliable, exactly how it supports a reason.

Acknowledgments and responses. Imagine what readers might object to, then outline a response. Responses may be sub-arguments with a claim, reasons, evidence, and even another response to an imagined response to your response.

Warrants. Generally speaking, if you need a warrant, state it before you offer its claim and supporting reason. This following argument, for example, needs a warrant if it's intended for non-experts in Elizabethan social history:

Since most students at Oxford University in 1580 signed documents with only their first and last names,^{reason} most of them must have been commoners.^{claim}

That argument is clearer to everyone (even experts) when introduced by a warrant:

In late sixteenth-century England, when someone was not a gentleman but a commoner, he did not add “Mr.” or “Esq.” to his signature.^{warrant} Most students at Oxford University in 1580 signed documents with only their first and last names,^{reason} so most of them must have been commoners.^{claim}

If you think readers might question your warrant, make an argument supporting it.

If your paper is long and “fact-heavy” with dates, names, events, or numbers, you might end each major section by briefly summarizing the progress of your argument. What have you established in that section? How does your argument shape up so far? If in your final draft those summaries seem clumsy, cut them.

12.1.5 Sketch a Working Conclusion

State your point again at the top of a conclusion page of your storyboard.

After it, if you can, sketch its significance (another answer to *So what?*).

In doing all this, you may discover that you can't use all the notes you collected. That doesn't mean you wasted time. Research is like gold mining: dig up a lot, pick out a little, toss the rest. Ernest Hemingway said that you know you're writing well when you discard stuff you know is good—but not as good as what you keep.

12.2 AVOIDING THREE COMMON BUT FLAWED PLANS

Not all plans are equally good. Our first efforts often track our thinking or activities as researchers but not the experiences of readers.

Do not organize your paper as a narrative of your thinking. Few readers want to know what you found first, followed by the dead ends you hit, then the problems you overcame. They become especially annoyed when they have to slog through the history of your project to get to a main point you've saved for the end.

To test your draft for this problem, look for sentences that refer not to the results of your research but to how you did it or to what you were thinking. You see signs of this in language like *The first issue was . . . ; Then I compared . . . ; Finally, I conclude*. If you discover more than a few such sentences, you may not be supporting a claim but rather telling the story of how you found it. If so, reorganize your paper around the core elements of your argument—your claim and the reasons supporting it.

Do not assemble your paper as a patchwork of your sources. Readers want *your* analysis, not a summary of your sources. Beginning researchers go wrong when they string together quotations, summaries, and loose paraphrases of sources into a patchwork that reflects little of their own thinking. Such “patch writing” invites the charge *This is all summary, no analysis*. It is a particular risk if you do most of your research online, because it is so easy to cut-and-paste from your sources. Experienced readers recognize patch writing, and you risk a charge of plagiarism (see 14.6).

Advanced researchers rarely offer patchwork summaries, but they can follow sources too closely in another way: they map their paper on to the organization of a major source rather than create a new one that serves their argument better. If the key terms that run through your paper are the same as those in one or more sources, consider whether you are making your own argument or mimicking theirs.

Do not map your paper directly on to the language of your assignment. If you echo the language of your assignment in your first paragraph, your teacher may think that you've contributed no ideas of your own, as in this example:

ASSIGNMENT: Different theories of perception give different weight to cognitive mediation in processing sensory input. Some claim that input

reaches the brain unmediated; others that receptive organs are subject to cognitive influence. Compare two

theories of visual, aural, or tactile perception that take different positions on this matter.

PAPER'S OPENING PARAGRAPH: Different theorists of visual perception give different weight to the role of cognitive mediation in processing sensory input. In this paper I will compare two theories of visual perception, one of which . . .

If your assignment lists a series of issues to cover, avoid addressing them in the order given. If, for example, you were asked to “compare and contrast Freud and Jung on the imagination and unconscious,” you would not have to organize your paper into two parts, the first on Freud and the second on Jung. That kind of organization too often results in a pair of unrelated summaries. Instead, try breaking the topics into their conceptual parts, such as elements of the unconscious and the imagination, their definitions, and so on; then order those parts in a way useful to your readers.

12.3 TURNING YOUR PLAN INTO A DRAFT

Some writers think that once they have an outline or a storyboard, they can just grind out sentences. Experienced writers know better. They know that drafting can be an act of discovery that planning can never replace, because it is then that we often experience one of research's most exciting moments: we discover ideas that we didn't have until we expressed them. But like other steps in the process, even surprises happen better with a plan.

12.3.1 Draft in a Way That Feels Comfortable

Many experienced writers begin to write long before they fill up their storyboard. They create a rough plan, use early drafts to explore what they think, then create a final plan based on what they discover. They know that much of that early writing will not survive, so they start early. Exploratory drafting can help you discover ideas you never imagined, but it works only if you have a distant deadline. If you are new to your topic or have a short deadline, draft when you have a clearer plan.

Start Drafting as Soon as You Can

Deadlines come too soon: we long for another month, a week, just one more day. (We fought deadlines for every edition of this book.) In fact, some researchers seem never able to finish, thinking they have to keep working until their paper, dissertation, or book is perfect. That perfect paper has never been written and never will be. All you can do is to make yours as good as you can in the time available. When you've done that, you can say to yourself: *Reader, after my best efforts, here's what I believe —not the whole or final truth, but a truth important to me and I hope to you. I have tested and supported that truth as fully as time and my abilities allow, so that you might find my argument strong enough to consider, perhaps to accept, maybe even to change what you believe.*

Once they have a plan, many writers draft quickly: they let the words flow, omitting quotations and data that they can plug in later, skipping ahead when they get stuck. If they don't remember a detail, they insert a "[?]" and keep writing until they run out of gas, then go back to look it up. But quick drafters need time to revise, so if you draft quickly, start early.

Other writers can work only slowly and carefully: they have to get every sentence right before they start the next one. To do that, they need a meticulous plan. So if you draft slowly, create a detailed outline or storyboard.

Most writers work best when they draft quickly, revise carefully, and toss what's irrelevant. But draft in any way that works for you.

12.3.2 Use Keywords to Keep Yourself on Track

One problem with drafting is staying on track. A storyboard helps, but you might also keep your key concepts in front of you and, from time to time, check how often you use them, especially those that distinguish each section. But don't let your storyboard or key terms stifle fresh thinking. If you find yourself wandering, follow the trail until you see where it takes you. You may be on the track of an interesting idea.

Even if papers in your field don't use headings and subheadings, we suggest that you do when you draft. Create each heading out of the words that are unique to the section or subsection it heads:

Sam Houston as a Hero in Newspapers Outside of Texas

These headings also show the structure of your paper at a glance (numbered headings are common in some social sciences, rare in the humanities). If your field doesn't use heads, delete them from your final draft.

Quick Tip: Work Through Procrastination and Writer's Block

If you can't start writing or you struggle to draft even a few words, you may have writer's block. Some cases arise from anxieties about school and its pressures; if that might be you, see a counselor. But most cases have causes you can address:

You feel so intimidated by the task that you don't know where to begin. If so, divide the process into small tasks; then focus on one step at a time.

You have set no goals or goals that are too high. If so, create a routine

that sets goals you can meet, then use devices such as a progress chart or regular meetings with a writing partner.

You feel you must make every sentence or paragraph perfect before you move to the next one. You can avoid some obsession with perfection if you write informally along the way, telling yourself you are writing only to help you think on paper. In any event, know that every researcher compromises on perfection to get the job done.

If you have problems like these, go to the student learning center. Advisers there have worked with every kind of procrastinator and blocked writer and can give you advice tailored to your problem.

On the other hand, some cases of writer's block may really be opportunities to let your ideas simmer in your subconscious while they combine and recombine into something new and surprising. If you're stuck but have time (another reason to start early), let your

unconscious work on the problem while you do something else for a day or two. Then return to the task to see if you can get back on track.

13 Organizing Your Argument

This chapter presents a procedure for organizing and revising your drafts so that your argument is as clear to your readers as it is to you. At first this procedure may seem a bit mechanical, but that's its virtue. If you follow it one step at a time, you can analyze and improve the organization of your draft efficiently and reliably.

Some new researchers think that once they've churned out a draft, they're done. The best writers know better. They write a first draft not to show to readers, but to discover what case they can actually make for their point and whether it stands up to their own scrutiny. Then they revise and revise until they think their readers will agree with their argument too. Revising for readers is hard, though, because we all know our own work too well to read it as others will. You must first know what readers look for, then determine whether your draft helps them find it. To do that, you have to analyze your draft objectively; otherwise, you'll just read into it what you want your readers to get out of it.

Some writers resist *any* revising for readers, fearing that if they accommodate their readers, they compromise their integrity. They think that the truth of their discovery should speak for itself, and if readers have a hard time understanding it, well, they just have to work harder. But revising for readers doesn't mean pandering to them. In fact, you only improve your ideas when you imagine drawing readers into an amiable conversation in which they engage your beliefs as you engage theirs.

In this chapter, we show you how to diagnose and revise your organization and argument so that readers get out of it what you think you put into it.

13.1 THINKING LIKE A READER

Readers do not read word by word, sentence by sentence, as if they were adding up beads on a string. They want to begin with a sense of the whole, its structure, and, most important, why they should read your paper in the first place. Then they use that sense of the whole and its aims to interpret its parts. So when you revise, it makes sense to attend first to your overall organization, then to sections, then to the coherence of your paragraphs and the clarity of your sentences, and, finally, to matters of spelling and punctuation. In reality, of course, no one revises so neatly. We all revise as we go, correcting spelling as we rearrange our argument, clarifying evidence as we revise a

paragraph. But when you systematically revise top-down, from global structure to local sentences and words, you are more likely to read as your readers will than if you start at the bottom, with words and sentences, and work up. You will also revise more efficiently, because you won't spend time fine-tuning whole sections that you later decide to rearrange or even cut.

13.2 REVISING YOUR FRAME

Readers must recognize three things instantly and unambiguously:

where your introduction ends

where your conclusion begins

what sentence in one or both states your main point

To ensure that readers recognize these, do this:

Put an extra space after your introduction and before your conclusion. If your field approves, put headings at those joints so that readers can't miss them.

State your main point at or close to the end of your introduction. Then compare that point with the one in your conclusion. They should at least not contradict each other. Nor should they be identical: make the one in your conclusion more specific and contestable.

Include in the point sentence of your introduction key terms that name concepts and themes that run through your paper. Do this not only when your point sentence announces your main claim but also if it is just a launching point (see 12.1.1, 16.4.2).

For example, consider this introductory paragraph (much abbreviated). What does it imply about the point of the paper?

In the eleventh century, the Roman Catholic Church initiated several Crusades to recapture the Holy Land. In a letter to King Henry IV in the year 1074, Gregory VII urged a Crusade but failed to carry it out. In 1095 his successor, Pope Urban II, gave a speech at the Council of Clermont in which he also called for a Crusade, and in the next year, in 1096, he initiated the First Crusade. In this paper I will discuss the reasons for the Crusades.

The closest thing to a point sentence appears to be that vague last one. But it merely announces the Crusades as a topic.

Here are the first few sentences from the first paragraph of the conclusion (again, much abbreviated). What is its point?

The point sentence in the conclusion seems to be the second one (“But their efforts . . . apart”). That point is specific, substantive, and plausibly

contestable. We could add a shortened version of that point to the end of the introduction, or we could write a new sentence for the introduction that, while not revealing the full point, would at least introduce the key concepts of the paper more clearly:

In a series of documents, the popes proposed their Crusades to restore Jerusalem to Christendom, but their words suggest other issues involving **political concerns** about European and Christian **unity** in the face of **internal forces** that were **dividing** them.

13.3 REVISING YOUR ARGUMENT

Once you determine that the outer frame of your paper will work for readers, analyze its argument section by section. We know this seems to repeat earlier steps, but once drafted, your argument may look different from the way it did in your storyboard or outline.

13.3.1 Identify the Substance of Your Argument

Does the structure of your argument match the structure of your paper?

Is each reason supporting your main claim the point of a section of its own? If not, the organizing points of your paper may conflict with the structure of your argument.

Do you strike the right balance between reasons and evidence? In each section, identify everything that counts as evidence, all the summaries, paraphrases, quotations, facts, figures, graphs, tables— whatever you report from a primary or secondary source. If what you identify as evidence and its explanation are less than a third or so of a section, you may not have enough

evidence to support your reasons. If you have lots of evidence but few or no reasons, you may have just a data dump.

13.3.2 Evaluate the Quality of Your Argument

What might cause your readers to reject your argument?

Is your evidence reliable? In [chapter 9](#), we said that evidence should be accurate and precise, sufficient and representative, and authoritative (see 9.4). If you are close to a final draft, it may be too late to find more or better evidence. But you can check other matters:

Check your data and quotations against your notes.

Make sure your readers see how quotations and data relate to your claim.

Be sure you haven't skipped intermediate subreasons between a major reason and its supporting evidence.

Have you appropriately qualified your argument? Can you drop in a few appropriate hedges like *probably*, *most*, *often*, *may*, and so on?

Does your paper read like a conversation with peers or colleagues asking hard but friendly questions? If it reads like a contest between

competitors or if you haven't acknowledged alternative views or objections, go back through your argument and imagine a sympathetic but skeptical reader asking, *Why do you believe that? Are you really making that strong a point? Could you explain how this evidence relates to your point? But what about . . . ?* (Review 10.1–2.) Then answer the most important ones.

Have you expressed all the warrants you should? There is no easy test for this question. Once you identify each section and subsection of your argument, write in the margin its most important unstated warrant. Then ask whether readers will accept it. If not, you have to state and support it.

13.4 REVISING THE ORGANIZATION OF YOUR PAPER

Once you are confident about the outer frame of your paper and the substance of its argument, make sure that readers will find the whole paper coherent. To ensure that they do, check the following:

Do key terms run through your whole paper?

Circle key terms in the main point in your introduction and conclusion.

Circle those same terms in the body of your paper.

Underline other words related to concepts named by those circled terms.

Here again is that concluding paragraph about the Crusades, with its keywords circled:

If readers don't see at least one of those key terms in most paragraphs, they may think your paper wanders.

If you find a passage that lacks key terms, you might shoehorn a few in. If that's difficult, you may have gotten off track and need to rewrite or even discard that passage.

Is the beginning of each section and subsection clearly signaled? Could you quickly and confidently insert headings to mark where your major sections begin? If you can't, your readers probably won't recognize your organization. If you don't use headings, add an extra space at the major joints.

Does each major section begin with words that signal how that section relates to the one before it? Readers must not only recognize where sections begin and end, but understand why they are ordered as they are. Have you signaled the logic of your order with phrases such as

More important . . . , The other side of this issue is . . . , Some have objected that . . . , One complication is . . . , or even just *First, . . .*
Second, . . . ?

Is it clear how each section relates to the whole? For each section ask: *What question does this section answer?* If it doesn't answer one of the five questions whose answers constitute an argument (7.1), does it create a context, explain a background concept or issue, or help readers in some other way? If you can't explain how a section relates to your point, consider cutting it.

Is the point of each section stated in a brief introduction (preferably) or in its conclusion? If you have a choice, state the point of a section at the end of its introduction. Never bury it in the middle. If a section is longer than four or five pages, you might conclude by restating your point and summarizing your argument, especially if your argument is fact-heavy with names, dates, or numbers.

Do terms that unify each section run through it? Each section needs its own key terms to unify and uniquely distinguish it from the others. To test that, create a heading that uniquely distinguishes that section from all the others. Repeat step 1 for each section: find the point sentence and circle in it the key terms for that section (do not circle terms you circled in the main point of the whole paper). Check whether those terms run through that section. If you find no terms that differ from those running through the whole, then your readers may not see what new ideas that section contributes. If you find that some of the terms also run through another section, the two sections may only repeat each another. If so, consider combining them.

13.5 CHECKING YOUR PARAGRAPHS

You may have learned that every paragraph should begin with a topic sentence and be directly relevant to the section in which it appears. Those are good rules of thumb, but applied too strictly they can make your writing seem stiff. The important thing is to structure and arrange your paragraphs so that they lead your readers through the conversation you are orchestrating. Open each paragraph with a sentence or two that signal its key concepts. Doing that will help readers better understand what follows. If your opening doesn't also state the paragraph's point, then your last sentence should. Never bury the point in the middle.

Paragraphs vary in length depending on the type of writing in which they appear. For example, they tend to be shorter in brief research reports and longer in, say, critical essays or book chapters. Paragraphs should be long enough to develop their points but not so long that readers lose focus, which is simply to say they should be "just right" (another Goldilocks moment). If you find yourself stringing together choppy paragraphs of just a few lines, it may mean your points are not well developed. If you find yourself rolling out very long paragraphs of more than a page, it may mean that you are digressing. You can sometimes vary the lengths of your paragraphs for effect: use short paragraphs to highlight transitions or statements that you want to emphasize.

Some writers find it more natural to think not about their paragraphs but about their paragraph breaks. Use your paragraph breaks as you would the pauses in a conversation, for example, to rest after you make a strong point, to give your reader a moment to process a complex passage, or to signal a transition to a new idea.

13.6 LETTING YOUR DRAFT COOL, THEN PARAPHRASING IT

If you start your project early, you'll have time to let your revised draft cool. What seems good one day often looks different the next. When you return to it, don't read straight through; skim its top-level parts: its introduction, the first paragraph of each major section, and its conclusion. Then, based only on what you've read, paraphrase it for someone who hasn't read it. Does the paraphrase hang together? Does it accurately sum up your argument? Even better, ask someone else to skim your paper and summarize it: how well that reader summarizes your argument will predict how well your final readers will understand it. Finally, always consider your reader's advice, even if you do not follow every suggestion.

Quick Tip: Abstracts

An abstract is a paragraph that tells readers what they will find in a paper, an article, or a report. It should be shorter than an introduction but do three things that an introduction does:

- state the research problem

- announce key themes

- state the main point or a launching point that anticipates the main point

Abstracts differ from field to field, and some fields don't use them at all. But most abstracts follow one of three patterns. To determine which suits your field, ask your teacher or look in a standard journal. Here are examples of these patterns, adapted from the abstract to a recent article in political science (the third is the original).

1. Context + Problem + Main Point

This kind of abstract is an abbreviated introduction. It begins with a sentence or two to establish the context of previous research, continues with a sentence or two to state the problem, and concludes with the main result of the research.

Scholars have long assumed that democracy improves the quality of life for its citizens.*.context* But recent research has called this orthodoxy into question, suggesting that there is little or no relationship between a country's regime type and its level of human development.*.problem* In this article, we argue that democracy can be shown to advance human development, but only when considered as a historical phenomenon.*.main point*

2. Context + Problem + Launching Point

This pattern is the same as the previous one, except that the abstract states not specific results, only their general nature (see 12.1.1).

Scholars have long assumed that democracy improves the quality of life for its citizens,*.context* but recent research has called this orthodoxy into question, suggesting that there is little or no relationship between a country's regime type and its level of human development.*.problem* In this article, we review this body of work, develop a series of causal pathways through which democracy might improve social welfare, and test two hypotheses: (a) that a country's level of democracy in a given year affects its level of human development and (b) that its stock of democracy over the past century affects its level of human development.*.launching point*

3. Summary

A summary also states the context and the problem; but before reporting the result, it summarizes the rest of the argument, focusing either on the evidence supporting the result or on the procedures and methods used to achieve it. Here is the abstract as it was published:

Does democracy improve the quality of life for its citizens? Scholars have long assumed that it does,*.context* but recent research has called this orthodoxy into question.*.problem* This article reviews this body of work, develops a series of causal pathways through which democracy might improve social welfare, and tests two hypotheses: (a) that a country's level of democracy in a given year affects its level of human development and (b) that its stock of democracy over the past century affects its level of human development. Using infant mortality rates as a core measure of human development, we conduct a series of time-series—cross-national statistical tests of these two hypotheses. We find only slight evidence for the first

proposition, but substantial support for the second.*summary* Thus, we argue that the best way to think about the relationship between democracy and development is as a time-dependent, historical phenomenon.*main point*

Since this version includes a summary, the statement of the problem is slightly abbreviated. Notice, too, the opening sentence. Rather than stating the context in standard fashion, this version begins with what seems to be a rhetorical question—“Does democracy improve the quality of life for its citizens?”—just so it can then upend the implied answer. Even as compressed a form as an abstract allows for the occasional stylistic flourish.

A final tip: if you publish your research, some researcher down the line may want to find it, using a search engine that looks for keywords. So imagine searching for your paper yourself. What keywords would you look for? Put them in your title and the first sentence of your abstract.

14 Incorporating Sources

Nothing sets the experienced researcher apart from the beginner more than the effective use of sources. But even a beginning researcher can project an ethos of credibility by following a few principles that show respect both for the writer's sources and for readers.

14.1 QUOTING, PARAPHRASING, AND SUMMARIZING APPROPRIATELY

You must build your paper out of your own words that reflect your own thinking. But you'll support much of that thinking with quotations, paraphrases, and summaries. As we've said, different fields use them differently: researchers in the humanities quote more than do social and natural scientists, who typically paraphrase and summarize. But you must decide each case for itself, depending on how you use the information. Here again are some principles:

Summarize when details are irrelevant or a source isn't important enough to warrant much space. Paraphrase when you can state what a source says more clearly or concisely or when your argument depends on the details in a source but not on its specific words.

Quote for these purposes:

—The words themselves are evidence that backs up your reasons. —The words are from an authority who backs up your claims. —The words are strikingly original or express your key concepts so compellingly that the quotation can frame an extended discussion. —A passage states a view that you disagree with, and to be fair you want to state it exactly.

For every summary, paraphrase, or quotation you use, cite its bibliographic data in the appropriate style (see 14.5 and the Quick Tip). Under no circumstances stitch together downloads from the Web with a few sentences of your own. Teachers grind their teeth reading such papers, dismayed by their lack of original thinking. Readers of advanced projects reject such patchworks out of hand.

14.2 INTEGRATING DIRECT QUOTATIONS INTO YOUR TEXT

Signal direct quotations in one of two ways:

For four or fewer quoted lines, run them into your text, surrounded by quotation marks.

For five or more lines, set them off as an indented block.

You can insert run-in and block quotations in your text in three ways.

Drop in the quotation with a few identifying words (*Author says, According to Author, As Author puts it, etc.*).

Diamond says, “The histories of the Fertile Crescent and China . . . hold a salutary lesson for the modern world: circumstances change, and past primacy is no guarantee of future primacy” (417).

- Introduce the quotation with a sentence that interprets or characterizes it.

Diamond suggests what we can learn from the past: “The histories of the Fertile Crescent and China . . . hold a salutary lesson for the modern world . . .” (417).

Weave the grammar of the quotation into the grammar of your own sentence.

Diamond suggests that the chief “lesson for the modern world” in the history of the Fertile Crescent and China is that “circumstances change, and past primacy is no guarantee of future primacy” (417).

You can modify a quotation, so long as you don’t change its meaning and you signal deletions with three dots (called *ellipses*) and changes with square brackets. This sentence quotes the original intact:

Posner focuses on religion not for its spirituality, but for its social functions: “A notable feature of American society is religious pluralism, and we should consider how this relates to the efficacy of governance by social norms in view of the historical importance of religion as both a source and enforcer of such norms” (299).

This version modifies the quotation to fit the grammar of the writer’s sentence:

In discussing religious pluralism, Posner says that “a notable feature of American society is [our] religious pluralism” and notes how social norms affect “the efficacy of governance . . . in view of the historical importance of religion as both a source and enforcer of such norms” (299).

14.3 SHOWING READERS HOW EVIDENCE IS RELEVANT

By this point you may be so sure that your evidence supports your reasons that you’ll think readers can’t miss its relevance. But evidence never speaks for itself, especially not long quotations or complex sets of numbers. You must speak for such evidence by introducing it with a sentence stating what you want your readers to get out of it. For example, this passage bases a claim about Hamlet on the evidence of the following quotation:

When Hamlet comes upon his stepfather, Claudius, at prayer, he demonstrates cool rationality:*claim*

Now might I do it [kill him] pat, now ’a is a-praying, And now I’ll do’t.
And so ’a goes to heaven,

And so am I reveng’d. . . . [Hamlet pauses to think] [But this] villain
kills my father, and for that, I, his sole son, do this same villain send
To heaven.

Why, this is hire and salary, not revenge. (3.3)*report of evidence*

It is not clear how that quotation supports the claim, because nothing in it specifically refers to Hamlet’s rationality. In contrast, compare this:

When Hamlet comes upon his stepfather, Claudius, at prayer, he demonstrates cool rationality.*claim* **He impulsively wants to kill Claudius**

but pauses to reflect: if he kills Claudius while praying, he will send his soul to heaven, but he wants Claudius damned to hell, so he coolly decides to kill him later:*reason*

Now might I do it [kill him] pat, . . .*report of evidence*

Now we see the connection. (Do the same with tables and figures; see 15.3.1.)

Lacking a reason that explains the evidence, readers may not see what it *means*. So introduce complex evidence with a sentence explaining it.

14.4 THE SOCIAL IMPORTANCE OF CITING SOURCES

14.4.1 Citations Benefit You

Citations protect you from a charge of plagiarism, but beyond that narrow self-interest, correct citations contribute to your ethos. First, readers don't trust sources they can't find. If they can't find your sources because you failed to document them adequately, they won't trust your evidence; and if they don't trust your evidence, they won't trust your paper—or you. Second, many experienced researchers think that if a writer can't get the little things right, he can't be trusted on the big ones. Getting the details of citations right distinguishes reliable, experienced researchers from careless beginners. Finally, teachers assign research papers to help you learn how to integrate the research of others into your own thinking. Proper citations show that you have learned one important part of that process.

14.4.2 Citations Help Your Readers

Readers use citations before, while, and after they read your paper. Before, many experienced readers will preview your paper by skimming your list of sources to see whose work you read and whose you didn't. As they read, readers use citations to decide how much they can trust the reliability, currency, and completeness of your evidence. Papers with outdated or only very recent citations of sources found on the Internet alert readers to be skeptical. But papers whose citations show range and depth in engaging sources reassure readers. Finally, just as you depended on sources to start your bibliographical trail, so will some readers depend on *your* list to start theirs.

14.4.3 Citations Honor Your Sources

Finally, citations honor your sources. Few academic researchers get rich writing on topics such as “Ohio education, 1825–1850.” Their reward isn't money; it's the reputation they earn for doing good work and the pleasure they take in knowing that colleagues respect it enough to cite it—even in disagreement. Your sources may never know you cited them, but that doesn't matter. When you cite sources, you honor them by acknowledging your intellectual debts.

In short, when you cite sources fully and accurately, you sustain and enrich the sense of community that gives written research both its scholarly and social value.

14.5 FOUR COMMON CITATION STYLES

It would be easier if we all cited sources in the same style, but we don't. For academic research, there are two basic patterns, each with two common versions. The many differences among the styles can seem picky and irrelevant, but they matter to readers. So be sure to find out which style you should use, and consult the proper guide for your style. (You can also find reliable online guides.)

Many researchers today use citation software that automatically generates citations in the style they choose. Some teachers encourage this practice. Others feel that students should not rely on such assistance, but rather learn the details. If you don't know where your teacher stands on the issue, ask.

14.5.1 Two Basic Patterns: Author-Title and Author-Date

All citation forms begin with the name of the author, editor, or whoever else is responsible for the source. We distinguish styles by what follows the author. If the title follows the author, the style is called *author-title*.

Anes, Lee J. *A Story of Ohio: Its Early Days*. Boston: Hobson Press, 1988.

This pattern is common in the humanities.

If the date follows the author, the style is called *author-date*.

Anes, Lee. 1988. *A story of Ohio: Its early days*. Boston: Hobson Press.

This pattern is used in the natural sciences and most of the social sciences, because in those rapidly changing fields, readers want to know quickly how old a source is. They can spot dates more easily when they come at the beginning of a citation.

14.5.2 Two Author-Title Styles

There are two versions of author-title style, each based on a well-known style manual.

Chicago Author-Title Style: *The Chicago Manual of Style*, 16th ed.

(Chicago: University of Chicago Press, 2010). It is sometimes called

Turabian style, based on a widely used condensed manual: Kate L.

Turabian, *A Manual for Writers of Research Papers, Theses, and Dissertations*, 8th ed. (Chicago: University of Chicago Press, 2013). When using this style, you list your sources in a bibliography and cite them in your text with footnotes or endnotes.

MLA Style: *MLA Handbook for Writers of Research Papers*, 8th ed.

(New York: Modern Language Association, 2016). You are mostly likely to learn MLA (Modern Language Association) style in a literature or composition course. In this style, you give a list of works cited and cite your sources parenthetically in your text.

These styles differ only in minor details, but those details matter, so be sure to consult the proper style guide.

14.5.3 Two Author-Date Styles

There are two versions of author-date style, each based on a well-known style manual.

Chicago Author-Date Style: This style is also described in *The Chicago Manual of Style* and sometimes called Turabian style. When using it, you list your sources in a bibliography but cite them parenthetically in your text.

APA Style: *Publication Manual of the American Psychological*

Association, 6th ed. (Washington, DC: American Psychological Association, 2009). This style uses parenthetical citations as well.

Like the author-title styles, these styles differ only in minor details. But again, those details matter, so be sure to follow the prescriptions of the style you use down to the last comma, space, and capital letter.

14.6 GUARDING AGAINST INADVERTENT PLAGIARISM

It will be as you draft that you risk the worst mistake a researcher can make: you lead readers to think that you're trying to pass off as your own the work of another writer. Do that and you risk an accusation of plagiarism, a charge that, if sustained, could mean, for a professional writer, an irreparably damaged reputation or, for a student writer, a failing grade or even expulsion. Students know they cheat when they put their name on a paper purchased on the Internet or copied from a fraternity or sorority file. Most also know they cheat when they pass off as their own long passages copied directly from their sources. For those cases, there's nothing to say beyond *Don't*.

But many inexperienced writers don't realize when they risk being charged with plagiarism because they are careless or misinformed. You run that risk when you do any of the following:

You quote, paraphrase, or summarize a source but fail to cite it.

You use ideas or methods from a source but fail to cite it.

You use the exact words of a source and you do cite it, but you fail to put those words in quotation marks or in a block quotation.

You paraphrase a source and cite it, but you use words so similar to those of the source that anyone can see that as you paraphrased, you followed the source word by word.

14.6.1 Cite the Source of Every Quotation, Paraphrase, or Summary

You must cite your source every time you use its words, even if you only paraphrase or summarize them. If the quotations, paraphrases, or summaries come from different pages of your sources, cite each one individually. If a paraphrase or summary extends over several paragraphs, cite it only once at the end. (See the Quick Tip at the end of this chapter for guidance on citing sources in your text.)

The most common problem is not that students don't know that they should cite a source, but that they lose track of which words are theirs and which are borrowed. That's why we urged you in [chapter 6](#) to distinguish in your notes between quotations, paraphrases, and summaries of sources and your own analyses, thoughts, and commentary. Always include the citation as soon as you add a quotation because you may

not remember to do so later. Be especially careful to cite a paraphrase or summary as you draft it; otherwise, you may not even remember that it originated with a source.

14.6.2 Signal Every Quotation, Even When You Cite Its Source

Even if you cite the source, readers must know exactly which words are not yours, even if they are *as few as a single line*. It gets complicated, however, when you copy less than a line. Read this:

“Because technology begets more technology, the importance of an invention’s diffusion potentially exceeds the importance of the original invention. Technology’s history exemplifies what is termed an autocatalytic process: that is, one that speeds up at a rate that increases with time, because the process catalyzes itself” (Diamond 1998, 301).

If you were writing about Jared Diamond’s ideas, you would probably have to use some of his words, such as *the importance of an invention*. But you wouldn’t put that phrase in quotation marks, because it shows no originality of thought or expression.

Two of his phrases, however, are so striking that they do require quotation marks: *technology begets more technology* and *autocatalytic process*. For example:

The power of technology goes beyond individual inventions because “technology begets more technology.” It is, as Diamond puts it, an “autocatalytic process” (301).

Once you cite those words, you can use them again without quotation marks or citation:

As one invention begets another one and that one still another, the process becomes a self-sustaining catalysis that spreads across national boundaries.

This is a gray area: words that seem striking to some are not to others. If you put quotation marks around too many ordinary phrases, readers might think you’re naive, but if you fail to use them when readers think you should, they may suspect you of plagiarism. Since it’s better to seem naive than dishonest, especially early in your career, use quotation marks freely. (You must, however, follow the standard practices of your field. Lawyers, for example, often use the exact language of a statute or judicial opinion with no quotation marks.)

14.6.3 Don't Paraphrase Too Closely

You paraphrase appropriately when you represent an idea in your own words more clearly or pointedly than the source does. But readers will think that you plagiarize if they can match your words and phrasing with those of your source.

For example, here is a passage from Malcolm Gladwell's *Outliers: The Story of Success*:

"Achievement is talent plus preparation. The problem with this view is that the closer psychologists look at the careers of the gifted, the smaller the role innate talent seems to play and the bigger the role preparation seems to play" (38).

This too-close paraphrase is plagiarism:

Success seems to depend on a combination of talent and preparation. However, when psychologists closely examine the gifted and their careers, they discover that innate talent plays a much smaller role than preparation (Gladwell 38).

This paraphrase does not plagiarize:

As Gladwell observes, summarizing studies on the highly successful, we tend to overestimate the role of talent and underestimate that of preparation (38).

This phrasing is not a close match to the original. And notice that we chose not to put *talent* or *preparation* in quotes. We decided that those words are common enough to use as our own.

To avoid seeming to plagiarize, read the passage, look away, think about it for a moment; *then still looking away*, paraphrase it in your own words. Then check whether you can run your finger along your sentence and find synonyms for the same ideas in the same order in your source. If you can, try again.

14.6.4 Usually Cite a Source for Ideas Not Your Own

Most of our ideas are based on sources somewhere in history. But readers don't expect you to cite a source for the idea that the world is round. They do, however, expect you to cite a source for an idea when (1) the idea is associated with a specific person *and* (2) it's new enough *not* to be part of a field's common knowledge. For example, psychologists

claim that we think and feel in different parts of our brains. But no reader would expect you to cite a source for that idea, because it's so familiar that no one would think you are implying it is yours. On the other hand, some psychologists argue that emotions are crucial to rational decision making. That idea is so new and tied to particular researchers that you'd have to cite them.

14.6.5 Don't Plead Ignorance, Misunderstanding, or Innocent Intentions

Some students sincerely believe that they don't have to cite material downloaded from the Web because it's free and publicly available. They are wrong. Other students defend themselves by claiming they didn't *intend* to mislead. Well, we read words, not minds. Here is how to think about this issue: If the person you borrowed from read your writing, would she recognize your words or ideas as her own, including paraphrases, summaries, or even general ideas or methods? If so, you must cite that source and enclose any of her exact words in quotation marks or set them off in a block quotation. No exceptions, no excuses.

Why the Fuss over Honest Mistakes?

Some students wonder why teachers are so unforgiving of honest slip-ups. *What's the harm?*

First, they harm your credibility. One failure to acknowledge a source can lead readers to doubt your honesty, a career-ending judgment for an advanced student. But they matter even to a beginner. Your teacher is preparing you to write not for her but for others who will have only your words to judge your ethos. She needs to see that you know not only how to use sources thoughtfully but how to acknowledge them carefully and completely.

Other students think plagiarism is a victimless offense. It is not. Recently, two young scholars were praised when they used in a new way

methods and ideas published twenty years earlier. They mentioned their source in passing but failed to acknowledge their specific debt fully. In doing so, they not only claimed undeserved credit but deprived the older scholar of credit he deserved. Worse, by omitting the bibliographical trail that led to his work, they kept readers from rediscovering it. The credit he lost cost him not only reputation but also perhaps grants, promotions, and ultimately higher pay.

Quick Tip: Indicating Citations in Your Paper

You must indicate in your paper every place where you use a source. The three of the four most common citation styles—Chicago author-date style, MLA style, and APA style (see 14.5)—use parenthetical citations that direct readers to specific pages in the source, with enough information to find the corresponding entry in a list of sources.

Some have claimed that Castro would reform Cuban politics (Smith 1999, 233).

If you use Chicago author-title style, you may instead use a raised number, or superscript, that directs readers to a correspondingly numbered note at the bottom of the page or at the end of the paper.

Some have claimed that Castro would reform Cuban politics.⁵

5. George Smith, *Travels in Cuba* (Boston: Hasbro Press, 1999), 233.

PARENTHETICAL CITATIONS

A parenthetical (or in-text) citation includes only the information a reader needs to locate the source in a list of sources at the end of your paper. Depending on your field, that list will be called your bibliography, references, or works cited. What you include in an in-text citation depends first on whether you use author-title or author-date citation style. For example, here are the author-title forms for citing a single-author work if you do not mention the author in your sentences and you have only one work by that author in your list of sources:

Chicago Author-Title (Author, page[s])

Only one writer provides data on this matter (Kay, 220).

MLA (Author page[s])

Only one writer provides data on this matter (Kay 220).

If in your list of sources you list more than one publication for an author, you must add a short title so that readers will know which publication you are citing. In this case, the format in both styles is the same:

Chicago Author-Title and MLA (Author, *Short Title*, page[s]) Only one writer provides data on this matter (Kay, *A Life*, 220).

In author-date style, you must add the date to every citation:

Chicago Author-Date (Author date, page[s])

Only one writer provides data on this matter (Kay 2006, 220).

APA (Author, date, p. xxx)

Only one writer provides data on this matter (Kay, 2006, p. 220).

If you have mentioned the author, drop the name from the citation:

Chicago Author-Date: Kay is the only writer who provides data on this matter (2006, 220).

MLA: Kay is the only writer who provides data on this matter (220).

APA: Kay is the only writer who provides data on this matter (2006, p. 220).

There are additional rules for citations if a work has more than one author, if you cite more than one work by the same author, and so on. For these, consult the appropriate guide.

NOTES AND BIBLIOGRAPHY

In Chicago author-title style, you use notes—footnotes at the bottom of the page or endnotes following the paper—to direct readers to sources in a bibliography. Notes include the same information as a bibliography entry, but the form differs in three ways: notes list names not last name, first name, but first name last name; individual elements of a note are separated by commas rather than periods; and publication data are in parentheses.

NOTE FORM: 5. George Smith, *Travels in Cuba* (Boston: Hasbro Press, 1999), 233.

BIBLIOGRAPHY FORM: Smith, George. *Travels in Cuba*. Boston: Hasbro Press, 1999.

For details, consult the Turabian guide or *The Chicago Manual of Style*. Researchers are increasingly using parenthetical citations rather than notes, because notes duplicate the information listed in a bibliography. If in doubt, ask your teacher.

15 Communicating Evidence Visually

Most readers grasp quantitative evidence more easily in tables, charts, and graphs than they do in words. But some visual forms suit particular data and messages better than others. In this chapter, we show you how to choose the graphic form that best helps readers both grasp your data and understand how they support your argument.

15.1 CHOOSING VISUAL OR VERBAL REPRESENTATIONS

When the data are few and simple, readers can grasp them as easily in a sentence as in a table:

In 2013, on average, men earned \$50,033 a year and women \$39,157, a difference of \$10,876.

TABLE 15.1. Male-female salaries (\$), 2013

But if you present more than a few numbers, readers will struggle to keep them straight:

Between 1970 and 2010, the structure of families changed in two ways. In 1970, 85 percent of families had two parents, but in 1980 that number declined to 77 percent, then to 73 percent in 1990, to 68 percent in 2000, and to 64 percent in 2010. The number of one-parent families rose, particularly families headed by a mother. In 1970, 11 percent of families were headed by a single mother. In 1980, that number rose to 18 percent, in 1990 to 22 percent, and to 23 percent in 2000. There were some marginal changes among single fathers (headed 1 percent of the families in 1970, 2 percent in 1980, 3 percent in 1990, and 4 percent in 2000). Families headed by no adult remained stable at 3–4 percent.

A note on terminology: We use the term *graphics* for all visual representations of data. Traditionally, graphics are divided into *tables* and *figures*. A table is a grid with columns and rows. Figures are all other graphic forms, including graphs, charts, photographs, drawings, and diagrams. Figures that present quantitative data are divided into *charts* and *graphs*. Charts typically consist of bars, circles, points, or other shapes; graphs consist of continuous lines.

15.2 CHOOSING THE MOST EFFECTIVE GRAPHIC

When you graphically present data as complex as in that paragraph, the most common choices are tables, bar charts, and line graphs, each of which has a distinctive rhetorical effect.

A table seems precise and objective. It emphasizes discrete numbers and requires readers to infer relationships or trends on their own (unless you state them in an introductory sentence)

Charts and line graphs present a visual image that communicates values less precisely than do the exact numbers of a table but with more impact. But charts and graphs also differ. A bar chart emphasizes contrasts among discrete items:

How many choices you should consider depends on your experience. If you're new to quantitative research, limit your choices to basic tables, bar charts, and line graphs. Your computer software offers more choices, but ignore those that you aren't familiar with. If you're doing advanced research, readers will expect you to draw from a larger range of graphics favored in your field. In that case, consult [table 15.7](#), which describes the rhetorical uses of other common forms. You may have to consider even more creative ways of representing data if you are writing a dissertation or article in a field that routinely displays complex relationships in large data sets. (See the bibliography for additional resources.) What follows is a guide to the basics of tables, charts, and graphs.

15.3 DESIGNING TABLES, CHARTS, AND GRAPHS

Computer programs create graphics so dazzling that many writers let their software determine their design. That's a mistake. Readers don't care how fancy a graphic looks if it doesn't communicate your point clearly. Here are some principles for designing effective graphics. To follow them, you may have to change default settings in your graphics software.

15.3.1 Frame Each Graphic to Help Readers Understand It

A graphic representing complex numbers rarely speaks for itself. You must frame it to show readers what to see in it and how to understand its relevance to your argument:

Label every graphic in a way that describes its data. For a table, the label is called a *title* and is set flush left above the table; for a figure, the label is called a *legend* and is set flush left below the figure. Keep titles and legends short but descriptive enough to distinguish every graphic from every other one.

- Avoid making the title or legend a general topic.

NOT: Heads of households

BUT: Changes in one- and two-parent heads of households, 1970–2010

Do not give background information or characterize what the data imply.

NOT: Weaker effects of counseling on depressed children before professionalization of staff, 1995–2004

BUT: Effect of counseling on depressed children, 1995–2004

Be sure labels distinguish graphics presenting similar data. **NOT:** Risk factors for high blood pressure

BUT: Risk factors for high blood pressure among men in Cairo, Illinois

OR: Risk factors for high blood pressure among men in St. Louis, Missouri

Insert into the table or figure information that helps readers see how the data support your point. For example, if numbers in a table show a trend

and the size of the trend matters, indicate the change in a final column. If a line on a graph changes in response to an influence not mentioned on the graph, add text to the image to explain it.

Although reading and math scores declined by almost 100 points following redistricting, that trend reversed when supplemental math and reading programs were introduced.

Introduce the table or figure with a sentence that explains how to interpret it. Then highlight what it is in the table or figure that you want readers to focus on, particularly any number or relationship mentioned in that introductory sentence. For example, we have to study [table 15.3](#) to understand how it supports the sentence before it:

Most predictions about increased gasoline consumption have proved wrong.

15.3.2 Keep All Graphics as Simple as Their Content Allows

Some guides encourage you to cram as much data as you can into a graphic. But readers want to see only the data relevant to your point, free of distractions. For all graphics:

Include only relevant data. If you include data only for the record, label it accordingly and put it in an appendix.

Keep the visual impact simple.

Box a graphic only if you group two or more figures.

Do not color or shade the background.

FOR TABLES

Never use both horizontal and vertical dark lines to divide columns and rows. Use light gray lines only if the table is complex or you want to direct your reader's eyes in one direction to compare data.

For tables with many rows, lightly shade every fifth row.

FOR CHARTS AND GRAPHS

Use background grid lines only if the graphic is complex or readers need to see precise numbers. Make them light gray.

Color or shade lines or bars only to show a contrast. Use color only if

the text will be printed in color and not photocopied later. (Black-and-white photocopies make many colors look alike.)

Never use iconic bars (for example, images of cars to represent automobile production) or add a third dimension merely for effect. Both look amateurish and can distort how readers judge values.

Plot data on three dimensions only when your readers are familiar with such graphs and you cannot display the data in any other way.

Use clear labels.

Label all rows and columns in tables and both axes in charts and graphs.

Use tick marks and labels to indicate intervals on the vertical axis of a graph.

If possible, label lines, bar segments, and the like on the image rather than in a legend set to the side. Use a legend only if labels would make the image too complex to read.

When specific numbers matter, add them to bars or segments in charts or to dots on lines in graphs.

15.4 SPECIFIC GUIDELINES FOR TABLES, BAR CHARTS, AND LINE GRAPHS

15.4.1 Tables

Tables with lots of data can seem dense, so organize them to help readers.

Order the rows and columns by a principle that lets readers quickly find what you want them to see. Do not automatically choose alphabetic order.

Round numbers to a relevant value. If differences of less than 1,000 don't matter, then 2,123,499 is irrelevantly precise.

Sum totals at the bottom of a column or at the end of a row, not at the top or left.

15.4.2 Bar Charts

Bar charts communicate as much by visual impact as by specific numbers. But bars arranged in no pattern imply no point. If possible, group and arrange bars to create an image that matches your message. For example, look at [figure 15.4](#) in the context of the explanatory sentence before it. The items are listed alphabetically, an order that doesn't help readers see the point.

Most of the world's deserts are concentrated in North Africa and the Middle East

Figure 15.4. World's ten largest deserts

In contrast, [figure 15.5](#) supports the claim with a coherent image.

Most of the world's deserts are concentrated in North Africa and the Middle East.

Figure 15.5. World distribution of large deserts

In standard bar charts, each bar represents 100 percent of a whole. But sometimes readers need to see specific numbers for parts of the whole. You can do that in two ways:

Divide the bars into proportional parts, creating a "stacked" bar.

Give each part of the whole its own bar, then group the parts into clusters.

Use stacked bars only when you want readers to compare whole values for different bars rather than their divided segments, because readers can't easily compare the proportions of segments by eye alone. If you do use stacked bars, do this:

Arrange segments in a logical order. If possible, put the largest segment at the bottom in the darkest shade.

Label segments with specific numbers and to assist comparisons; connect corresponding segments with gray lines.

Compare figures [15.6](#) and [15.7](#):

Figure 15.6. World generation of nuclear energy, 1980–1999

Figure 15.7. Largest generators of nuclear energy, 1980–1999

If you group bars because segments are as important as the wholes, do this:

Arrange groups in a logical order; if possible put bars of similar size next to one another (order bars in the same way through all the groups).

Label groups with the number for the whole, either above each group or below the labels on the bottom.

Most data that fit a bar chart can also be shown in a pie chart. Pie charts are popular in magazines, tabloids, and annual reports. While splashy, they are harder to read than bar charts. Readers must compare proportions of segments whose sizes are often hard to judge. But pie charts have their place, especially to communicate qualitative impressions about the comparative size of data, either to show that one segment is disproportionately larger than the rest or that the data is divided into many small segments. Avoid using pie charts to convey quantitative data, however. Use bar charts instead.

15.4.3 Line Graphs

Because a line graph emphasizes trends, readers must see a clear image to interpret it correctly. Do the following:

Choose the variable that makes the line go in the direction, up or down, that supports your point. If the good news is a reduction (down) in high school dropouts, you can more effectively represent the same data as a rising line indicating increase in retention (up). If you want to emphasize bad news, find a way to represent your data as a falling line.

Plot more than six lines on one graph only if you cannot make your point in any other way.

If you have fewer than ten or so data points, indicate them with dots. If only a few are relevant, insert numbers to show their exact value.

Do not depend on different shades of gray to distinguish lines, as in [figure 15.8](#).

Compare [figure 15.8](#) and [figure 15.9](#):

Figure 15.8. Foreign-born residents in the United States, 1870–1990

Figure 15.9. Foreign-born residents in the United States, 1870–1990

[Figure 15.8](#) is harder to read because the shades of gray do not distinguish the lines well against the background and because our eyes have to flick back and forth to connect the lines to the legend. [Figure 15.9](#) makes those connections clearer.

These different ways of showing the same data can be confusing. To cut through that confusion, test different ways of representing the same data. Construct alternative graphics; then ask someone unfamiliar with the data to judge them for impact and clarity. Be sure to introduce the figures with a sentence that states the claim you want the figure to support.

15.5 COMMUNICATING DATA ETHICALLY

Your graphic must be not only clear and accurate, but honest. Do not distort the image of the data to make your point. For example, the two bar charts below display identical data, yet imply different messages:

Figure 15.10. Capitol City pollution index, 1982–1994

The 0–100 scale in the figure on the left creates a fairly flat slope, which makes the drop in pollution seem small. The vertical scale in the figure on the right, however, begins not at 0 but at 80. When a scale is so truncated, it creates a sharper slope that exaggerates small contrasts.

Graphs can also mislead by implying false correlations. Someone might claim that unemployment goes down as union membership goes down and offer [figure 15.11](#) as evidence. And indeed, in that graph, union membership and the unemployment rate do seem to move together so closely that a reader might infer one causes the other:

Figure 15.11. Union membership and unemployment rate, 1993–1999

But the scale for the left axis (union membership) differs from the scale for the right axis (the unemployment rate), making it seem that the two trends could be causally related. They may be, but that distorted image doesn't prove it.

Graphs can also mislead when the image encourages readers to misjudge values. The two charts in [figure 15.12](#) represent exactly the same data but seem to communicate different messages:

Figure 15.12. Representation of suburban counties in state university undergraduates (percent of total)

The charts in [figure 15.12](#) are both stacked area charts. Despite their visual differences, they represent the same data. Area charts such as these represent changes in values not by the *angles* of the lines, but by the areas *between* them. In both charts, the bands for south, east, and west are roughly the same width throughout, indicating little change in the values they represent. The band for the north, however, widens sharply, representing a sharp increase in the numbers it represents. In the chart on the left, readers could easily

misjudge the top three bands, because they are on top of the rising north band, making those bands seem to rise as well. In the chart on the right, on the other hand, those three bands do not rise because they are on the bottom. Now only the band for the north rises.

Here are four guidelines for avoiding visual misrepresentation:

- Do not manipulate a scale to magnify or reduce a contrast.

- Do not use a figure whose image distorts values.

- Do not make a table or figure unnecessarily complex or misleadingly simple.

- If the table or figure supports a point, state it.

16 Introductions and Conclusions

A good introduction encourages readers to read your work with interest and prepares them to understand it better. A good conclusion leaves them with a clear statement of your point and renewed appreciation of its significance. In this chapter, we show you how to write both. The time you spend revising your introduction and conclusion may be the most important revision you do.

Once you think you have a draft that works, you're ready to write your final introduction and conclusion. Some writers think that means following the standard advice: *Grab their attention with something snappy or cute*. That's not useless advice, but readers want more than cute and snappy. In [part II](#), we showed you how to develop a project around a research problem. Here, we show you how to use that problem to engage your readers. What seizes their attention is a problem they think needs a solution, and what holds it is a promise that you've found it. As we've said, you can always work with readers who say, *I don't agree*. What you can't survive are those who shrug and say, *I don't care*.

16.1 THE COMMON STRUCTURE OF INTRODUCTIONS

As we've emphasized, different research communities do things in different ways, but nowhere do those differences seem greater than in their introductions. These three condensed examples are from the fields of cultural criticism, computer design, and legal history. But while they look different on the surface, their underlying structures are identical.

Why can't a machine be more like a man? In almost every episode of *Star Trek: The Next Generation*, the android Data wonders what makes a person a person. In the original *Star Trek*, similar questions were raised by the half-Vulcan Mr. Spock, whose status as a person was undermined by his machinelike logic and lack of emotion. In fact, Data and Spock are only the most recent "quasi-persons" who have explored the nature of humanity. The same question has been raised by and about creatures ranging from Frankenstein's monster to the Terminator. But the real question is why these characters who struggle to be persons are always white and male. As cultural interpreters, do they tacitly reinforce destructive stereotypes of what it means to be "normal"? The model person seems in fact to be defined by Western criteria that exclude most of the people in the world.

As part of its program of Continuous Quality Improvement (CQI),

Motodyne Computers plans to redesign the user interface for its Unidyne™ online help system. The specifications for its interface call for self-explanatory icons that let users identify their function without verbal labels. Motodyne has three years' experience with its current icon set, but it has no data showing which icons are self-explanatory. Lacking such data, we cannot determine which icons to redesign. This report provides data for eleven icons, showing that five of them are not self-explanatory.

In today's society, would Major John André, a British spy in civilian clothes captured behind American lines in 1780, be hanged? Though considered a noble patriot, he suffered the punishment mandated by military law. Over time our traditions have changed, but the punishment for spying has not. It is the only offense that mandates death. Recently, however, the Supreme Court has rejected mandatory death sentences in civilian cases, creating an ambiguity in their application to military cases. If Supreme Court decisions apply to the military, will Congress have to revise the Uniform Code of Military Justice? This article concludes that it will.

The topics and problems posed in those three introductions differ as much as their intended readers, but behind them is a shared pattern that readers look for in all introductions, regardless of field. That common structure consists of three elements:

Contextualizing background statement of the problem response to the problem

Not every introduction has all three elements, but most do.

Here is that pattern of *Context* + *Problem* + *Response* in each of those introductions:

CONTEXT: Why can't a machine be more like a man? . . . The same question has been raised by and about creatures ranging from Frankenstein's monster to the Terminator.

PROBLEM: But the real question is . . . do they tacitly reinforce destructive stereotypes of what it means to be "normal"?

RESPONSE: The model person seems in fact to be defined by Western criteria that exclude most of the people in the world.

CONTEXT: As part of its program of Continuous Quality Improvement (CQI), Motodyne Computers plans to redesign the user interface. . . .
Motodyne has three years' experience with its current icon set . . .

PROBLEM: but it has no data showing which icons are self-explanatory.

Lacking such data, we cannot determine which icons to redesign.

RESPONSE: This report provides data for eleven icons, showing that five of them are not self-explanatory.

CONTEXT: In today's society, would Major John André . . . be hanged [for spying]? . . . It is the only offense that mandates death.

PROBLEM: Recently, however, the Supreme Court has rejected mandatory death sentences in civilian cases, creating an ambiguity in their application to military cases. . . . Will Congress have to revise the Uniform Code of Military Justice?

RESPONSE: This article concludes that it will.

Each of those elements plays its own role not only in motivating readers to read your paper, but in helping them understand it.

16.2 STEP 1: ESTABLISHING A CONTEXT

The opening context establishes *common ground*, a shared understanding between reader and writer about the larger issue the writer will address. But it does more, illustrated by the opening of a fairy tale:

Like the opening to most fairy tales, this one establishes an unproblematic, even happy context, just so that it can be disrupted with a problem:

The rest of the story elaborates that problem and then resolves it.

Unlikely though it may seem, most introductions follow the same strategy. They open with the stable context of a common ground—some apparently unproblematic account of research already known. The writer then disrupts it with a problem, saying in effect: *Reader, you may think you know something, **but** your knowledge is flawed or incomplete.*

STABLE CONTEXT: In today's society, would Major John André, a British spy . . . be hanged? . . . [Spying] is the only offense that mandates death.

DISRUPTING PROBLEM: Recently, **however**, the Supreme Court has rejected mandatory death sentences. . . .

Not every research paper opens with common ground. This one opens directly with a problem:

Recently the chemical processes that thin the ozone layer have been found to be less well understood than once thought. We may have labeled hydrofluorocarbons as the chief cause incorrectly.

Some readers might find that problem disturbing enough to motivate their reading, but we can heighten its punch by introducing it with the seemingly unproblematic context of prior research, *specifically so that we can disrupt it*:

As we have investigated environmental threats, our understanding of chemical processes in acid rain and the buildup of carbon dioxide has improved, allowing us to understand better their effects on the biosphere.*.stable context* [Sounds good.] **But recently the processes that thin the ozone layer have been found to be less well understood than once thought.***.destabilizing condition* We may have labeled hydrofluorocarbons as the chief cause incorrectly.*.consequence*

Readers now have not one reason to see their self-interest in the problem, but two: not just the problem itself, but also their incomplete understanding of the whole matter.

Your context can describe a misunderstanding:

The Crusades are widely believed to have been motivated by religious zeal to restore the Holy Land to Christendom.*.stable context* In fact, the motives were at least partly, if not largely, political.

It can survey flawed research:

Few sociological concepts have fallen out of favor as fast as Catholicism's alleged protective influence against suicide. Once one of sociology's basic beliefs, it has been called into question by a series of studies in both Europe and North America. . . .*.stable context* However, certain studies still find an effect of religion . . .

Or it can point to a misunderstanding about the problem itself:

American education has focused on teaching children to think critically, to ask questions and test answers.*.stable context* But the field of critical thinking has been taken over by fads and special interests.

Some inexperienced researchers skimp on common ground, opening their paper as if they were picking up a class conversation where it left off. Their introductions are so sketchy that only others in the course would understand them:

In view of Hofstadter's failure to respect the differences among math, music, and art, it is not surprising that the response to *The Embodied Mind* would be stormy. It is less clear what caused the controversy. I will argue that any account of the human mind must be interdisciplinary. . . .

When you draft your introduction, imagine you are writing to someone who has read some of the same sources as you and is generally interested in the same issues, but does not know what specifically happened in your class.

Others make the opposite mistake, thinking they should list every source they read that remotely touches their topic. Survey only those sources whose findings you will *directly* modify. Add more *only* if you need to locate the problem in a wider context.

16.3 STEP 2: STATING YOUR PROBLEM

Once you establish a stable context or common ground, disrupt it with a problem. As we've said, the statement of a research problem has two parts (see [chapter 4](#)):

a *condition* of incomplete knowledge or understanding, and
the *consequences* of that condition, a more significant gap in understanding

You can state the condition directly:

. . . but Motodyne has no data showing which icons are self-explanatory.

Or you can imply it in an indirect question:

The real question is why these characters are always white and male.

You make this condition of ignorance or flawed understanding part of a *full* research problem *only* when you imagine someone asking, *So what?*, and then spell out as an

answer the *consequence* of that flawed understanding. You can state that consequence as a direct cost:

Lacking such data, we cannot determine which icons to redesign.*.cost*

Or you can transform the cost into a benefit:

With such data, we could determine which icons to redesign.*.benefit*

The choice between stating a cost and stating a benefit is not just a matter of style. Some research indicates that readers are more motivated by a real cost than by a potential benefit. Our suggestion: state costs or consequences when presenting your problem; state benefits to intensify your solution. That's the straightforward version of stating a problem; there are variations.

16.3.1 When Should You State the Condition of a Problem Explicitly? Occasionally, you tackle a problem so familiar that its name implies both its condition and consequence to those in the field: *the role of DNA in personality*; *Shakespeare's knowledge of foreign languages*. Likewise, in some fields like mathematics and the natural sciences, many research problems are widely known, so just stating the condition is enough to bring to mind its consequence. Here again is that (condensed) introduction to Crick and Watson's landmark account of the double-helix structure of DNA:

We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological interest. A structure for nucleic acid has already been proposed by Pauling and Corey. They kindly made their manuscript available to us in advance of publication. Their model consists of three intertwined chains, with the phosphates near the fibre axis, and the bases on the outside. In our opinion, this structure is unsatisfactory. . . .

It was enough for them merely to "suggest" a structure for DNA, because they knew everyone wanted to know what it was. (Note, though, that they do raise a problem by mentioning Pauling and Corey's *incorrect* model.)

In the natural sciences and most social sciences, researchers usually address questions familiar to their readers. In that case, you might think you do not need to spell out your problem. But readers won't know the *particular* flaw in their knowledge that your research will correct unless you tell them.

In the humanities and some social sciences, researchers more often pose questions that they alone have found or even invented, questions that readers find new and often surprising. In that case, you must explicitly describe the gap in knowledge or flawed understanding that you intend to resolve.

16.3.2 Should You Spell Out Consequences and Benefits?

To convince readers that they should take your problem seriously, you must state the cost *they* will pay if it is not resolved or the benefits *they* gain if it is. Sometimes you can describe tangible costs that your research helps your readers avoid (see 4.1):

Last year the River City Supervisors agreed that River City should add the Bayside development to its tax base. Their plan, however, was based on little economic analysis. If the Board votes to annex Bayside without understanding what it will cost the city, **the Board risks worsening River City's already shaky fiscal situation.** When the burden of bringing sewer

and water service up to city code are included in the analysis, the annexation will cost more than the Board assumes.

This is the kind of problem that motivates *applied* research. The area of ignorance (no economic analysis) has tangible consequences (higher costs).

In pure research, you formulate the same kind of problem when you explain the consequence not in money, but as misunderstanding or, alternatively, as the possible benefit of better understanding:

Since 1972 American cities have annexed upscale neighborhoods to prop up tax bases, often bringing disappointing economic benefits. But those results could have been predicted had they done basic economic analysis. The annexation movement is a case study of how political decisions at the local level fail to use expert information. What is puzzling is why cities do not seek out that expertise. **If we can discover why cities fail to rely on basic economic analyses, we might better**

understand why their decision making fails so often in other areas as well.

This paper analyzes the decision-making process of three cities that annexed surrounding areas without consideration of economic consequences.

16.3.3 Testing Conditions and Consequences

In [chapter 4](#) we suggested a way to test how clearly you articulate the consequences of not solving a problem: after the sentences that best state your readers' condition of ignorance or misunderstanding, ask, *So what?*

Motodyne has no data showing which icons are self-explanatory. [*So what?*] Without such data, it cannot determine which icons to redesign.

Stories about the Alamo in Mexican and U.S. versions differ in obvious ways, but U.S. versions from different eras also differ. [*So what?*] Well . . .

Answering *So what?* can be exasperating, even dismaying. If you fall in love with stories about the Battle of the Alamo, you can pursue them to your heart's content, without having to answer to anyone but yourself: *I just like reading about them*. But for others to appreciate your research, you have to "sell" them on its significance. Otherwise, why should they spend time on it? To convince readers to care about your work, you have to show them that your problem is their problem—even if they don't know it yet. You have to convince them that if they go on not knowing, say, how Hollywood turned the Alamo story into myth, they will fail to understand something more important about national identity. To be sure, some readers will ask again, *So what? I don't care about national identity*. To which you can only shrug and think, *Wrong audience*. Successful researchers know how to find and solve interesting problems, but they also know how to find (or create) an audience interested in the problems they solve.

If you are sure your readers know the consequences of your problem, you might decide not to state them explicitly. Crick and Watson did not specify the cost of not knowing the structure of DNA, because they knew their readers already recognized that without understanding the structure of DNA, they could not understand genetics (something more important). Had Crick and Watson spelled out that consequence, it might have seemed redundant or condescending.

If you are tackling your first research project, no reasonable teacher will expect you to state the consequences of your problem in detail, because you probably don't yet know why other researchers think it is significant. But you take a big step in that direction when you can state your own incomplete knowledge or flawed understanding in a way that shows you are committed to improving it. You take an even bigger step when you can show that by better understanding one thing, you better understand something much more important, even if only to you.

16.4 STEP 3: STATING YOUR RESPONSE

Once you disrupt your readers' stable context with a problem, they expect you to resolve it in one of two ways: by stating your solution or main point or by promising that you will do so later on. Readers look for this statement or promise in the last few sentences of your introduction.

16.4.1 State the Gist of Your Solution

You can state your main point/solution explicitly toward the end of your introduction:

16.4.2 Promise a Solution

Alternatively, you can delay your main point by stating toward the end of your introduction only where your paper is headed, implying that you will present that point in your conclusion. This approach provides a launching point and creates a point-last paper:

As we have investigated environmental threats, our understanding . . . has improved. . . . But recently the chemical processes . . . have been found to be less well understood. . . . [So *what?*] We may have labeled hydrofluorocarbons as the chief cause incorrectly. [Well, *what have you found?*] **In this report we describe a hitherto unexpected chemical bonding between . . .***promise of point to come*

This introduction launches us into the paper, not with its main point but with a promise of one to come.

The weakest promise is one that merely announces a vague topic
This study investigates processes leading to ozone depletion.

When you save your point for the end of your paper, you ask your readers to trust that getting to it is worth their effort. You build this trust in your introduction by giving them not just a general topic but an outline of your solution or a plan for your argument (or both).

There are many designs for hydroelectric turbine intakes and diversion screens, but on-site evaluation is not cost-effective. A more viable alternative is computer modeling. **To evaluate hydroelectric diversion screens, this study will evaluate three computer models—Quattro, AVOC, and Turbo-plex—to determine which is most cost-effective in reliability, speed, and ease of use.**

This kind of plan is common in social sciences, but less frequent in the humanities, where many consider it a bit heavy-handed.

16.5 SETTING THE RIGHT PACE

When crafting your introduction, you must decide how quickly to raise your problem. That depends on how much your readers know. In this next example, the writer devotes one sentence to announcing a consensus among well-informed engineers and then briskly disrupts it:

Fluid-film forces in squeeze-film dampers (SFDs) are usually obtained from the Reynolds equation of classical lubrication theory. **However, the increasing size of rotating machinery requires the inclusion of fluid inertia effects in the design of SFDs. Without them . . .**

(We have no idea what any of that means, but the structure of *Context + Problem* is clear.)

This next writer also addresses technical concepts but patiently lays them out for readers who have little technical knowledge:

A method of protecting migrating fish at hydroelectric power developments is diversion by screening turbine intakes . . . [*another 110 words explaining screens*]. Since the efficiency of screens is determined by the interaction of fish behavior and hydraulic flow, screen design can be evaluated by determining its hydraulic performance . . . [*40 more words explaining hydraulics*]. **This study provides a better understanding of the hydraulic features of this technique, which may guide future designs.**

The pace of an introduction varies by field. Researchers whose problems are already familiar to their research communities can open quickly; those who work in fields where problems are not widely shared must start more slowly. But the pace of your introduction signals something else as well. When you open quickly, you imply an audience of peers; when you open slowly, you imply readers who know less than you. If your readers are knowledgeable and you open slowly, they may think *you* know too little. But if they know little and you open quickly, they may think you are inconsiderate of their needs.

16.6 ORGANIZING THE WHOLE INTRODUCTION

When organizing your introduction, you have many choices, but they are not as complicated as they might seem. They all follow what is in fact a simple “grammar.” A full introduction consists of just three elements:

Context + Problem + Response

You don’t need all three in every introduction:

If the problem is well known, omit the common ground.

If the consequences of the problem are well known, omit them.

If you want readers to follow your thinking before they know your answer, offer a launching point at the end of your introduction and state your main point in your conclusion.

All this may seem formulaic, but it’s what readers expect. And when you master a rhetorical pattern like this, you have more than a formula for writing. You also have a tool for thinking. To write a full statement of your shared context and problem, you have to think hard about what your readers know, what they don’t, and, in particular, what they should know and why.

16.7 FINDING YOUR FIRST FEW WORDS

Many writers find the first sentence or two especially difficult to write, and so they fall into clichés.

Don’t repeat the language of your assignment. If you are struggling to start, prime your pump by paraphrasing it, but when you revise, rewrite it.

Don’t start with a dictionary entry: “*Webster’s* defines *ethics* as . . .” If a word is important enough to define, a dictionary definition won’t serve.

Don’t start grandly: “The most profound philosophers have for centuries wrestled with the important question of . . .” If your subject is grand, it will speak its own importance.

These miscues arise from a good impulse: they are attempts to establish a shared context or common ground with a community of readers. The problem in all cases is that it is the

wrong community. In that first example, the community is too narrow: it is just the student's teacher. In the other examples, the community is too broad: those writers are groping for a context that all of humanity could agree to. To avoid these missteps, open in a way that is likely to appeal to the *specific community of readers* you hope to interest. Here are three standard choices for your first sentence or two.

16.7.1 Open with a Striking Fact Relevant to Your Problem

Those who think that tax cuts for the rich stimulate the economy should contemplate the fact that the top 1 percent of Americans control one-third of America's total wealth.

16.7.2 Open with a Striking Quotation

Do this only if its words anticipate key terms in the rest of your introduction:

"From the sheer sensuous beauty of a genuine Jan van Eyck there emanates a **strange fascination** not unlike that which we experience when permitting ourselves to be **hypnotized** by **precious stones**." Edwin Panofsky suggests here something **strangely magical** in Jan van Eyck's works. His images hold a **jewel-like** fascination. . . .

16.7.3 Open with a Relevant Anecdote

Do this only if its language anticipates your topic and vividly illustrates your problem. Here are the opening sentences of an article recounting the rise and fall of a Chicago street gang:

On a park bench in July 1996, Cynthia, Laurie, and other senior officers of the Black Sisters United (BSU)—Chicago's largest federation of "girl gangs"—reflected on their efforts to sustain an organization that could represent and act on behalf of young African-American women in the city. "We was so close!" Cynthia said with deep anguish, sitting upright and looking about to see if anyone had heard her.

16.8 WRITING YOUR CONCLUSION

Even if your argument doesn't have a section labeled *Conclusion*, it will have a paragraph or two that serve as one. Your conclusion is an occasion to sum up your argument, but just as important, it is an opportunity to extend your research community's conversation by

suggesting new questions your research has allowed you to see. You may be happy to know that you can write your conclusion using the same elements in your introduction, in reverse order.

16.8.1 Start with Your Main Point

State your main point near the beginning of your conclusion. If you already stated it in your introduction, repeat it here but more fully; do not simply repeat it word-for-word.

16.8.2 Add a New Significance or Application

After your point, say why it's significant, preferably with a new answer to *So what?* For example, the writer of this conclusion introduces an additional consequence of the Supreme Court's decision on military death sentences:

In light of recent Supreme Court decisions rejecting mandatory capital punishment, the mandatory death penalty for treason is apparently unconstitutional and must therefore be revised by Congress. **More significantly, though, if the Uniform Code of Military Justice is changed, it will challenge the fundamental value of military culture that ultimate betrayal requires the ultimate penalty. Congress will then have to deal with the military's sense of what is just.**

This observation belongs in the conclusion rather than in the introduction because it suggests *further questions* the article doesn't take up: *How exactly will the military respond to that challenge to its values? How should Congress respond in turn?* Just as in your introduction you increase the punch of your problem by stating its consequences, so in your conclusion you can increase the significance of your solution by noting its additional implications.

16.8.3 Call for More Research

Just as your opening context surveys research already done, so your conclusion can call for research still to do:

These differences between novice and expert diagnosticians define their maturation and development. But while we know how novices and experts think differently, **we do not understand which elements in the social experience of novices contribute to that development and how. We need longitudinal studies on how**

mentoring and coaching affect outcomes and whether active explanation and critique help novices become skilled diagnosticians more quickly.

When you state what remains to do, you keep the conversation alive. So before you write your last words, imagine someone fascinated by your work who wants to follow up on it: What more would *you* like to know? What research would you suggest they do? After all, that may have been how you found your own problem.

Quick Tip: Titles

The first thing readers read—and the last thing you should write—is your title. Beginning writers just attach a few words to suggest the topics of their papers. That's a mistake: a title is useful when it helps readers understand *specifically* what is to come. Compare these three titles:

Microfinance

Microfinance and Economic Development

Microfinance as a Strategy for Economic Development: Realizing Its Potential for Improving the Standing of Women

Put into your title the keywords in your main point, the ones you circled when you checked for the continuity of conceptual themes (6.6.1, 8.2.1,

12.1.1, 12.3.2, 13.4). When readers see those concepts turn up again in your main point and again through the body of your paper, they will feel that your text has met their expectations. (Two-line titles give you more room for key terms. End the first line with a colon that introduces a more specific second line.)

17 Revising Style

Telling Your Story Clearly

So far we have focused on the argument and organization of your paper. In this chapter, we show you how to revise your sentences so that readers will think they are clear and direct.

Readers will accept your claim only if they understand your argument, but they won't understand your argument if they can't understand your sentences. Once you revise your paper so that readers will judge its argument to be sound and well organized, find time to make a last pass to make your sentences as easy to read as the complexity of your ideas allows. But again, you face a familiar problem: you can't know which sentences need revising just by reading them. Since you already know what you want them to mean, you will read into them what you want your readers to get out of them. To ensure that your sentences will be as clear to your readers as they are to you, you need a way to identify difficult sentences even when they seem fine to you.

17.1 JUDGING STYLE

If you had to read an article in the style of one of the following examples, which would you choose?

1a. Conventional management practice assumes that interaction and collaboration enhance organizational performance by improving employee creativity and productivity. But unless collaboration is punctuated by isolation, and unless workspace configurations provide isolation opportunities, erosion rather than enhancement of organizational effectiveness may result.

1b. Managers want the people who work for them to interact and collaborate. When they do this, they become more creative and productive. The organization then performs better. But people also need opportunities to work alone, and workplaces need to provide these opportunities. Otherwise, the organization may become less effective.

1c. Managers conventionally assume that when employees interact and collaborate, they become more creative and productive, thus leading the whole organization to perform better. But unless employees also have opportunities to work alone, and

unless workspaces are configured to provide them, the organization may become less rather than more effective.

Few readers choose (1a): it sounds dense, abstract, opaque. Some choose (1b), but it sounds simpleminded, like an adult speaking slowly to a child. Most choose (1c), which sounds like one colleague speaking to another. One of the worst problems in academic writing today is that too many researchers sound like (1a).

A few researchers prefer (1a), claiming that heavy thinking demands heavy writing, that when they try to make complicated ideas clear, they sacrifice nuances and complexity of thought for too-easy understanding. If readers don't understand, too bad; they should work harder.

Perhaps. Everyone who reads philosophers like Immanuel Kant or Friedrich Hegel struggles with their complex prose style, at least at first. But what they have to say proves to be worth the effort. The problem is, few of us think as well as Kant or Hegel. For most of us most of the time, our dense writing indicates not the irreducible difficulty of a work of genius, but the sloppy thinking of writers who aren't considering their readers. And even when complex thought does require a complex style (which is less often than we think), every sentence profits from a second look (and truth be told, Kant and Hegel would have benefited from a good editor).

Some writers do go too far in avoiding a complex style, using simplistic sentences like those in (1b) above. But we assume that most of you do not have that problem, and that you need little help with spelling and grammar. (If you think you do, talk to a writing tutor.) We address here the problem of a style that is too "academic," which is to say, more difficult than it has to be. Convolved and indirect prose is not what good writers aim for, but what thoughtless ones get away with.

This problem especially afflicts those just starting advanced work because they are hit by double trouble. First, when any of us writes about new and complex ideas that challenge our understanding, we write less clearly than we ordinarily can. This problem afflicts even the most experienced researchers. But new researchers compound that problem when they believe that a complex style bespeaks academic success and they imitate the tangled prose they read. That we can avoid.

17.2 THE FIRST TWO PRINCIPLES OF CLEAR WRITING

17.2.1 Distinguishing Impressions from Their Causes

If we asked you to explain how you chose between (1a) and (1c) above, you would probably describe (1a) with words like *unclear*, *wordy*, and *dense*; (1c) with words like *clear*, *concise*, and *direct*. But those words refer not to those sentences on the page, but to how you *felt* as you read them. If you said that (1a) was *dense*, you were really saying that *you* had a hard time getting through it; if you said (1c) was *clear*, you were saying that *you* found it easy to understand.

There's nothing wrong with using impressionistic words to describe your feelings, but they don't help you *fix* unclear sentences like (1a), because they don't explain *what it is on the page or screen that makes you feel as you do*. For that, you need a way to think about sentences that connects an impression like *confusing* to what it is *in the sentence* that confuses you. More important, you have to know how to revise your own sentences when they are clear to you but won't be to your readers.

There are a few principles that distinguish the felt complexity of (1a) from the mature clarity of (1c). These principles focus on only two parts of a sentence: the first six or seven words and the last four or five. Get those words straight, and the rest of the sentence will (usually) take care of itself. To use these principles, though, you must understand five grammatical terms: *simple subject*, *whole subject*, *verb*, *noun*, and *clause*. (If you haven't used those terms for a while, review them before you read on.)

This is important: don't try to apply these principles as you write new sentences. If you follow them *as you draft*, you may tie yourself in knots. Rather, let them guide you when you revise sentences you have already written.

17.2.2 Subjects and Characters

The first principle may remind you of something you learned in grammar school. At the heart of every sentence are its subject and verb. In grammar school you probably learned that subjects are the "doers" or agents of an action. But that's not always true, because subjects can be things other than doers, even actions. Compare these two sentences (the whole subject in each clause is underlined):

2a. Locke frequently repeated himself because he did not trust the power of words to name things accurately.

2b. The reason for Locke's frequent repetition lies in his distrust of the accuracy of the naming power of words.

The two subjects in (2a)—*Locke* and *he*—fit that grammar-school definition: they are doers. But the subject of (2b)—*The reason for Locke's frequent repetition*—does not, because *reason* doesn't really *do* anything here. The real doer is still Locke.

To get beyond sixth-grade definitions, we have to think not only about the grammar of a sentence—its subjects and verbs—but also about the *stories* they tell—about doers and their actions. Here is a story about rain forests and the biosphere:

3a. If rain forests are stripped to serve short-term economic interests, the earth's biosphere may be damaged.

3b. The stripping of rain forests in the service of short-term economic interests could result in damage to the earth's biosphere.

In the clearer version, (3a), look at the whole subjects of each clause:

3a. If rain forests_{subject} are stripped_{verb} . . . the earth's biosphere_{subject} may be damaged_{verb}.

Those subjects name the main characters in that story in a few short, concrete words: *rain forests* and *the earth's biosphere*. Compare (3b):

3b. The stripping of rain forests in the service of short-term economic interests_{subject} could result_{verb} in damage to the earth's biosphere.

In (3b) the simple subject (*stripping*) names not a concrete character but rather an action; it is only part of the long abstract phrase that is the whole subject: *the **stripping** of rain forests in the service of short-term economic interests*.

Now we can see why grammar-school definitions may be bad language theory but good advice about writing. The first principle of clear writing is this:

Readers will judge your sentences to be clear and readable to the degree that you make their subjects name the main characters in your story. When you do this, your subjects will be short, specific, and concrete.

17.2.3 Verbs, Nouns, and Actions

There is a second difference between clear and unclear prose: it is in the way writers express the crucial *actions* in their stories—as verbs or as nouns. For example, look again at the pairs of sentences (2) and (3) below. (Words naming actions are boldfaced; actions that are verbs are underlined; actions that are nouns are double-underlined.)

2a. Locke frequently **repeated** himself because he did not **trust** the power of words to **name** things accurately.

2b. The reason for Locke's frequent **repetition** lies in his **distrust** of the accuracy of the **naming** power of words.

3a. If rain forests are **stripped** to **serve** short-term economic interests, the earth's biosphere may be **damaged**.

3b. The **stripping** of rain forests in the **service** of short-term economic interests could result in **damage** to the earth's biosphere.

Sentences (2a) and (3a) are clearer than (2b) and (3b) because their subjects are characters, but also because their actions are expressed not as nouns but as verbs.

There is a technical term for turning a verb (or adjective) into a noun: we *nominalize* it. (This term defines itself: when we nominalize the verb *nominalize*, we create the nominalization *nominalization*.) Most nominalizations end with suffixes such as *-tion*, *-ness*, *-ment*, *-ence*, *-ity*.

Verb → Nominalization Adjective → Nominalization

But some are spelled like the verb: *change* → *change*; *delay* → *delay*; *report* → *report*.

(We'll discuss passive verbs like *are stripped* and *be damaged* in 17.4.) When you express actions not with verbs but with abstract nouns, you also

clutter a sentence with articles and prepositions. Look at all the articles and prepositions (boldfaced) in (4b) that (4a) doesn't need:

4a. Having standardized indices for measuring mood disorders, we now can quantify patients' responses to different treatments.

4b. The standardization **of** indices **for the** measurement **of** mood disorders has now made possible **the** quantification **of** patient response **as a** function **of** treatment differences.

Sentence (4b) adds one *a*, *as*, and *for*; two *thes*, and four *ofs*, all because four verbs were turned into nouns: *standardize* → *standardization*, *measure* → *measurement*, *quantify* → *quantification*, *respond* → *response*.

When you turn adjectives and verbs into nouns, you can tangle up your sentences in two more ways:

You have to add verbs that are less specific than the verbs you could have used. In (4b), instead of the specific verbs *standardize*, *measure*, *quantify*, and *respond*, we have the single vague verb *made*.

You are likely to make the characters in your story modifiers of nouns or objects of prepositions or to drop them from a sentence altogether: in (4b), the character *we* becomes *our*, and thereafter the rest of the characters are missing in action.

So here are two principles of a clear style:

- Express crucial actions in verbs.

Make your central characters the subjects of those verbs; keep those subjects short, concrete, and specific.

17.2.4 Diagnosis and Revision

Given how readers judge sentences, we can offer ways to diagnose and revise yours.

To diagnose:

Underline the first six or seven words of every clause, whether main or subordinate.

Perform two tests:

Are the underlined subjects concrete characters, not abstractions?

Do the underlined verbs name specific actions, not general ones like *have*, *make*, *do*, *be*, and so on?

If the sentence fails either test, you should probably revise.

To revise:

Find the characters you want to tell a story about. If you can't, invent them.

Find what those characters are doing. If their actions are in nouns, change them into verbs.

Create clauses with your main characters as subjects and their actions as verbs.

You will probably have to recast your sentence in some version of *If X, then Y*; *X, because Y*; *Although X, Y*; *When X, then Y*; and so on.

That's the simple version of revising dense prose into something clearer.

Here is a more nuanced one.

17.2.5 Who or What Can Be a Character?

You may have wondered why we called *rain forests* and *the earth's biosphere* "characters" when we usually think of characters as flesh-and-blood people. For our purposes, a character is anything that can be the subject of a lot of verbs in a sequence of sentences. This means that we can also tell stories whose characters are things like *rain forests* and even abstractions like *thought disorders*. In your kind of research, you may have to tell a story about *demographic changes*, *social mobility*, *isotherms*, or *gene pools*. Sometimes you have a choice: a paper in economics might tell a story about real or virtual people,

such as *consumers* and the *Federal Reserve Board*, or about abstractions associated with them, such as *savings* and *monetary policy*. Note, however, that you can still make those abstract characters part of a story with action verbs:

5a. When consumers **save** more, the Federal Reserve **changes** its monetary policy to influence how banks **lend** money.

5b. When consumer savings **rise**, Federal Reserve monetary policy **adapts** to **influence** bank **lending** practices.

A passage might be about real people or about abstractions associated with them: *banks* vs. *lending practices*, *savers* vs. *microeconomics*, or *analysts* vs. *predictions*. All things being equal, though, readers prefer characters to be at least concrete things or, better, flesh-and-blood people.

Experts, however, like to tell stories about abstractions (boldfaced; subjects are underlined).

Standardized indices to measure **mood disorders** help us quantify how patients respond to different **treatments**. These measurements suggest that treatments requiring long-term **hospitalization** are no more effective than outpatient **care** for most patients.

The abstract nominalizations in the second sentence—*measurements*, *treatments*, *hospitalization*, *care*—refer to concepts as familiar to its intended readers as *doctors* and *patients*. Given those readers, the writer would not need to revise them.

In a way, that example undercuts our advice about avoiding nouns made out of verbs, because now instead of revising every abstract noun into a verb, you have to choose which ones to change and which ones to leave as nouns. For example, the abstract nouns in the second sentence of (6) are the same as the first three in (7a):

7a. The **hospitalization** of patients without appropriate **treatment** results in the unreliable **measurement** of outcomes.

But we would improve that sentence if we revised those abstract nouns into verbs:

7b. We cannot **measure** outcomes reliably when patients **are hospitalized** but not **treated** appropriately.

So what we offer here is no iron rule of writing, but rather a principle of diagnosis and revision that you must apply judiciously. In general, though, readers prefer sentences whose subjects are short, specific, and concrete. And that usually means flesh-and-blood characters.

17.2.6 Avoiding Excessive Abstraction

You create the worst problems for readers when you make abstract nouns your main character and subjects of your sentences, then sprinkle more abstractions around them. Here is a passage about two abstract characters, *democracy* and *institutionalization*. Nevertheless, the passage is still clear, at least for its intended readers, because its writers focused on their characters in subjects and avoided additional abstractions, especially nominalizations (main characters are italicized; whole subjects are underlined; verbs are boldfaced):

8a. We **expect** that older *democracies* **will benefit** from greater *institutionalization* in the political sphere. Although political *institutionalization* **is** difficult to define, there **seems** to be general consensus that **procedures** in a well-institutionalized polity **are** functionally **differentiated**, **regularized** (and hence predictable), **professionalized** (including meritocratic methods of recruitment and promotion), **rationalized** (explicable, rule based, and non-arbitrary), and **infused** with value. Most long-standing *democracies* **fit** this description.

Note how the story becomes less clear when those main characters are displaced from subjects and when the key abstraction *institutionalization* is surrounded by other abstract nouns (main characters are italicized; whole subjects are underlined; the additional abstractions are boldfaced):

8b. Our **expectation** is that greater *institutionalization* in the political sphere will be of **benefit** to older *democracies*. Although **definition** of political *institutionalization* is difficult, there seems to be general consensus that

functional differentiation, regularization (and hence predictable), professionalization (including meritocratic methods of recruitment and promotion), rationalization (explicable, rule based, and nonarbitrary), and the infusion of value are characteristic of procedures in a well-institutionalized polity. This description is a fit for most long-standing *democracies*.

We're not suggesting that you change every abstract noun into a verb. This story about democracy and institutionalization would be difficult to transpose into one about a flesh-and-blood character like *citizens* or *you*. (If you don't believe us, give it a try.) If your best main characters are abstractions, use them. But avoid other abstractions you don't need. As always, the trick is knowing which ones you need and which you don't (usually fewer than you think). Knowing one from the other is a skill that comes only from practice— and criticism.

17.2.7 Creating Main Characters

Having qualified our principle once, we complicate it again. If your sentences are readable, your characters will be the subjects of verbs that express the crucial actions those characters are involved in. But most stories have several characters, any one of whom you can turn into a main character by making it the subject of sentences. Take the sentence about rain forests:

If rain forests are stripped to serve short-term economic interests, the earth's biosphere may be damaged.

That sentence tells a story that implies other characters but does not specify them: Who is stripping the forests? More important, does it matter? This story could focus on them, but who are they?

9a. If developers strip rain forests to serve short-term economic interests, they may damage the earth's biosphere.

9b. If loggers strip rain forests to serve short-term economic interests, they may damage the earth's biosphere.

9c. If Brazil strips its rain forests to serve short-term economic interests, it may damage the earth's biosphere.

Which is best? It depends on whom you want *your readers to think* the story is about. As you revise sentences, put characters in subjects and actions in verbs, when you can. But be sure that the character is your *central* character, if only for that sentence.

17.3 A THIRD PRINCIPLE: OLD BEFORE NEW

There is a third principle of reading and revising even more important than the first two. Fortunately, all three principles are related. Compare the (a) and

versions in the following. Which seems clearer? Why? (Hint: Look at the beginnings of sentences, this time not just for characters as subjects, but whether those subjects express information that is familiar or information that is new and therefore unexpected.)

10a. Because the naming power of words was distrusted by Locke, he repeated himself often. Seventeenth-century theories of language, especially Wilkins's scheme for a universal language involving the creation of countless symbols for countless meanings, had centered on this naming power. A new era in the study of language that focused on the ambiguous relationship between sense and reference begins with Locke's distrust.

10b. Locke often repeated himself because he distrusted the naming power of words. This naming power had been central to seventeenth-century theories of language, especially Wilkins's scheme for a universal language involving the creation of countless symbols for countless meanings. Locke's distrust begins a new era in the study of language, one that focused on the ambiguous relationship between sense and reference.

Most readers prefer (10b), saying not just that (10a) is *too complex* or *inflated*, but that it's also *disjointed*; it doesn't *flow*—impressionistic words that again describe not what we see on the page but how we *feel* about it.

We can explain what causes those impressions if we again apply the “first six or seven words” test. In the disjointed (a) version, the sentences after the first one begin with information that a reader could not predict:

the naming power of words

Seventeenth-century theories of language

A new era in the study of language

In contrast, the sentences after the first one in (10b) begin with information that readers would find familiar:

Locke

This naming power [repeated from the previous sentence]

Locke's distrust [a useful abstract noun because it repeats something from the previous sentence]

In (10a) each sentence begins unpredictably, so we can't easily see the "topic" of the whole passage. In (10b) each sentence after the first opens with words referring to ideas that readers recall from the previous sentence.

Readers follow a story most easily if they can begin each sentence with a character or idea that is familiar to them, either because it was already mentioned or because it comes from the context. From this principle of reading, we can infer principles of diagnosis and revision.

To diagnose:

Underline the first six or seven words of every sentence.

Have you underlined words that your readers will find familiar and easy to understand (usually words used before)?

If not, revise.

To revise:

Make the first six or seven words refer to familiar information, usually something you have mentioned before (typically your main characters).

Put at the ends of sentences information that your readers will find unpredictable or complex and therefore harder to understand.

This old-new principle happily cooperates with the ones about characters and subjects, because older information usually names a character (after you introduce it, usually at the *end* of a prior sentence). But should you ever have to choose between beginning a

sentence with a character or with old information, *always choose the principle of old before new*.

17.4 CHOOSING BETWEEN THE ACTIVE AND PASSIVE VOICE

You may have noted that some of the clearer sentences had passive verbs. This seems to contradict familiar advice from English teachers to avoid them. Followed mindlessly, that advice will make your sentences *less* clear. Rather than worry about active and passive, ask a simpler question: Do your sentences begin with familiar information, preferably a main character? If you put familiar characters in your subjects, you will use the active and passive properly.

For example, which of these two passages “flows” more easily?

11a. The quality of our air and even the climate of the world depend on healthy rain forests in Asia, Africa, and South America. But the increasing demand for more land for agricultural use and for wood products for construction worldwide now threatens these forests with destruction.

11b. The quality of our air and even the climate of the world depend on healthy rain forests in Asia, Africa, and South America. But these rain forests are now threatened with destruction by the increasing demand for more land for agricultural use and for wood products used in construction worldwide.

Most readers think (11b) flows more easily. Why? Note that the beginning of the second sentence in (11b) picks up on the character introduced at the end of the first sentence:

11b. . . . rain forests in Asia, Africa, and South America. But these rain forests . . .

The second sentence of (11a), on the other hand, opens with information completely unconnected to the first sentence:

11a. . . . rain forests in Asia, Africa, and South America. But the increasing demand for more land . . .

In other words, the passive allowed us to move the older, more familiar information from the end of its sentence to its beginning, where it belongs.

And that's the main function of the passive: to build sentences that begin with older information. If we don't use the passive when we should, our sentences won't flow as well as they could.

In English classes, students are told that they should use only active verbs, but they hear the opposite in engineering, the natural sciences, and some social sciences. There teachers demand the passive, thinking that it makes writing more objective. Most of that advice is equally misleading. Compare the passive (12a) with the active (12b):

12a. Eye movements **were measured** at tenth-of-second intervals.

12b. We **measured** eye movements at tenth-of-second intervals.

These sentences offer equally objective information, but their *stories* differ: one is about eye movements, the other about a person measuring them, who happens also to be the author. The first is supposed to be more “objective” because it ignores the person and focuses on the movements. But just avoiding *I* or *we* doesn't make writing more “objective.” It simply changes the story.

In fact, the issue of the passive is still more complicated. When a scientist uses the passive to describe a *process*, she implies that the process can be repeated by anyone. In this case, the passive is the right choice, because anyone who wanted to repeat the research would have to measure eye movements.

On the other hand, consider this pair of sentences:

13a. It **can be concluded** that the fluctuations result from the Burnes effect.

13b. We **conclude** that the fluctuations result from the Burnes effect.

The active verb in (13b), *conclude*, and its first-person subject, *we*, are not only common in the sciences, but appropriate. The difference? It has to do with the kind of action the verb names. The active (and therefore first person) is appropriate when authors refer to actions that only the *writer/researcher* can perform—not only rhetorical actions, such as *suggest*, *conclude*, *argue*, or *show*, but also those for which they get credit as scientists, such as *design* experiments, *solve* problems, or *prove* results. Everyone can *measure*, but only author/researchers are entitled to *claim* what their research means. Scientists typically use the first person and active verbs at the beginning of journal articles, where they describe

how *they* discovered their problem and at the end where they describe how *they* solved it. In between, when they describe processes that anyone can perform, they regularly use the passive.

17.5 A FINAL PRINCIPLE: COMPLEXITY LAST

We have focused on how clauses begin. Now we look at how they end. You can anticipate the principle for ending sentences: if familiar information goes first, the newest, most complex information goes last. This principle is particularly important in three contexts:

when you introduce a new technical term

when you present a unit of information that is long and complex

when you introduce a concept that you intend to develop in what follows

17.5.1 Introducing Technical Terms

When you introduce technical terms that are new to your readers, construct your sentences so that those terms appear in the last few words. Compare these two:

14a. The monoamine hypothesis has been the leading biological account of depression for over three decades. According to this hypothesis, deficits in monoamines including dopamine, epinephrine, norepinephrine, and serotonin are associated with depression. Monoamine concentrations in neural synapses are regulated in different ways by different types of antidepressants.

14b. For over three decades, the leading biological account of depression has been the monoamine hypothesis. According to this hypothesis, depression is associated with deficits in neurotransmitters called monoamines, including dopamine, epinephrine, norepinephrine, and serotonin. Different types of antidepressants work in different ways to regulate concentrations of monoamines in neural synapses.

In (14a) all the technical-sounding terms appear early in the sentences; in (14b) the technical terms appear at the end of the sentences.

17.5.2 Introducing Complex Information

Put complex bundles of ideas that require long phrases or clauses at the end of a sentence, never at the beginning. Compare (11a) and (11b) again:

11a. The quality of our air and even the climate of the world depend on healthy rain forests in Asia, Africa, and South America. But the increasing demand for more land for agricultural use and for wood products for construction worldwide now threatens these forests with destruction.

11b. The quality of our air and even the climate of the world depend on healthy rain forests in Asia, Africa, and South America. But these rain forests are now threatened with destruction by the increasing demand for more land for agricultural use and for wood products used in construction worldwide.

In (11a) the second sentence begins with a long, complex unit of information, a subject that runs on for more than a line. In contrast, the subject of the second sentence in (11b), *these rain forests*, is short, simple, and easy to read, again because the passive verb (*are now threatened*) lets us flip the short and familiar information to the beginning and the long and complex part to the end.

In short, don't begin your sentences with complexity; save it for the end. Unfortunately that's not easy to do, because you may be so familiar with your ideas that you can't distinguish what is *for your readers* old and simple from what's new and complex.

17.5.3 Introducing What Follows

When you start a paragraph, put the key terms that appear in the rest of the paragraph at the end of the first or second sentence. Which of these two sentences would best introduce the rest of the paragraph that follows?

15a. The political situation changed, because disputes over succession to the throne plagued seven of the eight reigns of the Romanov line after Peter the Great.

15b. The political situation changed, because after Peter the Great seven of the eight reigns of the Romanov line were plagued by turmoil over disputed succession to the throne.

The problems began in 1722, when Peter the Great passed a law of succession that terminated the principle of heredity and required the sovereign to appoint a successor. But because many tsars, including Peter, died before they named successors, those who aspired to rule had no authority by appointment, and so their succession was often disputed by lower-level aristocrats. There was turmoil even when successors were appointed.

Most readers feel that (15b) is more closely connected to the rest of the passage. The last few words of (15a) seem unimportant in relation to what follows (in another context, of course, they might be crucial).

So once you've checked the first six or seven words in every sentence, check the last five or six as well. If those words are not the most important, complex, or weighty, revise so that they are. Look especially at the ends of sentences that introduce paragraphs or even sections.

17.6 SPIT AND POLISH

We've focused on those issues of sentence style relevant to writing research papers, and on principles of diagnosis and revision that help make prose as readable as possible. There are other principles—sentence length, the right choice of words, concision, and so on. But those are issues pertinent to writing of all kinds and are addressed by many books. And, of course, readability alone is not enough. After you revise your style, you still have to check your grammar, spelling, and punctuation. Then you have to make sure that you have observed the accepted conventions for representing numbers, proper names, foreign words, and so on. Though important, those matters fall outside the purview of this book.

Quick Tip: The Quickest Revision Strategy

Our advice about revision may seem overly detailed, but if you revise in steps, it's not difficult to follow. The first step is the most important: as you draft, remember to forget these steps (except for this one about remembering). Your first job is to draft something to revise. You will never do that if you keep asking yourself whether you should have just used a verb or a noun. If you don't have time to look at every sentence, start with

passages where you found it hard to explain your ideas. When you struggle to write about confusing content, your sentences tend toward confusion as well.

For Clarity and Flow

To diagnose:

Highlight the first six or seven words in every sentence. Ignore short introductory phrases such as *At first*, *For the most part*, and so on.

Run your eye down the page, checking whether you highlighted a consistent set of related words. The words that begin a series of sentences need not be identical, but they should name people or concepts that your readers will see are clearly related. If not, revise.

Check the highlighted words in each sentence. They should include a subject that names a character and a verb that names an important action. If not, revise.

To revise:

Identify your main characters, real or conceptual. Make them the subjects of verbs.

Look for nouns ending in *-tion*, *-ment*, *-ence*, and so on. If they are the subjects of verbs, turn them into verbs.

Make sure that each sentence begins with familiar information, preferably a character you have mentioned before.

For Emphasis

To diagnose:

Underline the last five or six words in every sentence.

You should have underlined

technical-sounding words that you are using for the first time

the newest, most complex information

information that is most emphatic

concepts that the next several sentences will develop

If you do not see that information there, revise: put those words last in the sentence.

PART V

Some Last Considerations

The Ethics of Research

In the last few hundred pages, we've offered a lot of practical advice, but also much preaching about creating social contracts with your readers, projecting an ethos that will encourage their trust, guarding against biases in collecting and reporting evidence, avoiding plagiarism, and so on. Now we want to share with you the underlying ethical issues that shape our advice, hoping that when you close this book, you'll give them more thought.

Everything we've said about research reflects our belief that it is a profoundly *social* activity that connects you both to those who will use your research and to those who might benefit—or suffer—from that use. But it also connects you and your readers to everyone whose research you used and beyond them to everyone whose research they used. To understand our responsibility to those in that network, now and in the future, we have to move beyond mere technique to think about the ethics of civil communication.

We start with two broad conceptions of the word *ethics*: the forging of bonds that create a community and the moral choices we face when we act in that community. The term *ethical* comes from the Greek *ethos*, meaning either a community's shared *customs* or an individual's *character*, good or bad. So far, we have focused on the community-building aspects of research, the bonds we create with our readers and our sources. But as does any social activity, research challenges us to define our individual ethical principles and then to make choices that honor or violate them.

At first glance, a purely academic researcher seems on relatively safe ethical ground—we are less tempted to sacrifice principle for gain than, say, a Wall Street analyst evaluating a stock that her firm wants her to push on investors, or a scientist paid by a drug company to “prove” that a product is safe (regardless of whether it works). No teacher will pay you to write a paper supporting her views, and you probably won't have occasion to fake results to gain fame—like the American researcher who became famous (and powerful) for discovering an HIV virus, when he had in fact “borrowed” it from a laboratory in France.

Even so, you will face such choices from the very beginning of your project. Some are the obvious *Thou shalt nots* for ethical researchers:

They do not plagiarize or claim credit for the results of others.

They do not misreport sources, invent data, or fake results.

They do not submit data whose accuracy they don't trust, unless they say so.

They do not conceal objections that they cannot rebut.

They do not caricature or distort opposing views.

They do not destroy data or conceal sources important for those who follow.

We apply these principles easily enough to obvious cases: the biologist who used india ink to fake "genetic" marks on his mice, the Enron accountants and their auditors at Arthur Andersen who shredded source documents, the government political advisers who erase e-mails, or the student who submits a paper purchased on the Internet.

More challenging are those occasions when ethical principles take us beyond a simple *Do not* to what we should affirmatively *Do*. When we think about ethical choices in that way, we move beyond simple conflicts between our own self-interest and the honest pursuit of truth, or between what we want for ourselves and what is good for or at least not harmful to others. If reporting research is genuinely a collaborative effort between readers and writers to find the best solution to shared problems, then the challenge is to find ways to create ethical partnerships to make ethical choices (what we traditionally call *character*) that can help build ethical communities.

Such a challenge raises more questions than we can answer here. Some of those questions have answers that we all agree on; others are controversial. The five of us answer some of them differently. But one thing we agree on is that research offers every researcher an ethical invitation that, when not just dutifully accepted but *embraced*, can serve the best interests of both researchers and their readers.

When you create, however briefly, a community of shared understanding and interest, you set a standard for your work higher than any you could set for yourself alone.

When you explain to others why your research *should* change their understanding and beliefs, you must examine not only your own understanding and interests, but your responsibility to them if you convince them to change theirs.

When you acknowledge your readers' alternative views, including their strongest objections and reservations, you move closer not just to more reliable knowledge, better understanding, and sounder beliefs, but to honoring the dignity and human needs of your readers.

In other words, when you do research and report it as a conversation among equals working toward greater knowledge and better understanding, the ethical demands you place on yourself should redound to the benefit of all—even when we cannot all agree on a common good. When you decline that conversation, you risk harming yourself and possibly those who depend on your work.

It is this concern for the integrity of the common work of a community that underscores why researchers condemn plagiarism so strongly. Plagiarism is theft, but of more than words. By not acknowledging a source, the plagiarist steals the modest recognition that honest researchers should receive, the respect that a researcher spends a lifetime struggling to earn. And that weakens the community as a whole, by reducing the value of research to those who follow.

That is true in all research communities, including the undergraduate classroom. The student plagiarist steals not only from his sources, but from his colleagues by making their work seem lesser by comparison to what was bought or stolen. When such intellectual thievery becomes common, the community grows suspicious, then distrustful, then cynical: *Everyone does it. I'll fall behind if I don't.* Teachers must then worry as much about not being tricked as about teaching and learning. What's worse, the plagiarist compromises her own education and so steals from the larger society that devotes its resources to training her and her generation to do reliable work later, work that the community will depend on.

In short, when you report your research ethically, you join a community in a search for some common good. When you respect sources, preserve and acknowledge data that run against your results, assert claims only as strongly as warranted, acknowledge the limits of your certainty, and meet all the other ethical obligations you have as a researcher and

writer, you move beyond gaining a grade or other material goods—you earn the larger benefit that comes from creating a bond with your readers. You discover that research focused on the best interests of others is also in your own.

A Postscript for Teachers

In this postscript we want to make explicit what has been implicit throughout. We hope you will join in an effort to improve the national “research scene.” Too many teachers of undergraduates say, *I’ve given up teaching the research paper*. Colleagues tell us that the ones they get are boring patchworks, that students aren’t up to the task, that in any event the dead-tree research paper is a relic of pre-digital days, and even that no one but ivory-tower academics does research anymore.

We think otherwise, of course. We think doing research is the best way to learn to read and think critically. And we know for a fact that the vast majority of our students will have careers in which, if they do not do their own research, they will have to evaluate and depend on the research of others. We also know that most of that research will be in written form, even if it happens to be delivered online. And we can think of no way to prepare for that responsibility better than doing research of one’s own.

We wrote this book for those who agree, and believe—or will at least consider—two propositions:

Students learn to do research well and report it clearly when they take the perspective of their readers and of the community whose values and practices define competent research and its reporting.

They learn to manage an important part of that mental and social process when they understand how a few key formal features of their reports influence how their readers read and judge them.

These two propositions, we believe, are closely related. By understanding the complementary processes of reading and writing, students plan, perform, and report their research better. They can use the features that readers expect to guide themselves through not only the process of drafting, but all the stages of their project. And by understanding what their readers look for in a report, they learn to read the reports of others more critically. The two processes, reading and writing, are mutually supporting.

THE RISKS OF IMPOSING FORMAL RULES

Emphasizing formal features, though, has its risks, especially with new researchers. It is easy to reduce formal structure to empty drill. Those who teach dancers only to hit their marks or pianists only to find the right keys deprive students of the deep pleasures of dance or music. Those who teach research *by the numbers*, as if it were merely learning the proper forms for footnotes and bibliography, deprive students of the pleasures of discovery, students who might otherwise have blessed the world with their own good research.

If students are shown how to approach research in the right spirit, the features of argument become not empty forms but answers to questions that stimulate and reward hard thinking. They help students recognize what is important in the relationship between a researcher, her sources, her disciplinary colleagues and readers. This recognition is a crucial prerequisite to creative and original research.

Forms empty of meaning encourage empty imitation, especially when teachers fail to create in their classrooms a rhetorical context that dramatizes for students their social role as researchers, even if at first only in simulation or role-playing. No textbook can fully create that context, because it requires a class experience that only imaginative teachers can orchestrate.

Only a teacher, understanding his unique students, can devise assignments that create situations whose social dynamic gives point and purpose to research and whose expectations students can recognize and understand. The less experience students have, the more social support teachers must provide before their students can use formal structures in productive ways.

ON ASSIGNMENT SCENARIOS: CREATING A GROUND FOR CURIOSITY

Teachers have found many ways to construct research assignments that give students this necessary support. The most successful have these features:

Good assignments establish outcomes beyond a product to be evaluated. Good teachers ask students to raise a question or problem that at least *they* want to resolve, and to support that resolution with reliable and relevant evidence. Good research assignments

then ask students to translate that private interest into a public one, so that they can experience, or at least imagine, readers who need the understanding that only they can provide.

The best assignments ask students to write for those who actually need to know or understand something better. Those readers might be a transient community of researchers that a problem creates, as when students do their research for a client outside of class. A senior design class, for example, might address a problem of a local company or civic organization; a music class might write program notes; a history class might investigate the origins of some part of their university or an institution in their local community.

Less experienced students might write for their classmates, but they might also write for students in another class who could actually use the information that a beginning researcher could provide. They might do preliminary research for those senior design students or for students in a graduate seminar; or they might even write reports back to students still in high school.

Next best are assignments that simulate such situations, in which students assume that other students or a client or even other researchers have a problem that the student researcher can resolve. Even in large classes, students can work in small groups whose members serve as readers with interests that beginning researchers can reasonably address.

Good assignments help students learn about their readers. Most students have trouble imagining readers whom they have never met and whose situation they have never experienced. Biology students with no knowledge or experience working with a government agency will be unlikely to write a plausible report that meets the concerns of a state EPA administrator. But teachers can help by urging students to imagine those distant readers. Alternatively, they can turn the class into its own audience by letting students decide what problems need solving, what questions need answering. If students can define the problems they're interested in, they will make the best possible readers for one another's research.

Good assignments create scenarios that are rich in contextual information. When students write to solve the problems of readers known and accessible to them, the assignment presents a scenario rich in detail. Students can investigate, interrogate, and analyze the situation for as long as time and ingenuity allow.

But when it's not practical to locate the project in a real context, the assignment should create as much of an imagined context as possible. It's impossible to predict everything students need to know about such a scenario, so it is important to make analysis and discussion of it a part of the writing process. Only when students are working in a social context do they have meaningful choices and good reasons to make them. Only then are those choices rhetorically significant. And only when writers can make rhetorically significant choices will they understand that at the heart of every real writing project is the anticipation of their readers' responses. When students have no choices because their project has no rhetorical "scene" and so is only a mechanical drill, doing research and writing it up become merely make-work—for you as much as for them.

Again we stress the importance of lively discussion among the students, either in class, if the class is small enough, or in subgroups if the class is large.

Good assignments provide interim readers. Few professional researchers call a report finished before they have solicited responses, something students need even more. Encourage students to solicit early responses from colleagues, friends, family, even from you. And build opportunities for response into the assignment itself. Other students can play this role reasonably well, but not if they think that their task is just "editing"—which for them often means rearranging a sentence here and fixing a misspelling there. Have student responders work through some of the steps in [chapters 12–17](#); you can even create teams of responders, each with responsibility for specific features of the text. Those who provide interim responses must participate in the scenario as imagined readers.

As with any real project, good assignments give students time and a schedule of interim deadlines. Research is messy, so it does no good to march students through it lockstep: (1) select topic, (2) state thesis, (3) write outline, (4) collect bibliography, (5) read and take notes, (6) write report. That caricatures real research. But students need some framework, a schedule of tasks that helps them monitor their progress. They need time for false starts and blind alleys, for revision and reconsideration. They need interim deadlines and stages for sharing and criticizing their progress. Those stages can reflect the various sequences outlined in this book.

RECOGNIZING AND TOLERATING THE INEVITABLE MESSINESS OF LEARNING

Students also seriously—sometimes desperately—need other kinds of support, especially recognition of what can be expected of them and tolerance for the predictable missteps of even experienced researchers. Beginners behave in awkward ways, taking suggestions and principles as inflexible rules that they apply mechanically. They work through a topic to a question to their library's online catalog to a few websites, marching on and on to a feeble conclusion, not because they lack imagination or creativity, but because they are struggling to acquire a skill that to them is surpassingly strange. Such awkwardness is an inevitable stage in learning any skill. It passes, but too often only after they have moved on to other classes.

We urge you not to be troubled when a whole class of beginning students produces reports that look alike. We have had to learn to be patient with students, as we wait for the delayed gratification that comes when the learners arrive at genuine originality—knowing it will likely come when we are no longer there to see it.

We try to assure students that even if they do not solve their problem, they succeed if they can pose it in a way that convinces us that it is new—at least to them—and arguably *needs* a solution. Proving that there is a problem to be solved often requires more research and more critical ability than solving it, certainly more than one in which a student can ask a simple question and answer it.

We know that some students use research assignments simply to gather information on a topic, to review a field just to gain control over it. To them, the demand for a significant problem seems artificial. You can only ask them to imagine that they are writing for a reader who is intelligent and possibly interested in their topic but does not have the time to do any research, a reader who is, indeed, in the circumstance they are in.

Finally, different students stand in different relations to the research practices you teach. Advanced students should strive toward the full quality of your own disciplinary practices. But few beginners are yet committed to any research community or to the values that underlie everything in this book. Some will make that commitment early, but most will not. Some never will. In sum, to teach research well, we teachers must adapt the steps we've outlined here to fit the particular circumstances and needs of the individuals before us in class. We can only hope that students at all levels learn these steps, learn to identify them in other writing projects, and then attempt them on their own. Maybe then

they can move toward the kind of sound research and reasoned decision-making that our society so badly needs but too seldom gets.

Method 25-Research Books can Be Used.

1. Look At The Research Folder
2. Decide The Book To Listen, Follow and Apply
 - Bernard Research Methods in Anthropology.
 - Qualitative Research & Evaluation Methods_ Integrating Theory and Practice.
 - Research Methodology - Methods and Techniques.
 - Research Methodology in the Medical and Biological Sciences.
 - Research Methods in Education.
 - Social-Research-Methods.
 - The Craft of Research, Fourth Edition (Chicago Guides to Writing, Editing, and Publishing.
 - The Oxford Handbook of Qualitative Research.
 - The Sage Encyclopedia of Qualitative Research Methods.
 - The SAGE Handbook of Qualitative Research.
 - The Language of Composition_ Reading, Writing, Rhetoric.
 - Patterns for College Writing_ A Rhetorical Reader and Guide.
 - How to Write Anything_ A Guide and Reference with Readings with 2009 MLA and 2010 APA Updates.
3. Use Intelligently skimming methods.
 - Method 1-Systematic Skimming or Pre-reading. Pages 47-51.
4. By skimming you will find the same sources, cited over and over again in the texts as the important go to works.
5. Use Rules of reading: Choose one of the methods.
 - For Basic Knowledge-Basic Level. Pages 66-74
 - For Analysis-Intermediate Level. Pages 141-307
 - Mixed Method-Advanced Level. Pages 341-942
6. Analysis of Logic.
7. Analysis of Grammar.

8. Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

9. Analysis of Genre.

A. Open Figure Of Speech Folder. Use the Following Books for Analysis of Genre :

- Literary Device.
- FIGURES OF SPEECH - Biblical Research Journal.
- Figures of Speech.

10. Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context?

11. Facts within The Context.

12. Do the Fact Checking. Checking Facts, If they are correct or incorrect.

A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.

- Fact Checking Process.
- Verification Handbook.
- The Data Journalism.
- Data Journalism - Centre for Investigative Journalism.
- Tutorial-computational-fact-checking-a-content-management-perspective.
- Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
- Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
- The Effect of Fact-checking on Elites.
- Why do journalists fact-check.
- Fact-checking 101.
- Sagan-Baloney.
- Fact Checking.

B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:

- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries

- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University

- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

- C. Do full fact checking of the facts the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- D. Do full fact checking of the figures the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- E. Do full fact checking of the statistics the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- F. Do full fact checking of the formulas the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- G. Do full fact checking of the mathematical results the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

13. Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?
- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?

- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing views? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing views to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

14. Checking Each Fact's Sources, If they Are Reliable or Unreliable. Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Is the Source Reliable or Unreliable?

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.
 34. Eyewitness.

- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original format and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website

8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine

1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
3. Is the tertiary source objectively when they are speaking about certain subject?
4. Are the tertiary source present facts carefully or careless?
5. Is the tertiary source truthfully presents the facts opinions/data?
6. Is the tertiary data was accepted blind faith or skeptically analysed by author?

7. What tertiary source did the author use? List:

- Almanacs
- Bibliographies
- Classification
- Population registers
- Chronologies
- Dictionaries
- Encyclopedias
- Directories
- Fact books
- Guidebooks
- Indexes
- Abstract sources
- Manuals textbooks
- Handbooks
- Wikipedia
- Concordance
- Field guides
- Timelines
- Surveys
- Overview articles
- Directories

8. Is the Source Reliable or Unreliable?

14. Rhetorical Analysis Of The Text

A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:

- Rhetoric By Aristotle.
- A Companion to Rhetoric and Rhetorical Criticism.
- Ancient Rhetoric From Aristotle to Philostratus.
- Ancient Rhetoric For Contemporary Students by Sharon Crowley.
- Art Of Rhetoric By Aristotle.
- Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
- Encyclopaedia of Rhetoric.
- On Rhetoric: Theory of Civic Discourse by Aristotle.
- Politics and Rhetoric: The Persuasive Power of Metaphor.
- Rhetoric By Jennifer Richards.
- Rhetoric In Details By John Benjamins.
- Rhetorical Grammar By Martha Kolln.
- Sourcebook on Rhetoric By James Jasinski.
- The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
- The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
- The Rhetoric of Reason By James Crosswhite.
- Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
- Writing Arguments: a RHETORIC With Reading by John Ramage.

B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

15. Take notes on literature.

16. By reading, you will identify certain questions within the area of research.

17. Master the literature in the area of research.

18. Use Rules of Writing.

Investigative Journalism

Method 26- Investigative Journalism

1. Open Investigative Journalism Folder. Choose and Use One Of The Following Books From Investigative Journalism Research Book and Follow Every Step:

- **Skimming- Rules of Reading Page 47-51.**
- **Method 1-Speed Reading. Very FAST Reading. Pages 59-64.**
- **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study. Methods 1-6. Rules of reading pages 66-74.**
- **Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text. Rules of Reading Pages 141-307.**
- **VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method. Rules of Reading Pages 341-942.**
- **How To Read A Book By Mortimer Adler.**
- **How To Become a Mouthpiece for The People: a Manual For Investigative Journalism.**
- **Investigative Journalism Handbook.**
- **Investigative Journalism By Hugo De Burgh.**
- **Journalism-New_Challenges-Fowler.**
- **Journalism of Ideas.**
- **Investigative and Interpretative Journalism.**
- **Story Based Inquiry: a manual for investigative Journalism.**
- **The Global Investigative Journalism Casebook.**
- **The Future OF Computer Assisted Reporting.**
- **A Watchdog Guide to Investigative Reporting.**
- **Basic Private Investigation_ A Guide to Business Organization, Management, and Basic Investigative Skills for the Private Investigator.**
- **What is Investigative Journalism.**
- **CIMA-Investigative Journalism - Dave Kaplan.**
- **CIPE_2009_Investigative Reporting Toolkit.**
- **Citizen Investigation.**
- **Computer-assisted reporting in Australia_ diffusion of the intern.**

- **Criminal Investigation for the Professional Investigator (Professional Investigators.**
- **Digital Investigative Journalism.**
- **Introduction to Journalism By Richard Rudin.**
- **Journalism Under Fire.**
- **The Future of Cross Border Investigative Journalis, By Muckraking.**
- **Investigative and Interpretative Reporting MAC 214.**
- **Notes on Investigative Journalism.**
- **Tell Me No Lies by John Pilger.**
- **Inquiry Into The Future of Investigative Journalism By Aljeezera.**
- **The Global Casebook: An Anthology for Teacher and Students of Investigative Journalism.**
- **10 Steps To Investigative reporting.**
- **Investigative Reporting In Zambia: Practitioner's Handbook.**
- **Investigative Journalism Techniques.**
- **Research Methods.**

2. Decide The Book To Listen, Follow and Apply

3. Follow Each steps.

4. Use Intelligently skimming methods.

- **Method 1-Systematic Skimming or Pre-reading.**

5. By skimming you will find the same sources, cited over and over again in the texts as the important go to works.

6. Choose Use Rules of reading Method. Follow each step of the method on every step of the investigative journalism I will be taken.

- **For Basic Knowledge-Basic Level.**
- **For Analysis-Intermediate Level.**
- **Mixed Method-Advanced Level.**

7. Step 1. Create a tentative bibliography of your subject by recourse to library catalogues, advisors, and bibliographies in books.

8. Step 2. Inspect *all* of the books on the tentative bibliography to ascertain which are germane to your subject, and also to acquire a clearer idea of the subject.
Note: These two steps are not, strictly speaking, chronologically distinct; that is, the two steps have an effect on each other, with the second, in particular, serving to modify the first.

9. Step 3: Data Journalism and Investigative Journalism and Reporting Toolkit. Open Investigative Journalism Folder. Choose and Use One Of The Following Books From Data Journalism and Investigative Journalism Toolkit and Follow Every Step:

- **Model Curricula For Journalism Education.**
- **Safety for journalism.**
- **The Journalism Handbook Toward Critical Data Practise.**
- **Investigative Research Links.**
- **Bellingcat Digital Toolkit.**
- **Citizen.**
- **Data JournLISM- cENTRE FOR iNVESTIGATIVE jOURNALISM.**
- **Creating Freelance Career.**
- **Digital Tool.**
- **How To Fund Investigative Journalism.**
- **Freelance to Freedom.**
- **Resource Book On Investigative Journalism.**
- **Freelance Bible.**
- **The Self Publishing Menu.**
- **The Data jOURNALISM hANDBOOK.**

10. Step 4: Analyse Accounts And The Resources I have Gathered. Open Investigative Journalism Folder. Choose and Use One Of The Following Books From Analyse Business, Accounting Book and Follow Every Step:

- **Accounting All-in-One For Dummies.**
- **Accounting For Dummies.**
- **Bookkeeping and Accounting All-in-One For Dummies.**
- **Business Math For Dummies (For Dummies (Business & Personal Finance.**
- **Business Start Up For Dummies Three e-book Bundle_ Starting a Business For Dummies, Business Plans For Dummies, Understanding Business Accounting.**
- **Cash Flow.**
- **Complete MBA.**
- **Financial Accounting For Dummies.**
- **Financial Investigation and Forensic Accounting, Third Edition.**
- **CFA 1-3 Levels.**
- **Accounting ACCA F 1-9 AND P1-7.**
- **Follow Money.**
- **Forensic and Investigative Accounting.**
- **Forensic Science_ Fundamentals and Investigations.**
- **Fundamental Analysis For Dummies.**
- **How to Read A Financial Report (Wringing Vital Signs Out Of The Numbers).**
- **How to Read a Financial Report_ Wringing Vital Signs Out of the Numbers.**
- **Managerial Accounting For Dummies.**
- **Money Laundering _ A Guide for Criminal Investigators.**
- **Reading financial reports for dummies.**
- **The Personal MBA_ Master the Art of Business.**
- **Training Manual-Reporting on Corruption Investigative Journalism.**

11. Step 5: Analyse Resources I have Gathered. Open Investigative Journalism Folder. Choose and Use One Of The Following Books From Other Books and Follow Every Step

- Who is Running The Company.
- Corporate Governance.
- How to Analyze People at First Sight.
- How to Avoid Being Killed in a War Zone_ The Essential Survival Guide for Dangerous Places.
- Information Security for Journalism.
- investigating local govt.
- Investigating,Companies,A,DIY,Handbook,University,of,Liverpool.
- Learn to Earn_ A Beginner's Guide to the Basics of Investing and Business.
- Predictive analytics for dummies.
- Spy the Lie_ Former CIA Officers Teach You How to Detect Deception.
- Verification Handbook.

12. STEP 12 IN SYNTOPICAL READING: FINDING THE RELEVANT PASSAGES. Since we are of course assuming that you know how to read analytically, we are assuming that you could read each of the relevant books thoroughly if you wanted to. But that would be to place the individual books first in the order of your priorities, and your problem second. In fact, the order is reversed. *In syntopical reading, it is you and your concerns that are primarily to be served, not the books that you read. First,* the topic in connection with which the passage is being read serves to give direction to the reader in interpreting the passage. But it does not tell him what the passage means, since the passage may be relevant to the topic in several or many different ways. Hence the reader is called upon to *discover precisely what relevance the passage has to the topic.* To learn to do this is to acquire a major skill in the art of reading.

13. STEP 13 Use Rules of Reading by Analysing the various text. IN SYNTOPICAL READING: BRINGING THE AUTHORS TO TERMS. In interpretive reading (the second stage of analytical reading) the first rule requires you to come to terms with the author, which means identifying his key words and discovering how he uses them. But now you are faced with a number of different authors, and it is unlikely that they will have all used the same words, or even the same terms. *Thus it is you who must establish the terms, and bring your authors to them rather than the other way around.* *First* the collection of a number of passages on the same topic, but from different works and different authors, serves to *sharpen the reader's interpretation of each passage read.* Sometimes, when passages from the same book are read in sequence and in the context of one another, each becomes clearer. Sometimes the meaning of each of a series of contrasting or conflicting passages from different books is accentuated when they are read against one another. And sometimes the passages from one author, by amplifying or commenting on the passages from another, materially help the reader's understanding of the second author. *Second* if syntopical reading is done on a number of different subjects, the fact that the same passage will often be found cited in the Syntopicon under two or more subjects will have its instructive effect. The passage has an amplitude of meaning that the reader will come to perceive as he interprets it somewhat differently in relation to different topics. Such multiple interpretation not only is a basic exercise in the art of reading but also tends to make the mind habitually alert to the many strains of meaning that any rich or complex passage can contain. This is probably the most difficult step in syntopical reading. What it really comes down to is forcing an author *to use your language, rather than using his.* All of our normal reading habits are opposed to this. As we have pointed out several times, we assume that the author of a book we want to read analytically is our better, and this is particularly true if the book is a great one. Our tendency is to accept the author's terms and his organization of the subject matter, no matter how active we may be in trying to understand him. In syntopical reading, however, we will very quickly be lost if we accept any one author's terminology. We may understand *his* book, but we will fail to understand the others, and we will find that not much light is shed on the subject in which we are interested. Not only must we resolutely refuse to accept the terminology of *any one* author; we must also be willing to face the possibility that *no* author's terminology will be useful to us. In other words, we must accept the fact that coincidence of terminology between us and any of the authors on our list is merely accidental. Often, indeed, such coincidence will be inconvenient; for if we use one term or set of terms of an author, we may be tempted to use others among his terms, and these may get in the way rather than help. Syntopical reading, in short, is to a large extent an exercise in translation. We do not have to translate from one natural language to another, as from French to English. But we do impose a common terminology on a number of authors who, whatever natural language they may have shared in common, may not have been specifically concerned with the problem we are trying to solve, and therefore may not have created the

ideal terminology for dealing with it. This means that as we proceed on our project of syntopical reading we must begin to build up a set of terms that first, helps us to understand all of our authors, not just one or a few of them, and second, helps us to solve our problem. That insight leads to the third step.

14. STEP 14 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: GETTING THE QUESTIONS CLEAR. The second rule of interpretive reading requires us to find the author's key sentences, and from them to develop an understanding of his propositions. Propositions are made up of terms, and of course we must do a similar job on the works we are reading syntopically. But since we ourselves are establishing the terminology in this case, *we are faced with the task of establishing a set of neutral propositions as well*. The best way to do this is to frame a set of questions that shed light on our problem, and to which each of our authors gives answers. This, too, is difficult. The questions must be stated in such a way and in such an order that they help us to solve the problem we started with, but they also must be framed in such a way that all or most of our authors can be interpreted as giving answers to them. The difficulty is that the questions we want answered may not have been seen as questions by the authors. Their view of the subject may have been quite different from ours. Sometimes, indeed, we have to accept the fact that an author gives *no* answer to one or more of our questions. In that case, we must record him as silent or indeterminate on the question. But even if he does not discuss the question explicitly, we can sometimes find an implicit answer in his book. *If* he had considered the question, we may conclude, he would *then* have answered it in such and such a way. Restraint is necessary here; we cannot put thoughts into our authors' minds, or words into their mouths. But we also cannot depend entirely on their explicit statements about the problem. If we could depend on any one of them in that way, we probably would have no problem to solve. We have said that the questions must be put in an order that is helpful to us in our investigation. The order depends on the subject, of course, but some general directions can be suggested. The first questions usually have to do with *the existence or character of the phenomenon or idea we are investigating*. If an author says that the phenomenon exists or that the idea has a certain character, then we may ask further questions of his book. These may have to do with *how the phenomenon is known or how the idea manifests itself*. A final set of questions might have to do with *the consequences of the answers to the previous questions*. We should not expect that all of our authors will answer our questions in the same way. If they did, we would once again have no problem to solve; it would have been solved by consensus. Since the authors will differ, we are faced with having to take the next step in syntopical reading.

15. STEP 15 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: DEFINING THE ISSUES. If a question is clear, and if we can be reasonably certain that authors answer it in different ways— perhaps pro and con—then an issue has been defined. It is the issue between the authors who answer the question in one way, and those who answer it in one or another opposing way.

16. STEP 16 Use One of Rules of Reading Methods For Full Analysis of Texts.

17. STEP 17 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Context Of Author's text.

1. What is Immediate Context?
2. What is the Book Context?

18. STEP 18 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. What are The Facts Within Context of an Author.

19. STEP 19 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Grammar Of Texts.

20. STEP 20 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Logic Of Texts.

21. Step 21- Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

22. Step 22- Facts within The Context.

23. Step 23- Do the Fact Checking. Checking Facts, If they are correct or incorrect.

A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.

- Fact Checking Process.
- Verification Handbook.
- The Data Journalism.
- Data Journalism - Centre for Investigative Journalism.
- Tutorial-computational-fact-checking-a-content-management-perspective.
- Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
- Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
- The Effect of Fact-checking on Elites.
- Why do journalists fact-check.
- Fact-checking 101.
- Sagan-Baloney.
- Fact Checking.

B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:

- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries

- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University

- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

- C. Do full fact checking of the facts the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- D. Do full fact checking of the figures the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- E. Do full fact checking of the statistics the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- F. Do full fact checking of the formulas the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- G. Do full fact checking of the mathematical results the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

24. Step 24 Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?
- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?

- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing views? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing views to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalization or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

25. Step 25. Checking Each Fact's Sources, If they Are Reliable or Unreliable.

Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Is the Source Reliable or Unreliable?

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.

- 34. Eyewitness.
- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original form and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website

8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories
 8. Is the Source Reliable or Unreliable?

26. STEP 26 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. Analysis of Rhetoric Of Texts.

A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:

- Rhetoric By Aristotle.
- A Companion to Rhetoric and Rhetorical Criticism.
- Ancient Rhetoric From Aristotle to Philostratus.
- Ancient Rhetoric For Contemporary Students by Sharon Crowley.
- Art Of Rhetoric By Aristotle.
- Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
- Encyclopaedia of Rhetoric.
- On Rhetoric: Theory of Civic Discourse by Aristotle.
- Politics and Rhetoric: The Persuasive Power of Metaphor.
- Rhetoric By Jennifer Richards.
- Rhetoric In Details By John Benjamins.
- Rhetorical Grammar By Martha Kolln.
- Sourcebook on Rhetoric By James Jasinski.
- The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
- The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
- The Rhetoric of Reason By James Crosswhite.
- Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
- Writing Arguments: a RHETORIC With Reading by John Ramage.

B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

C. When only two answers are given by all of the authors examined, the issue is a relatively simple one. Often, more than two alternative answers are given to a question. In that case, the opposing answers must be ordered in relation to one another, and the authors who adopt them classified according to their views. An issue is truly joined when two authors who understand a question in the same way answer it in contrary or contradictory ways. But this does not happen as often as one might wish. Usually, differences in answers must be ascribed to *different conceptions of the question* as often as to *different views of the subject*. The task of the syntopical reader is to define the issues in such a way as to

insure that they are joined as well as may be. Sometimes this forces him to frame the question in a way that is not explicitly employed by any author. There may be many issues involved in the discussion of the problem we are dealing with, but it is likely that they will fall into groups. Questions about the character of the idea under consideration, for example, may generate a number of issues that are connected. A number of issues revolving around a closely connected set of questions may be termed the *controversy* about that aspect of the subject. Such a controversy may be very complicated, and it is the task of the syntopical reader to sort it out and arrange it in an orderly and perspicuous fashion, even if no author has managed to do that. This sorting and arranging of the controversies, as well as of the constituent issues, brings us to the final step in syntopical reading.

27. STEP 27 Use Rules of Reading by reading the various text. IN SYNTOPICAL READING: ANALYSING THE DISCUSSION. So far we have found the relevant passages in the works examined, created a neutral terminology that applies to all or most of the authors examined, framed and ordered a set of questions that most of them can be interpreted as answering, and defined and arranged the issues produced by differing answers to the questions. What then remains to be done? The first four steps correspond to the first two groups of rules for analytical reading. Those rules, when followed and applied to any book, allowed us to answer the questions, What does it say? and How does it say it? In our syntopical reading project, we are similarly able at this point to answer the same questions about the discussion concerning our problem. In the case of the analytical reading of a single work, two further questions remained to be answered, namely, Is it true? and What of it? In the case of syntopical reading, we are now prepared to address ourselves to similar questions about the discussion. Let us assume that the problem with which we began was not a simple one, but was rather one of those perennial problems with which thinkers have struggled for centuries, and about which good men have disagreed and can continue to disagree. We should recognize, on this assumption, that our task as syntopical readers is not merely to answer the questions ourselves—the questions that we have so carefully framed and ordered both to elucidate the discussion of the subject and the subject itself. The truth about a problem of this sort is not found so easily. In fact, we would probably be presumptuous to expect that the truth could be found in any one set of answers to the questions. Rather, it is to be found, if at all, in *the conflict of opposing answers*, many if not all of which may have persuasive evidence and convincing reasons to support them. The truth, then, insofar as it can be found—the solution to the problem, insofar as that is available to us—consists rather in the *ordered discussion itself* than in any set of propositions or assertions about it. Thus, in order to present

this truth to our minds—and to the minds of others—we have to do more than merely ask and answer the questions. We have to ask them in a certain order, and be able to defend that order; we must show how the questions are answered differently and try to say why; and we must be able to point to the texts in the books examined that support our classification of answers. Only when we have done all of this can we claim to have analysed the discussion of our problem. And only then can we claim to have understood it. We may, indeed, have done more than that. A thorough analysis of the discussion of a problem may provide the groundwork for further productive work on the problem by others. It can clear away the deadwood and prepare the way for an original thinker to make a breakthrough. Without the work of analysis, that might not have been possible, for the dimensions of the problem might not have been visible.

28. Take notes on literature.

29. By reading, you will identify certain questions within the area of research.

30. Master the literature in the area of research.

31. Use Rules of Writing.

Mixed Method

Method 27-Mixed Methods of Rules of Reading

1. Decide, What Rules of Reading Method I Will Use For Following:

- I. Reading.**
- II. Deep Work.**
- III. Listening.**
- IV. Analysis.**
- V. Thinking.**
- VI. Learning.**
- VII. Study.**
- VIII. Investigative Journalist.**
- IX. Syntopicon.**
- X. Research.**
- XI. Asking Questions.**
- XII. Doing.**

2. Choose One of the Method of Rules of Reading For Following:.

A. VERY VERY FAST Reading- Skimming. Pages 47-51.

B. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

I. Method 1-Chapter Summary Method. Pages 143-147.

II. Method 2-Character Quality Method. Pages 148-160.

III. Method 3-Thematic Method. Pages 161-163.

IV. Method 4-Biographical Method. Pages 164-176.

V. Method 5-Topical Method. Pages 177-180.

VI. Method 6-Word Study Method. Pages 181-189.

VII. Method 7-Book Background Method. Pages 190-194.

VIII. Method 8-Book Survey Method. Pages 195-205.

IX. Method 9-Chapter Analysis Method. Pages 206-215.

X. Method 10-Paragraph Study. Pages 216-229.

XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.

XII. Method 12-Book Synthesis Method. Pages 235-238.

XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.

XIV. Method 14-Studying Bible Prophecy. Pages 246-259.

XV. Method 15-Typological Study Method. Pages 260-262.

XVI.Method 16- John MacArthur Way Bible Study. Pages 263-268.

XVII.Method 17-Inductive Bible Study Method. Pages 269-296.

XVIII.Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.

XIX.Method 19-Theological Group of Principles. Pages 303-306.

XX.Method 20- How To Read A Book Pages 307.

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.

II. Method 22-How To Read A Book For Various Books. Pages 342-600.

III. Method 23- Syntopicon Pages 601-642.

IV. Method 24-The Craft of Research. Pages 644-882.

V. Method 25-Research Books can Be Used. Pages 883-897.

VI. Method 26-Investigative Journalism. Pages 898-923.

VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.

3. Analysis of Logic.

4. Analysis of Grammar.

5. Discourse Analysis of The Text

A. Use the Following Books for Discourse Analysis:

- Critical Discourse Analysis_ The Critical Study of Language.
- Discourse analysis.
- The Routledge handbook of discourse analysis.

6. Analysis of Genre.

A. Open Figure Of Speech Folder. Use the Following Books for Analysis of Genre :

- Literary Device.
- FIGURES OF SPEECH - Biblical Research Journal.
- Figures of Speech.

7. Analysis of Context

1. What is Immediate Context?
2. What is the Book Context?
3. What is the Whole Context?

11. Facts within The Context.

12. Do the Fact Checking. Checking Facts, If they are correct or incorrect.

A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.

- Fact Checking Process.
- Verification Handbook.
- The Data Journalism.
- Data Journalism - Centre for Investigative Journalism.
- Tutorial-computational-fact-checking-a-content-management-perspective.
- Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
- Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
- The Effect of Fact-checking on Elites.
- Why do journalists fact-check.
- Fact-checking 101.
- Sagan-Baloney.
- Fact Checking.

B. Research the Facts, figures and ideas and do fact checking, if these are true or false through:

- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University
- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries

- Bubl Link
- Look at all academic search engine and journals and books published by academics
- Expository or ordinary Bible commentaries-have between 1-50 commentaries on the text you study
- Treasure of scripture knowledge
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Doctrinal issues
- Books on custom
- Books on Culture
- Books on economy
- Books on political
- Books on geography
- Books on social
- Books on reconstructing the time
- Concordance
- Biblical greek dictionary
- Biblical Hebrew Dictionary
- Biblical Greek text
- Biblical Hebrew text
- Biblical Hebrew Grammar-Beginners to Advanced
- Biblical Greek Grammar-Beginners to Advanced
- Life and time of Jesus the Messiah
- Biography and History on Life and time of Paul, Peter, John, Luke, Matthew, Mark and other apostles
- Topical Study
- Wikipedia
- E-book
- Books about autobiography and Biography
- Websites
- University

- Books
- Audiobooks
- Handbooks
- Dictionary
- Cross References
- Atlas
- Commentaries
- Articles
- Journals
- Newspapers
- Websites
- Harvard business review
- Google professor manual
- Lensman Solvay
- Brussels
- My Athens
- Academic works and index
- Academic information
- Iseek education
- Virtual LRC
- Refseek
- Google scholar
- Microsoft academic search
- Trade journals
- Encyclopedia
- Wiki
- Handbooks
- Diaries
- Bubl Link
- Look at all academic search engine and journals and books published by academics.

- C. Do full fact checking of the facts the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- D. Do full fact checking of the figures the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- E. Do full fact checking of the statistics the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- F. Do full fact checking of the formulas the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- G. Do full fact checking of the mathematical results the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- H. Do full fact checking of the evidences the author provided.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?
- I. Any other information author provided do full fact checking.
 - Are The Facts Provided are Trustworthy?
 - Are the FACTS are True or Wrong?
 - Has the Author Did a Full Fact Checks on either side?

Do Checking The Sources of Each Fact Provided

- A. Use The Following Books To Do the Fact Checking
- B. Does the Author provided the list of sources citation?

13. Bias vs Unbiased

- A. Listen and read if the author is biased or unbiased.
- B. Is the author best representative for one or another side?
- C. Is the author bias or not? What is the author's bias and purpose?
- D. Does the speaker or writer have personal or professional interest in the information they are presenting?
- E. How a writer might purposely present ideas or events in ways that favour a particular political party/organisation/religion/social group?
- F. Does the author presents facts and explain the ideas to reader or listener?
- G. Is the author uses facts and opinions to argue for or against some idea?
- H. Is the author tries to amuse or interest the reader with humour, suspense, intense and stories?
- I. Look at the language in the passage?
 - If it is neutral and objective, the purpose is probably simply to inform the reader?
 - If is includes terms and are strongly positive, negative or emotional, the purpose is probably to persuade the reader?
 - It is include situations or descriptions that are funny, surprising or intriguing the writer, probably wants to entertain the reader?
- J. Is the author biased?
 - Is the author presenting only one side of an argument?
 - Is it include only facts and examples that support writer's opinion?
 - Is it using the language intended to influence the reader's emotions?
 - Is it ridicules other opinions or views?
- K. Does the author have contradictory information, cherry picked evidence or carefully select language in which to present information favourably?
- L. Is the author or speaker speaks/writes for company, special interest group, an institute foundation think tank or political party?
- M. Does the author/writer gets paid or provided any gift for endorsement or opinion?
- N. Does the person have interest on this topic or has any personal gain? If not then this writer/speaker is disinterested, impartial/unbiased objective.
- O. If the speaker/writer has interest, then why does she/he present the information/ data in such a way?
- P. In surveys or studies has the author worded the question in such a way to ensure the sought-after response?

- Q. Is the company paid the author to prove that the device or product is better than any other product in the market?
- R. Is the marketer or industry trying to defend the product? Did the author put the best spin on its information?
- S. When was the survey or studies or experiment done?
- T. What day were the tests, survey or experiment done?
- U. Purpose of the author writing?
- V. How did the author handle opposing views? Is the author trying to persuade the reader to some belief?
- W. Does the author fairly handle the opposing view? Or did the author dismiss opposing points without regard to their possible value?
- X. Does the writer make any straw man fallacy, misrepresenting opposing views to more easily knock them down?
- Y. Did the author use slanted language or commit personal attack?
- Z. Does the writer use sweeping generalisation or demonstrate an either/or approach to complicated issues, thereby revealing a strong bias toward one side?
- AA. Does the writer pretend to be objective?
- BB. Does the writer intend to be ironic or satirical, if she or he is clearly exaggerating for effect?
- CC. Does the writer admit to guesswork and speculation?

14. Checking Each Fact's Sources, If they Are Reliable or Unreliable. Sources the author used

- A. Open Fact Checking Folder. Use The Following Books to Do The Fact Checking.
- Fact Checking Process.
 - Verification Handbook.
 - The Data Journalism.
 - Data Journalism - Centre for Investigative Journalism.
 - Tutorial-computational-fact-checking-a-content-management-perspective.
 - Nato_stratcom_coe_fact-checking_and_debunking_02-02-2021-1.
 - Facts, Alternative Facts, and Fact Checking in Times of Post-Truth Politics.
 - The Effect of Fact-checking on Elites.
 - Why do journalists fact-check.
 - Fact-checking 101.
 - Sagan-Baloney.
 - Fact Checking.
- B. Listen or read what sources of information Author used
- C. What are the author's sources?
- Did the writer respond to those who have preceded them?
 - Has the writer depended on the primary/secondary/tertiary sources?
 - Has the writer misquoted the primary/secondary/tertiary or has he quoted the primary/secondary/tertiary source?
 - Has the writer uses statistics or data, has he used primary/secondary/tertiary source?
 - Has the writer interpreted the data or survey or statistics biased/unbiased?
 - Has the author correctly interpreted the information?
 - Has the author incorrectly interpreted information?
 - Search the very sources author uses and see if the author interpreted the information in correct way.
 - Has the author uses trust sources for the work he has written?

D. Is the Source Reliable or Unreliable?

E. Sources

- Is the author uses primary source in presenting some data or facts in his/her newspaper, article, book journal?
 1. Is the primary source reliable, fair, ethical and trustworthy?
 2. Is the primary source sloppy, biased, unethical?
 3. Is the primary source objective when they speaking about certain subject?
 4. Are the primary source present facts carefully or careless?
 5. Is the primary source truthfully presenting the facts, opinions and data?
 6. Who is the writer? Is he /she qualified expert to write about this topic?
 7. Did the write done proper research regarding the topic?
 8. What is the tone?
 9. What is the purpose of publication?
 10. What assumption does the author make?
 11. What are the bases of author's conclusions?
 12. Does the author agree or disagree with other authors on the subject?
 13. Was this written in regards of the counterargument other authors who have opposite views?
 14. Does the content agree or disagree with author/authors on the subject?
 15. Does the content agree or disagree with what you know or have learned about the issue?
 16. Where was the source made?
 17. Where is the material from? Is this a valid source of information?

F. Is the Source Reliable or Unreliable?

- What primary sources did the author use. This is the list of primary source:
 1. Data and original research.
 2. Diaries and journals.
 3. Letters and memos.
 4. Autobiographies and memoirs.
 5. Books or articles written at the time of event?
 6. Government documents.
 7. Census statistics.
 8. Organisational records.
 9. Documentaries.
 10. photographs, art (from the time period).
 11. Maps (from the period).
 12. Patents.
 13. Theses.
 14. Dissertations.
 15. Photographs.
 16. Journal articles.
 17. Newspaper articles.
 18. Survey research research.
 19. Meetings.
 20. Symposia.
 21. Original documents.
 22. Records of organisation.
 23. Internet.
 24. Email.
 25. Communication in listservs.
 26. Interviews.
 27. Video recordings.
 28. Audio recordings.
 29. Websites.
 30. Communication through social media.
 31. Artefacts.
 32. Reports.
 33. Works of art and architecture.
 34. Eyewitness.

- 35. Statistics.
- 36. Oral history.
- 37. Description of travel.
- 38. Cartoon.
- 39. Postcards.
- 40. Posters.
- 41. Internet communications.
- 42. Any above reprinted in the original format and language.

- Is the author use secondary source in presenting some data or facts in his/her newspaper, articles, book, magazine/, journal?
 1. Is the second hand source reliable, fair ethical and trustworthy?
 2. Is the second hand source being sloppy, biased, unethical in their quoting paraphrasing and summarising?
 3. Is the secondary source objectively when they are speaking about certain subject?
 4. Are the secondary source present facts carefully or careless?
 5. Is the secondary source truthfully presents the facts opinions/data?
 6. Is the secondary data was accepted blind faith or skeptically analysed by author?
 7. What secondary source did the author use? This is the list of secondary sources:
 - Encyclopedia
 - Chronologies
 - Biographies
 - Monographs
 - Most journal article
 - Literary criticism
 - Political analysis
 - Review of law and legislations
 - Essay on morals and ethics
 - Analyses of social policy
 - Study and teaching material
 - Literature reviews
 - Research articles
 - Criticism of works of literature, art and music
 - Most published books
 - Abstract of articles
 - Paraphrased quotation
 - Dictionaries
 - Textbooks
 - Commentaries
 - Magazines and newspaper articles
 - Website

8. Is the Source Reliable or Unreliable?

- Is the author use tertiary source in presenting some data or facts in her newspaper, articles, book journal or magazine
 1. Is the tertiary hand source reliable, fair, ethical and trustworthy?
 2. Is the tertiary hand source being sloppy, biased, unethical in their quoting, paraphrasing and summarising.
 3. Is the tertiary source objectively when they are speaking about certain subject?
 4. Are the tertiary source present facts carefully or careless?
 5. Is the tertiary source truthfully presents the facts opinions/data?
 6. Is the tertiary data was accepted blind faith or skeptically analysed by author?
 7. What tertiary source did the author use? List:
 - Almanacs
 - Bibliographies
 - Classification
 - Population registers
 - Chronologies
 - Dictionaries
 - Encyclopedias
 - Directories
 - Fact books
 - Guidebooks
 - Indexes
 - Abstract sources
 - Manuals textbooks
 - Handbooks
 - Wikipedia
 - Concordance
 - Field guides
 - Timelines
 - Surveys
 - Overview articles
 - Directories
 8. Is the Source Reliable or Unreliable?

14. Rhetorical Analysis Of The Text

A. Open Rhetorical Analysis Folder. Use The Following Books For Rhetorical Analysis of The Book:

- Rhetoric By Aristotle.
- A Companion to Rhetoric and Rhetorical Criticism.
- Ancient Rhetoric From Aristotle to Philostratus.
- Ancient Rhetoric For Contemporary Students by Sharon Crowley.
- Art Of Rhetoric By Aristotle.
- Conversations In American Literature: Language, Rhetoric, Culture By Robin Aufses.
- Encyclopaedia of Rhetoric.
- On Rhetoric: Theory of Civic Discourse by Aristotle.
- Politics and Rhetoric: The Persuasive Power of Metaphor.
- Rhetoric By Jennifer Richards.
- Rhetoric In Details By John Benjamins.
- Rhetorical Grammar By Martha Kolln.
- Sourcebook on Rhetoric By James Jasinski.
- The Language of Composition: Reading, Writing, Rhetoric by Renee Shea.
- The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.
- The Rhetoric of Reason By James Crosswhite.
- Trivium- Liberal Arts of Logic, Grammar and Rhetoric By Sister Mirriam Joseph.
- Writing Arguments: a RHETORIC With Reading by John Ramage.

B. Follow Every step of the Book, I have chose to do Rhetorical Analysis.

15. Take notes on literature.

16. By reading, you will identify certain questions within the area of research.

17. Master the literature in the area of research.

18. Use Rules of Writing.

*PART 6: Analysis Of Book By
Using External Sources.*

Step 40-Aids To Reading, Listening, Conversation, Debate

Any aid to reading that lies outside the book being read we may speak of as extrinsic. By “intrinsic reading” we mean reading a book in itself, quite apart from all other books. By “extrinsic reading” we mean reading a book in the light of other books. So far we have intentionally avoided mentioning any extrinsic aids to reading. The rules of reading we have set forth are rules of intrinsic reading—they do not include going outside the book to discover what it means. There are good reasons for our having insisted up to now on your primary task as a reader—taking the book into your study and working on it by yourself, with the power of your own mind, and with no other aids. But it would be wrong to continue insisting on this. Extrinsic aids can help. And sometimes they are necessary for full understanding.

One reason why we have said nothing about extrinsic reading up to now is that intrinsic and extrinsic reading tend to fuse in the actual process of understanding and criticising a book. We really cannot help bringing our experience to bear on the tasks of interpretation and criticism and even outlining. We must have read other books before this one; no one starts his reading career by reading analytically. We may not bring to bear our experience both of other books and of life as systematically as we should, but we nevertheless measure the statements and conclusions of a writer against other things that we know, from many different sources. Thus it is common sense to say that no book should be, because no book can be, read entirely and completely in isolation.

But the main reason for avoiding extrinsic aids up to this point is that many readers depend on them too slavishly, and we wanted you to realize that this is unnecessary. Reading a book with a dictionary in the other hand is a bad idea, although this does not mean you should never go to a dictionary for the meanings of words that are strange to you. And seeking the meaning of a book that puzzles you in a commentary is often ill-advised. On the whole, it is best to do all that you can by yourself before seeking outside help; for if you act consistently on this principle, you will find that you need less and less outside help.

The extrinsic aids to reading fall into four categories. In the order in which we will discuss them in this chapter, they are: first, relevant experiences; second, other books; third, commentaries and abstracts; fourth, reference books.

How and when to use any of these types of extrinsic aids cannot be stated for every particular case. Some general suggestions can be made, however. It is a common-sense maxim of reading that outside help should be sought whenever a book remains unintelligible to you, either in whole or part, *after you have done your best to read it according to the rules of intrinsic reading.*

The Role of Relevant Experience

There are two types of relevant experience that may be referred to for help in understanding difficult books. We have already mentioned the distinction involved, when we spoke in Chapter 6 of the difference between common experience and special experience. Common experience is available to all men and women just because they are alive. Special experience must be actively sought and is available only to those who go to the trouble of acquiring it. The best example of special experience is an experiment in a laboratory, but a laboratory is not always required. An anthropologist may acquire special experience by traveling to the Amazon basin, for example, to study the aboriginal inhabitants of a region that has not yet been explored. He thereby gains experience that is not ordinarily available to others, and that will never be available to many; for if large numbers of scientists invade the region, it will cease to be unique. Similarly, the experience of the astronauts on the moon is highly special, although the moon is not a laboratory in the ordinary sense of the term. Most men do not have the opportunity of knowing what it is like to live on an airless planet, and it will be centuries before this becomes a common experience, if it ever does. Jupiter, too, with its enormously greater gravity, will remain a "laboratory" in this sense for a long time to come, and may always be such.

Common experience does not have to be shared by everyone in order to be common. *Common* is not the same as *universal*. The experience of being a child of parents, for example, is not shared by every human being, for some are orphans from birth. However, family life is nevertheless common experience, because most men and women, in the ordinary course of their lives, share it. Nor is sexual love a universal experience, although it is common, in the sense we are giving the word *common*. Some men and women never experience it, but the experience is shared by such a high proportion of humans that it cannot be called special. (This does not mean that sexual activity cannot be studied in the laboratory, as in fact it has been.) The experience of being taught is not universal, either, for some men and women never go to school. But it, too, is common.

The two kinds of experience are mainly relevant to different kinds of books. Common experience is most relevant to the reading of fiction, on the one hand, and to the reading of philosophy, on the other. Judgments concerning the verisimilitude of a novel are almost wholly based on common experience; the book, we say, is either true or not true to our experience of life as it is led by most people, ourselves included. The philosopher, like the poet, appeals to the common experience of mankind. He does no work in laboratories or research in the field. Hence to understand and test a philosopher's leading principles you do not need the extrinsic aid of special experience. He refers you to your own common sense and your daily observation of the world in which you live.

Special experience is mainly relevant to the reading of scientific works. To understand and judge the inductive arguments in a scientific book, you must be able to follow the evidence that the scientist reports as their basis. Sometimes the scientist's description of an experiment is so vivid and clear that you have no trouble. Sometimes illustrations and diagrams help to acquaint you with the phenomena described.

Both common and special experience are relevant to the reading of history books. This is because history partakes both of the fictional and the scientific. On the one hand, a narrative history is a story, having a plot and characters, episodes, complications of action, a climax, an aftermath. The common experience that is relevant to reading novels and plays is relevant here, too. But history is also like science, in the sense that at least some of the experience on which the historian bases his work is quite special. He may have read a document or many documents that the reader could not manage to see without great trouble. He may have done extensive research, either into the remains of past civilizations or in the form of interviews with living persons in faraway places.

How do you know whether you are making proper use of your experience to help you understand a book? The surest test is one we have already recommended as a test of understanding: ask yourself whether you can give a concrete example of a point that you feel you understand. We have many times asked students to do this, only to find that they could not. The students appeared to have understood the point, but they were completely at a loss when called upon to supply an example. Obviously, they had not really understood the book. Test yourself in this way when you are not quite sure whether you have grasped a book. Take Aristotle's discussion of virtue in the *Ethics*, for example. He says over and over that virtue is a mean between the extremes of defect and excess. He gives some concrete examples; can you supply others? If so, you have understood his general point. If not, you should go back and read his discussion again.

Other Books as Extrinsic Aids to Reading

We will have more to say later about syntopical reading, where more than one book is read on a single subject. For the moment, we want to say a few things about the desirability of reading other books as extrinsic aids to the reading of a particular work.

Our advice applies particularly to the reading of so-called great books. The enthusiasm with which people embark on a course of reading great books often gives way, fairly soon, to a feeling of hopeless inadequacy. One reason, of course, is that many readers do not know how to read a single book very well. But that is not all. There is another reason: namely, that they think they should be able to understand the first book they pick up, without having read the others to which it is closely related. They may try to read *The Federalist Papers* without having first read the Articles of Confederation and the Constitution. Or they may try all these without having read Montesquieu's *The Spirit of Laws*, Rousseau's *The Social Contract*, and Locke's second treatise *Of Civil Government*.

Not only are many of the great books related, but also they were written in a certain order that should not be ignored. A later writer has been influenced by an earlier one. If you read the earlier writer first, he may help you to understand the later one. Reading related books in relation to one another and in an order that renders the later ones more intelligible is a basic common-sense maxim of extrinsic reading.

The utility of this kind of extrinsic reading is simply an extension of the value of context in reading a book by itself. We have seen how the context must be used to interpret words and sentences to find terms and propositions. Just as the whole book is the context for any of its parts, so related books provide an even larger context that helps you interpret the book you are reading.

It has often been observed that the great books are involved in a prolonged conversation. The great authors were great readers, and one way to understand them is to read the books they read. As readers, they carried on a conversation with other authors, just as each of us carries on a conversation with the books we read, though we may not write other books.

To join this conversation, we must read the great books in relation to one another, and in an order that somehow respects chronology. The conversation of the books takes place in time. Time is of the essence here and should not be disregarded. The books can be read from the present into the past or from the past into the present. Though the order from past to present has certain advantages through being more natural, the fact of chronology can be observed in either way.

It should be noted, incidentally, that the need to read books in relation to one another applies more to history and philosophy than to science and fiction. It is most important in the case of philosophy, because philosophers are great readers of each other. It is probably least important in the case of novels or plays, which, if they are really good, can be read in isolation, although of course the literary critic will not want to confine himself to doing so.

How to Use Commentaries and Abstracts

A third category of extrinsic aids to reading includes commentaries and abstracts. The thing to emphasize here is that such works should be used wisely, which is to say sparingly. There are two reasons for this.

The first is that commentators are not always right in their comments on a book. Sometimes, of course, their works are enormously useful, but this is true less often than one could wish. The handbooks and manuals that are widely available in college bookstores and in stores frequented by high school students are often particularly misleading. These works purport to tell the student everything he has to know about a book that has been assigned by one of his teachers, but they are sometimes woefully wrong in their interpretations, and besides, as a practical matter, they irritate some teachers and professors.

In defense of handbooks, it must be conceded that they are often invaluable for passing examinations. Furthermore, to balance the fact that some teachers are irritated by the errors of handbooks, other teachers use them themselves in their teaching.

The second reason for using commentaries sparingly is that, even if they are right, they may not be exhaustive. That is, you may be able to discover important meanings in a book that the author of a commentary about it has not discovered. Reading a commentary, particularly one that seems very self-assured, thus tends to limit your understanding of a book, even if your understanding, as far as it goes, is correct.

Hence, there is one piece of advice that we want to give you about using commentaries. Indeed, this comes close to being a basic maxim of extrinsic reading. Whereas it is one of the rules of intrinsic reading that you should read an author's preface and introduction *before* reading his book, the rule in the case of extrinsic reading is that you should not read a commentary by someone else until *after* you have read the book. This applies particularly to scholarly and critical introductions. They are properly used only if you do your best to read the book first, and then and only then apply to them for answers to questions that still puzzle you. If you read them first they are likely to distort your reading of the book. You will tend to see only the points made by the scholar or critic, and fail to see other points that may be just as important.

There is considerable pleasure associated with the reading of such introductions when it is done in this way. You have read the book and understood it. The writer of the introduction has also read it, perhaps many times, and has his own understanding of it. You approach him, therefore, on essentially equal terms. If you read his introduction before reading the book, however, you are at his mercy.

Heeding this rule, that commentaries should be read after you have read the book that they expound and not before, applies also to handbooks. Such works cannot hurt you if you have already read the book and know where the handbook is wrong, if it is. But if you depend wholly on the handbook, and never read the original book, you may be in bad trouble.

And there is this further point. If you get into the habit of depending on commentaries and handbooks, you will be totally lost if you cannot find one. You may be able to understand a particular book with the help of a commentary, but in general you will be a worse reader.

The rule of extrinsic reading given here applies also to abstracts and plot digests. They are useful in two connections, but in those two only. First, they can help to jog your memory of a book's contents, if you have already read it. Ideally, you made such an abstract yourself, in reading the book analytically, but if you have not done so, an abstract or digest can be an important aid. Second, abstracts are useful when you are engaged in syntopical reading, and wish to know whether a certain work is likely to be germane to your project. An abstract can never replace the reading of a book, but it can sometimes tell you whether you want or need to read the book or not.

How to Use Reference Books

There are many kinds of reference books. In the following section we will confine ourselves mainly to the two most used kinds, dictionaries and encyclopedias.

However, many of the things we will have to say apply to other kinds of reference books as well.

It is not always realized, yet it is nevertheless true, that a good deal of knowledge is required before you can use a reference book well. Specifically, four kinds of knowledge are required. Thus a reference book is an antidote to ignorance in only a limited way. It cannot cure total ignorance. It cannot do your thinking for you.

To use a reference book well, you must, *first*, have some idea, however vague it may be, of what you want to know. Your ignorance must be like a circle of darkness surrounded by light. You want to bring light to the dark circle. You cannot do that unless light surrounds the darkness. Another way to say this is that you must be able to ask a reference book an intelligible question. It will be no help to you if you are wandering, lost, in a fog of ignorance.

Second, you must know where to find out what you want to know. You must know what kind of question you are asking, and which kinds of reference books answer that kind of question. There is no reference book that answers all questions; all such works are specialists, as it were. Practically, this comes down to the fact that you must have a fair overall knowledge of *all* of the major types of reference books before you can use *any one* type effectively.

There is a *third*, and correlative, kind of knowledge that is required before a reference book can be useful to you. You must know how the particular work is organized. It will do you no good to know what you want to know, and to know the kind of reference book to use, if you do not know how to use the particular work. Thus there is an art of reading reference books, just as there is an art to reading anything else. There is a correlative art to making reference books, by the way. The author or compiler should know what kind of information readers will seek, and arrange his book to fit their needs. He may not always be able to anticipate these, however, which is why the rule that you should read the introduction and preface to a book before reading the book itself applies particularly here. Do not try to use a reference book before getting the editor's advice on *how* to use it.

Of course, not all kinds of questions can be answered by reference books. You will not find in any reference book the answers to the three questions that God asks the angel in Tolstoy's story, *What Men Live By*—namely, "What dwells in man?" "What is not given to man?" and "What do men live by?" Nor will you find the answers to another question that is also used as the title of a Tolstoy story: "How much land does a man need?" And there are many such questions. Reference books are only useful when you know which kinds of questions can be answered by them, and which cannot. This comes down to knowing the

sorts of things that men generally agree on. Only those things about which men generally and conventionally agree are to be found in reference books. Unsupported opinions have no business there, though they sometimes creep in.

We agree that it is possible to know when a man was born, when he died, and facts about similar matters. We agree that it is possible to define words and things, and that it is possible to sketch the history of almost anything. We do not agree on moral questions or on questions about the future, and so these sorts of things are not to be found in reference books. We assume in our time that the physical world is orderable, and thus almost everything about it is to be found in reference books. This was not always so; as a result, the history of reference books is interesting in itself, for it can tell us much about changes in men's opinions as to what is knowable.

As you can see, we have just been suggesting that there is a *fourth* requirement for the intelligent use of reference books. You must know *what* you want to know; you must know *in what reference work* to find it; you must know *how* to find it in the reference work; and you must know that it is *considered knowable* by the authors or compilers of the book. All this indicates that you must know a good deal before you can use a work of reference. Reference books are useless to people who know nothing. They are not guides to the perplexed.

How to Use a Dictionary

As a reference book, the dictionary is subject to all the considerations outlined above. But the dictionary also invites a playful reading. It challenges anyone to sit down with it in an idle moment. There are worse ways to kill time.

Dictionaries are full of arcane knowledge and witty oddments. Over and above that, of course, they have their more sober employments. To make the most of these, one has to know how to read the special kind of book a dictionary is.

Santayana's remark about the Greeks—that they were the only uneducated people in European history—has a double significance. The masses were, of course, uneducated, but even the learned few—the leisure class—were not educated in the sense that they had to sit at the feet of foreign masters. Education, in that sense, begins with the Romans, who went to school to Greek pedagogues, and became cultivated through contact with the Greek culture they had conquered.

It is not surprising, therefore, that the first dictionaries were glossaries of Homeric words, intended to help Romans read the *Iliad* and *Odyssey* as well as other Greek literature employing the “archaic” Homeric vocabulary. In the same way, many of us today need a glossary to read Shakespeare, or if not Shakespeare, Chaucer.

There were dictionaries in the Middle Ages, but they were usually encyclopedias of worldly knowledge comprised of discussions of the most important technical terms employed in learned discourse. There were foreign-language dictionaries in the Renaissance (both Greek and Latin), made necessary by the fact that the works that dominated the education of the period were in the ancient languages. Even when the so-called vulgar tongues—Italian, French, English—gradually replaced Latin as the language of learning, the pursuit of learning was still the privilege of the few. Under such circumstances, dictionaries were intended for a limited audience, mainly as an aid to reading and writing worthy literature.

Thus we see that from the beginning the educational motive dominated the making of dictionaries, although there was also an interest in preserving the purity and order of the language. As contrasted with the latter purpose, the *Oxford English Dictionary* (known familiarly as the OED), begun in 1857, was a new departure, in that it did not try to dictate usage but instead to present an accurate historical record of every type of usage—the worst as well as the best, taken from popular as well as elegant writing. But this conflict between the lexicographer as self-appointed arbiter and the lexicographer as historian can be regarded as a side-issue, for the dictionary, however constructed, is primarily an educational instrument.

This fact is relevant to the rules for using a dictionary well, as an extrinsic aid to reading. The first rule of reading any book is to know what kind of book it is. That means knowing what the author's intention was and what sort of thing you can expect to find in his work. If you look upon a dictionary merely as a spelling book or guide to pronunciation, you

will use it accordingly, which is to say not well. If you realize that it contains a wealth of historical information, crystallized in the growth and development of language, you will pay attention, not merely to the variety of meanings listed under each word, but also to their order and relation.

Above all, if you are interested in advancing your own education, you will use a dictionary according to its primary intention—as a help in reading books that might otherwise be too difficult because their vocabulary includes technical words, archaic words, literary allusions, or even familiar words used in obsolete senses.

Of course, there are many problems to be solved in reading a book well other than those arising from an author's vocabulary. And we have warned against—particularly on the first reading of a difficult book—sitting with the book in one hand and the dictionary in the other. If you have to look up too many words at the beginning, you will certainly lose track of the book's unity and order. The dictionary's primary service is on those occasions when you are confronted with a technical word or with a word that is wholly new to you. Even then, we would not recommend looking up even these during your first reading of a good book unless they seem to be important to the author's general meaning.

This suggests several other negative injunctions. There is no more irritating fellow than the one who tries to settle an argument about communism, or justice, or freedom, by quoting from the dictionary. Lexicographers may be respected as authorities on word usage, but they are not the ultimate founts of wisdom. Another negative rule is: Don't swallow the dictionary. Don't try to get word-rich quick by memorizing a fancy list of words whose meanings are unconnected with any actual experience. In short, do not forget that the dictionary is a book about words, not about things.

If we remember this, we can derive from that fact all the rules for using a dictionary intelligently. Words can be looked at in four ways.

- 1. WORDS ARE PHYSICAL THINGS—writable words and speakable sounds.** There must, therefore, be uniform ways of spelling and pronouncing them, though the uniformity is often spoiled by variations, and in any event is not as eternally important as some of your teachers may have indicated.
- 2. WORDS ARE PARTS OF SPEECH.** Each single word plays a grammatical role in the more complicated structure of a phrase or sentence. The same word can vary in different usages, shifting from one part of speech to another, especially in a non-inflected language like English.
- 3. WORDS ARE SIGNS.** They have meanings, not one but many. These meanings are related in various ways. Sometimes they shade from one into another; sometimes a word will have two or more sets of totally unrelated meanings. Through their meanings, different words are related to one another—as synonyms sharing in the same meaning even though they differ in shading; or

as antonyms through opposition or contrast of meanings. Furthermore, it is in their capacity as signs that we distinguish words as proper or common names (according as they name just one thing or many that are alike in some respect); and as concrete or abstract names (according as they point to something we can sense, or refer to some aspect of things that we can understand by thought but not observe through our senses).

Finally, 4. **WORDS ARE CONVENTIONAL.** They are man-made signs. That is why every word has a history, a cultural career in the course of which it goes through certain transformations. The history of words is given by their etymological derivation from original word-roots, prefixes, and suffixes; it includes the account of their physical changes, both in spelling and pronunciation; it tells of the shifting meanings, and which among them are archaic and obsolete, which are current and regular, which are idiomatic, colloquial, or slang.

A good dictionary will answer all of these four different kinds of questions about words. The art of using a dictionary consists in knowing what questions to ask about words and how to find the answers. We have suggested the questions. The dictionary itself tells you how to find the answers.

As such, it is a perfect self-help book, because it tells you what to pay attention to and how to interpret the various abbreviations and symbols it uses in giving you the four varieties of information about words. Anyone who fails to consult the explanatory notes and the list of abbreviations at the beginning of a dictionary has only himself to blame if he is not able to use it well.

How to Use an Encyclopedia

Many of the things we have said about dictionaries apply to encyclopedias also. Like the dictionary, the encyclopedia invites a playful reading. It too is diverting, entertaining, and, for some people, soothing. But it is just as vain to try to read an encyclopedia through as a dictionary. The man who knew an encyclopedia by heart would be in grave danger of incurring the title *idiot savant*—"learned fool."

Many people use a dictionary to find out how to spell and pronounce words. The analogous employment of an encyclopedia is to use it only to look up dates and places and other such simple facts. But this is to under-use, or misuse, an encyclopedia. Like dictionaries, such works are educational as well as informational tools. A glance at their history will confirm this.

Though the word "encyclopedia" is Greek, the Greeks had no encyclopedia, and for the same reason that they had no dictionary. The word meant to them not a book about knowledge, a book in which knowledge reposed, but knowledge itself— all the knowledge that an educated man should have. It was again the Romans who first found encyclopedias necessary; the oldest extant example is that of Pliny.

Interestingly enough, the first alphabetically-arranged encyclopedia did not appear until about 1700. Most of the great encyclopedias since then have been alphabetical. It is the easiest of all arrangements, and it made possible great strides in encyclopedia-making.

Encyclopedias present a different problem from word-books. An alphabetical arrangement is natural for a dictionary. But is the world, which is the subject matter of an encyclopedia, arranged alphabetically? Obviously not. Well then, how is the world arranged and ordered? This comes down to asking how knowledge is ordered.

The ordering of knowledge has changed with the centuries. All knowledge was once ordered in relation to the seven liberal arts—grammar, rhetoric, and logic, the trivium; arithmetic, geometry, astronomy, and music, the quadrivium. Medieval encyclopedias reflected this arrangement. Since the universities were arranged according to the same system, and students studied according to it also, the arrangement was useful in education.

The modern university is very different from the medieval one, and the change is reflected in modern encyclopedias. The knowledge that they report is divided up in fiefs, or specialties, that are roughly equivalent to the various departments of the university. But this arrangement, although it forms the backbone structure of an encyclopedia, is masked by the alphabetical arrangement of the material.

It is this infra-structure—to take a term from the sociologists—that the good reader and user of an encyclopedia will seek to discover. It is true that it is primarily factual information that he wants from his set. But he should not be content with facts in isolation.

The encyclopedia presents him with an arrangement of facts— facts in relation to other facts. The understanding, as contrasted with the mere information, that an encyclopedia can provide depends on the recognition of such relations.

In an alphabetically-arranged encyclopedia, these relations are to a large extent obscured. In a topically-arranged encyclopedia, they are, of course, highlighted. But topical encyclopedias have many disadvantages, among them the fact that most readers are not accustomed to using them. Ideally, the best encyclopedia would be one that had both a topical and an alphabetical arrangement. Its presentation of material in the form of separate articles would be alphabetical, but it would also contain some kind of topical key or outline—essentially, a table of contents. (A table of contents is a topical arrangement of a book, as opposed to an index, which is an alphabetical arrangement.) As far as we know, there is no such encyclopedia on the market today, but it would be worth the effort to try to make one.

In default of the ideal, the reader must fall back on the help and advice provided him by an encyclopedia's editors. Any good encyclopedia includes directions about how to use it effectively, and these should be read and followed. Often, these directions require that the user go first to the set's index, before turning to one of the alphabetically-arranged volumes. Here, the index is serving the function of a table of contents, though not very well; for it gathers together, under one heading, references to discussions in the encyclopedia that may be widely separated in space but that are nevertheless about the same general subject. This reflects the fact that although an index is of course alphabetically arranged, its so-called analyticals—that is, the breakdowns under a main entry—are topically arranged. But the topics themselves must be in alphabetical order, which is not necessarily the best arrangement. Thus the index of a really good encyclopedia such as Britannica goes part of the way toward revealing the arrangement of knowledge that the work reflects. For this reason, any reader who fails to use the index has only himself to blame if the work does not serve his needs.

There are negative injunctions associated with the use of encyclopedias, just as there are for dictionaries. Encyclopedias, like dictionaries, are valuable adjuncts to the reading of good books—bad books do not ordinarily require their presence; but, as before, it is wise not to enslave yourself to an encyclopedia. Again, as with dictionaries, encyclopedias are not to be used for the settling of arguments where these are based on differences of opinion. Nevertheless, they *should* be used to end disputes about matters of fact as quickly and permanently as possible. Facts should never be argued about in the first place. An encyclopedia makes this vain effort unnecessary, because encyclopedias are full of facts. Ideally, they are filled with nothing else. Finally, although dictionaries usually agree in their accounts of words, encyclopedias often do not agree in their accounts of facts. Hence, if you are really interested in a subject and are depending on encyclopedic treatments of it, do not restrict yourself to just one encyclopedia. Read more than one, and preferably ones written at different times.

We noted several points about words that the user should keep in mind when he consults a dictionary. In the case of encyclopedias, the analogous points are about facts, for an encyclopedia is about facts as a dictionary is about words.

1. **FACTS ARE PROPOSITIONS.** Statements of fact employ words in combination, such as “Abraham Lincoln was born on February 12, 1809,” or “the atomic number of gold is 79.” Facts are not physical things, as words are, but they do require to be explained. For thorough knowledge, for understanding, you must also know what the significance of a fact is—how it affects the truth you are seeking. You do not know much if all you know is what the fact is.
2. **FACTS ARE “TRUE” PROPOSITIONS.** Facts are not opinions. When someone says “it is a fact that,” he means that it is generally agreed that such is the case. He never means, or never should mean, that he alone, or he together with a minority of observers, believes such and such to be the case. It is this characteristic of facts that gives the encyclopedia its tone and style. An encyclopedia that contains the unsupported opinions of its editors is dishonest; and although an encyclopedia may report opinions (for example, in a phrase like “it is held by some that this is the case, by others that that is the case”), it must clearly label them. The requirement that an encyclopedia report the facts of the case and not opinions about it (except as noted above) also limits the work’s coverage. It cannot properly deal with matters about which there is no consensus—with moral questions, for example. If it does deal with such questions, it can only properly report the disagreements among men about them.
3. **FACTS ARE REFLECTIONS OF REALITY.** Facts may be either (a) informational singulars or (b) relatively unquestioned generalizations, but in either case they are held to represent the way things really are. (The birth date of Lincoln is an informational singular; the atomic number of gold implies a relatively unquestioned generalization about matter.) Thus facts are not ideas or concepts, nor are they theories in the sense of being mere speculations about reality. Similarly, an explanation of reality (or of part of it) is not a fact until and unless there is general agreement that it is correct.

There is one exception to the last statement. An encyclopedia can properly describe a theory that is no longer held to be correct, in whole or in part, or one that has not yet been fully validated, when it is associated with a topic, person or school that is the subject of an article. Thus, for example, Aristotle’s views on the nature of celestial matter could be expounded in an article on Aristoteleanism even though we no longer believe them to be true.

Finally, 4. **FACTS ARE TO SOME EXTENT CONVENTIONAL.** Facts change, we say. We mean that some propositions that are considered to be facts in one epoch are no longer considered to be facts in another. Insofar as facts are “true” and represent reality, they cannot change, of course, because truth, strictly speaking, does not change, nor does reality. But not all propositions that we take to be true are really true; and we must concede that almost any given proposition that we take to be true can be falsified by more patient or more accurate observation and investigation. This applies particularly to the facts of science.

Facts are also—again to some extent—culturally determined. An atomic scientist, for example, maintains a complicated, hypothetical structure of reality in his mind that determines—for him—certain facts that are different from the facts that are determined for and accepted by a primitive. This does not mean that the scientist and the primitive cannot agree on any facts; they must agree, for instance, that two plus two is four, or that a physical whole is greater than any of its parts. But the primitive may not agree with the scientist’s facts about nuclear particles, just as the scientist may not agree with the primitive’s facts about ritual magic. (That was a hard sentence to write, because, being culturally determined ourselves, we tend to agree with the scientist rather than the primitive and were thus tempted to put the second “fact” in quotation marks. But that is precisely the point.)

A good encyclopedia will answer your questions about facts if you remember the points about facts that we have outlined above. The art of using an encyclopedia as an aid to reading is the art of asking the proper questions about facts. As with the dictionary, we have merely suggested the questions; the encyclopedia will supply the answers.

You should also remember that an encyclopedia is not the best place to pursue understanding. Insights may be gained from it about the order and arrangement of knowledge; but that, although an important subject, is nonetheless a limited one. There are many matters required for understanding that you will not find in an encyclopedia.

There are two particularly striking omissions. An encyclopedia, properly speaking, contains no arguments, except insofar as it reports the course of arguments that are now widely accepted as correct or at least as of historical interest. Thus a major element in expository writing is lacking. An encyclopedia also contains no poetry or imaginative literature, although it may contain facts about poetry and poets. Since both the imagination and the reason are required for understanding, this means that the encyclopedia must be a relatively unsatisfying tool in the pursuit of it.

Step 41-Commentaries On Book and What Are Other's Take on?

1. Rule 1-Use Commentaries

A. Read or listen 25min and 5min break

- Read or Listen 20 pages an Hour according Mortimer Adler.

B. Read or Listen following Tools to Use Commentaries on Books.

1. Folder Commentaries on the Book.
2. Speed of Tool Books:Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed to Find Commentaries on Books.

C. Speed of Audiobook.

- Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed to **Use Commentaries.**

1. Rule 2-What are other take on this book

D. Read or listen 25min and 5min break

- Read or Listen 20 pages an Hour according Mortimer Adler

E. Read or Listen following.

1. Books, Sermon, Journals, Newspaper, Academic Text.
2. Speed of Tool Books:Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed to Find What are other takes on this Book.

F. Speed of Audiobook.

- Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed.

Step 42 - Review Of The Book

A. Read or listen 25min and 5min break

- Read or Listen 20 pages an Hour according Mortimer Adler

B. Read or Listen between 1-50 times the book

C. Speed of Audiobook

- Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed

D. What is the: title, author, publisher, date, length, and ISBN

E. Highlight any notable aspects, good or bad, of the book's design and production. Consider aesthetics, typography, cover, design, images, table of contents, notes, references, index.

F. What qualifies the author to write this book?

G. Does the book deliver on its promise? (What does it promise? What does it deliver? Cite evidence.)

H. What is the Style (casual, formal, light, humours, serious, scholarly . . .), point of view

I. What audience am I writing for? Consider where your review will be published. Who will be reading it, and what will they want to know about a book before buying it? Put yourself in the perspective of the intended audience, even if you are not a part of it.

J. Who is the audience? (i.e. age, reading level, interests, specialties...)

K. What genres/sub-genres does this fit into? Define the primary genre, then find elements of other sub-genres that may not have been immediately identifiable.

L. For nonfiction books what is your assessment of the quality of the argument, evidence, and exposition?

- Is the book intellectually honest?

M. What, if anything, is the original contribution this book makes?

N. What did you learn? What insights did you gain? Does the book make a unique contribution to knowledge or wisdom? Does it provide a new and better way to present difficult material?

O. What surprised you? Did you ever have an **ah-ha moment** while reading the book?

P. Was it easy or difficult to read? Fun and rewarding to read?

Q. For a fiction book, consider: Did you get lost in the book? What are the salient **plot points**? Did the book achieve emotional entrainment? Was the character development intriguing? Did you care about the characters?

- R. Which part attracts you most? Which ones were boring? Which chapter is the key-point of the story? Which portions did you like most? Why?
- S. Does The Book, Text, Debate, Discussion, Speech tries to use Sneaky technique to take away the audience's attention from something more important at that time?
- T. Does The Book, Text, Debate, Discussion, Speech tries to use Sneaky technique to take away the audience's attention from something more important?
- U. Does The author, Writer, Speaker tries to use Sneaky technique to take away the audience's attention from something more important?
- V. What is your favourite quote from the book? Why?
- W. What creative value does this book contribute?
- X. How does this book affect you on the whole? How does the author achieve this?
- Y. How does each role affect the story?
- Z. What is missing?
- AA. Does the book sparkle? A book that sparkles is fun to read, breaks new ground, communicates in memorable ways, uses images effectively, is accessible to a broad audience, and influences a significant readership to change their assumptions, beliefs, or ways of thinking.
- BB. Judge the book. Is it good or bad? Why?
- CC. Who are your target readers for your review? Are you writing this review to serve someone? Is your review outstanding among all the reviews of this book?
- DD. What, if anything, makes this an important work? What does the reader stand to gain by reading this book?
- EE. Book Style
- Reading level, vocabulary, sentence length.
 - **Point of view** (omniscient narrator, first person, . . .)
 - Serious, satire, humorous, academic, pedantic, frivolous
 - Comforting, call to action, alarming, disturbing,
- FF. Was I confused at any point while reading? If the writing was unclear, note this. If you didn't understand it, other readers probably won't either.
- GG. Did I care about the characters? If the characters weren't compelling in the slightest, the story likely fell flat. If you noticed this, include it in your review. (This is primarily a consideration in fiction and memoir.)
- HH. Did it have a compelling plot? Without a compelling plot, any work involving a storyline will lose the reader's attention. If you got bored, make it clear in your review.

- II. Was the dialogue believable? If it was difficult to believe anyone would talk like the characters in the book, the characters themselves were probably difficult to imagine.
- JJ. Were the events believable? At its core, a book (unless purely informational) is a story. If a story fails to be credible, the book cannot succeed at being a book.
- KK. Did any quotes strike me? Was anything said that you found interesting, thought-provoking, or tear-jerking? Note these strong moments in your review! (If this quote spoils a surprise moment in the book, include a warning at the beginning of your review.)
- LL. Was there any information I thought to be inaccurate? Credibility is important in any genre. If one piece of false information is presented, readers will lose trust in the entire book.
- MM. Are the illustrations engaging? If it includes illustrations, note if they are eye-catching or bland. Pay special attention to this if you are reviewing a children's book.
- NN. Is there any questionable/profane/graphic content? Many readers want to be aware of this kind of content before picking up a book. Even if it doesn't bother you, note anything that may be questionable to other readers.
- OO. What is the author's voice like? Describe how the author approaches the reader. Is the tone comedic, conversational, professional, or aloof?
- PP. **Tone** is the feeling that a book evokes in the reader. In many cases, this category best answers the question, "What are you in the mood for?" A more extensive list of tone descriptors and a brief definition of each is available in the above reference.
- Humorous, solemn, distant, intimate, ironic, arrogant, condescending, authoritative, scholarly, sentimental, angry, melancholy, anguished, youthful, optimistic, deadpan, satirical, maudlin, self-righteous, and so on.
- QQ. What is the author's purpose? Consider why this book was written and what the author intends to convey to the audience.
- RR. Book Semantics
- Credible, speculative, innovative, drivel, ...
 - Informative, argumentative, entertaining, ...
 - Well organised, well argued, excellent supporting evidence,
 - Muddled logic, rambling
 - Coherence, consistency, flow.
- SS. Is the author's purpose accomplished? Now consider how the answer above came across. Was it clear, or did you have to "dig" for it?

- TT. What are the author's credentials? What makes this author the only person who could write this book? Do they have a certain education or experience that makes them unique?
- UU. Is there an index or bibliography? This extra material, though not necessary, is good to know about before picking up the book.
- VV. What other books are similar to this one? What other titles have the same style as this one? Compare it to other books to give your audience a better idea of what it is like.
- WW. What did I learn while reading? Did this book make you think more deeply about any academic or moral topics?
- XX. Who would I recommend this book to? What specific audience would enjoy this book? Is it worth the time for others to read it?
- YY. **Tone** is the feeling that a book evokes in the reader. In many cases, this category best answers the question, "What are you in the mood for?" A more extensive list of tone descriptors and a brief definition of each is available in the above reference.
- Humorous, solemn, distant, intimate, ironic, arrogant, condescending, authoritative, scholarly, sentimental, angry, melancholy, anguished, youthful, optimistic, deadpan, satirical, maudlin, self-righteous, and so on.

Step 43 - Analysing Author and Publisher and Audience

Author

1. What is the author's background, Family, Family History, Every author's family what position they were in, university credentials, Ideology and worldview?
2. What credentials does s/he have?
3. What education and at what level?
4. The reason the writer wrote the text?
5. The writer's position on a particular subject?
6. How much research went into writer's own work?
7. How much experience does the author have?
8. Is the writer an expert in the topic at issue?
9. Is the author recognised by others as an authority in the field?
10. Is the author having knowledge of the field?
11. Did the author arrived to this conclusion through careful analysis?
12. Is this author the best representative for one or another side?
13. What are the author's bias and purpose?
14. Does the speaker or writer have personal or professional interest in the information they are presenting?
15. How a writer might purposely present ideas or events in ways that favour a particular political, organisational, religious?
16. Does the author present facts and explain the ideas to reader?
17. Is the author uses facts and opinions to argue for or against some idea?
18. Is the author tries to amuse or interest the reader with humour, suspense and stories?
19. Look at the language in the passage:
 - A. If it is neutral and objective, the purpose is probably simply to inform the reader
 - B. If it includes terms that are strongly positive, negative or emotional, the purpose is probably to persuade the reader
 - C. It is including situations or descriptions that are funny, surprising, or intriguing the writer probably wants to entertain the reader.
20. Is the author biased:

- A. Is the author presenting only one side of an argument?
 - B. Is it including only facts or examples that support the writer's opinion?
 - C. Is it using the language intended to influence the reader's emotions?
 - D. Is it ridicules other opinions or views
21. Does the author have contradictory information, cherry pick evidence or carefully select language in which to present information favourably?
 22. Is the author or speaker speaks/writes for the company, special interest group, an institute, a foundation think tank or a political party?
 23. Does she get paid for this endorsement or opinion?
 24. Does the person have interest on this topic or has any personal gain? If not then this writer or speaker is disinterested, impartial (unbiased) objective
 25. If the speaker/writer has interested, than why does s/he present the information/ argument/data in such a way?
 26. In surveys or studies, has the author worded the questions in such a way to ensure the sought after response?
 27. Is the company paid the author to proof that the devise or product is better than any other product in the market?
 28. Is the industry try to defend the product? Did the author put the best spin on its information?
 29. When was the survey or studies or experiment done?
 30. At what day were the tests, surveys or experiment done?
 31. Purpose of the author writing?
 32. How did the author handle the opposing view? Is the author trying to persuade the reader to some belief?
 33. Does the author fairly handled the opposing view? Or did the author dismiss opposing points without regard to their possible value?
 34. Does the writer made any straw man fallacy, misrepresenting opposing views to more easily move them down?
 35. Did the author used slanted language or commit personal attack?
 36. Does the writer make sweeping generalisations or demonstrate an either / or approach to complicated issues, thereby revealing a strong bias toward one side?
 37. Does the writer pretend to be objective?
 38. Does the writer intends to be ironic or satirical, if he or she is clearly exaggerating for effect?
 39. Does the writer admits to guesswork and speculation?

40. What are the author's sources?
41. Did the writer respond to those who have preceded them?
42. Has the writer depended on the primary source or secondary source?
43. Has the writer misquoted the primary source or has he quoted correctly the primary source?
44. Has the writer uses statistics or data, has he used primary source?
45. Has the writer interpreted the data or survey or statistics biased/unbiased?
46. Has the author correctly interpreted the information?
47. Has the author incorrectly interpreted information?

Publisher

1. Who is the publisher or sponsor?
2. Does writer use reliable publisher?
3. Does the writer use reputable publications?
4. Does the editor of the publication is respected and reputable?
5. Do the commercial interests dictate editorial policy of the publication? Or the publisher's
6. Is there periodical hoaxes or sabotage in the publication or publisher?
7. Has the editorial biased?
8. Have the editorials choose the topics and the perspective and slant of the writing?
9. Where does the editorial stand on political issues?
10. What does the table of content and ads use? And what political and cultural biases?
11. Does the scholarly presses and journals have any political or cultural stance?
12. Does the publisher protect and verify the statement they print to protect the reputation?
13. Is this article or book written by scholar? Or the books have been written by amateur or just get attention?
14. Is this book or article written with editing or review by disinterested parties?

Audience

1. Who is the intended audience?
2. Was it sponsored audience?
3. Real audience vs fake audience?
4. Who are the author's intended audience?
5. The book aimed at what audience? Uneducated, educated, experts etc? Is there any other targeted audience?
6. Is the book aimed at the readers far better versed than they are in the topic under study?
7. Is the audience familiar with the issue the author writes?
8. Is this article or book was written by the author to lead to agree with author's point of view?
9. Is the author tries to challenge the readers and the audience?
10. How has the audience Responded?
11. What has been written in response to the author's idea?
12. How the audience reviewed the book and the ideas?
13. Do the reviewers give bad or good mark to push their own agendas?
14. Is the quote from the book considered by scholars to be accurate and fair to the subject?
15. Is the biography or the quotes are based on the rumours and speculations?
16. What type of reputation does the writer has?
17. Do the other authors cite the writer?

Step 44 - How To Spot Bad Science

Unless you've studied it, most of us are never taught how to evaluate science or how to parse the good from the bad. Yet it is something that dictates every area of our lives. It is vital for helping us understand how the world works. It might be too much effort and time to appraise research for yourself, however. Often, it can be enough to consult an expert or read a trustworthy source.

But some decisions require us to understand the underlying science. There is no way around it. Many of us hear about scientific developments from news articles and blog posts. Some sources put the work into presenting useful information. Others manipulate or misinterpret results to get more clicks. So we need the thinking tools necessary to know what to listen to and what to ignore. When it comes to important decisions, like knowing what individual action to take to minimize your contribution to climate change or whether to believe the friend who cautions against vaccinating your kids, being able to assess the evidence is vital.

Much of the growing (and concerning) mistrust of scientific authority is based on a misunderstanding of how it works and a lack of awareness of how to evaluate its quality. Science is not some big immovable mass. It is not infallible. It does not pretend to be able to explain everything or to know everything. Furthermore, there is no such thing as "alternative" science. Science does involve mistakes. But we have yet to find a system of inquiry capable of achieving what it does: move us closer and closer to truths that improve our lives and understanding of the universe.

"Rather than love, than money, than fame, give me truth." Henry David Thoreau

There is a difference between bad science and pseudoscience. Bad science is a flawed version of good science, with the potential for improvement. It follows the scientific method, only with errors or biases. Often, it's produced with the best of intentions, just by researchers who are responding to skewed incentives.

Pseudoscience has no basis in the scientific method. It does not attempt to follow standard procedures for gathering evidence. The claims involved may be impossible to disprove. Pseudoscience focuses on finding evidence to confirm it, disregarding disconfirmation. Practitioners invent narratives to preemptively ignore any actual science contradicting their views. It may adopt the appearance of actual science to look more persuasive.

While the tools and pointers in this post are geared towards identifying bad science, they will also help with easily spotting pseudoscience.

Good science is science that adheres to the scientific method, a systematic method of inquiry involving making a hypothesis based on existing knowledge, gathering evidence to test if it is correct, then either disproving or building support for the hypothesis. It takes many repetitions of applying this method to build reasonable support for a hypothesis.

In order for a hypothesis to count as such, there must be evidence that, if collected, would disprove it.

In this post, we'll talk you through two examples of bad science to point out some of the common red flags. Then we'll look at some of the hallmarks of good science you can use to sort the signal from the noise. We'll focus on the type of research you're likely to encounter on a regular basis, including medicine and psychology, rather than areas less likely to be relevant to your everyday life.

[Note: we will use the terms "research" and "science" and "researcher" and "scientist" interchangeably here.]

Power Posing

"The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom." —Isaac Asimov

First, here's an example of flawed science from psychology: power posing. A 2010 study by Dana Carney, Andy J. Yap, and Amy Cuddy entitled "Power Posing: Brief Nonverbal Displays Effects Neuroendocrine Levels and Risk Tolerance" claimed "open, expansive" poses caused participants to experience elevated testosterone levels, reduced cortisol levels, and greater risk tolerance. These are all excellent things in a high-pressure situation, like a job interview. The abstract concluded that "a person can, via a simple two-minute pose, embody power and instantly become more powerful." The idea took off. It spawned hundreds of articles, videos, and tweets espousing the benefits of including a two-minute power pose in your day.

Yet at least eleven follow up studies, many led by Joseph Cesario of Michigan State University including "'Power Poses' Don't Work, Eleven New Studies Suggest," failed to replicate the results. None found that power posing has a measurable impact on people's performance in tasks or on their physiology. While subjects did report a subjective feeling of increased powerfulness, their performance did not differ from subjects who did not strike a power pose.

One of the researchers of the original study, Carney, has since changed her mind about the effect. Carney stated she no longer believe the results of the original study.

Unfortunately, this isn't always how researchers respond when confronted with evidence discrediting their prior work. We all know how uncomfortable changing our minds is.

The notion of power posing is exactly the kind of nugget that spreads fast online. It's simple, free, promises dramatic benefits with minimal effort, and is intuitive. We all know posture is important. It has a catchy, memorable name. Yet examining the details of the original study reveals a whole parade of red flags. The study had 42 participants. That might be reasonable for preliminary or pilot studies. But is in no way sufficient to "prove" anything. It was not blinded. Feedback from participants was self-reported, which is notorious for being biased and inaccurate.

There is also a clear correlation/causation issue. Powerful, dominant animals tend to use expansive body language that exaggerates their size. Humans often do the same. But that doesn't mean it's the pose making them powerful. Being powerful could make them pose that way.

A TED Talk in which Amy Cuddy, the study's co-author, claimed power posing could "significantly change the way your life unfolds" is one of the most popular to date, with tens of millions of views. The presentation of the science in the talk is also suspect. Cuddy makes strong claims with a single, small study as justification. She portrays power posing as a panacea. Likewise, the original study's claim that a power pose makes someone "instantly become more powerful" is suspiciously strong.

This is one of the examples of psychological studies related to small tweaks in our behavior that have not stood up to scrutiny. We're not singling out the power pose study as being unusually flawed or in any way fraudulent. The researchers had clear good intentions and a sincere belief in their work. It's a strong example of why we should go straight to the source if we want to understand research. Coverage elsewhere is unlikely to even mention methodological details or acknowledge any shortcomings. It would ruin the story. We even covered power posing on Farnam Street in 2016—we're all susceptible to taking these 'scientific' results seriously, without checking on the validity of the underlying science.

It is a good idea to be skeptical of research promising anything too dramatic or extreme with minimal effort, especially without substantial evidence. If it seems too good to be true, it most likely is.

Green Coffee Beans

“An expert is a person who has made all the mistakes that can be made in a very narrow field.” —Niels Bohr

The world of weight-loss science is one where bad science is rampant. We all know, deep down, that we cannot circumnavigate the need for healthy eating and exercise. Yet the search for a magic bullet, offering results without effort or risks, continues. Let's take a look at one study that is a masterclass in bad science.

Entitled “Randomized, Double-Blind, Placebo-Controlled, Linear Dose, Crossover Study to Evaluate the Efficacy and Safety of a Green Coffee Bean Extract in Overweight Subjects,” it was published in 2012 in the journal *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*. On the face of it, and to the untrained eye, the study may appear legitimate, but it is rife with serious problems, as Scott Gavura explained in the article “Dr. Oz and Green Coffee Beans – More Weight Loss Pseudoscience” in the publication *Science-Based Medicine*. The original paper was later retracted by its authors. The Federal Trade Commission (FTC) ordered the supplement manufacturer who funded the study to pay a \$3.5 million fine for using it in their marketing materials, describing it as “botched.”

The Food and Drug Administration (FDA) recommends studies relating to weight-loss consist of at least 3,000 participants receiving the active medication and at least 1,500 receiving a placebo, all for a minimum period of 12 months. This study used a mere 16 subjects, with no clear selection criteria or explanation. None of the researchers involved had medical experience or had published related research. They did not disclose the conflict of interest inherent in the funding source. It didn't cover efforts to avoid any confounding factors. It is vague about whether subjects changed their diet and exercise, showing inconsistencies. The study was not double-blinded, despite claiming to be. It has not been replicated.

The FTC reported that the study's lead investigator “repeatedly altered the weights and other key measurements of the subjects, changed the length of the trial, and misstated which subjects were taking the placebo or GCA during the trial.” A meta-analysis by Rachel Buchanan and Robert D. Beckett, “Green Coffee for Pharmacological Weight Loss” published in the *Journal of Evidence-Based Complementary & Alternative Medicine*, failed to find evidence for green coffee beans being safe or effective; all the available studies had serious methodological flaws, and most did not comply with FDA guidelines.

Signs of Good Science

“That which can be asserted without evidence can be dismissed without evidence.” —Christopher Hitchens

We’ve inverted the problem and considered some of the signs of bad science. Now let’s look at some of the indicators a study is likely to be trustworthy. Unfortunately, there is no single sign a piece of research is good science. None of the signs mentioned here are, alone, in any way conclusive. There are caveats and exceptions to all. These are simply factors to evaluate.

It’s Published by a Reputable Journal

“The discovery of instances which confirm a theory means very little if we have not tried, and failed, to discover refutations.” —Karl Popper

A journal, any journal, publishing a study says little about its quality. Some will publish any research they receive in return for a fee. A few so-called “vanity publishers” claim to have a peer-review process, yet they typically have a short gap between receiving a paper and publishing it. We’re talking days or weeks, not the expected months or years. Many predatory publishers do not even make any attempt to verify quality.

No journal is perfect. Even the most respected journals make mistakes and publish low-quality work sometimes. However, anything that is not published research or based on published research in a journal is not worth consideration. Not as science. A blog post saying green smoothies cured someone’s eczema is not comparable to a published study. The barrier is too low. If someone cared enough about using a hypothesis or “finding” to improve the world and educate others, they would make the effort to get it published. The system may be imperfect, but reputable researchers will generally make the effort to play within it to get their work noticed and respected.

It’s Peer Reviewed

Peer review is a standard process in academic publishing. It’s intended as an objective means of assessing the quality and accuracy of new research. Uninvolved researchers with relevant experience evaluate papers before publication. They consider factors like how well it builds upon pre-existing research or if the results are statistically significant. Peer review should be double-blinded. This means the researcher doesn’t know who is reviewing their work and the reviewer doesn’t know who the researcher is.

Publishers only perform a cursory “desk check” before moving onto peer review. This is to check for major errors, nothing more. They cannot have the expertise necessary to vet the

quality of every paper they handle—hence the need for external experts. The number of reviewers and strictness of the process depends on the journal. Reviewers either declare a paper unpublishable or suggest improvements. It is rare for them to suggest publishing without modifications.

Sometimes several rounds of modifications prove necessary. It can take years for a paper to see the light of day, which is no doubt frustrating for the researcher. But it ensures no or fewer mistakes or weak areas.

Pseudoscientific practitioners will often claim they cannot get their work published because peer reviewers suppress anything contradicting prevailing doctrines. Good researchers know having their work challenged and argued against is positive. It makes them stronger. They don't shy away from it.

Peer review is not a perfect system. Seeing as it involves humans, there is always room for bias and manipulation. In a small field, it may be easy for a reviewer to get past the double-blinding. However, as it stands, peer review seems to be the best available system. In isolation, it's not a guarantee that research is perfect, but it's one factor to consider.

The Researchers Have Relevant Experience and Qualifications

One of the red flags in the green coffee bean study was that the researchers involved had no medical background or experience publishing obesity-related research.

While outsiders can sometimes make important advances, researchers should have relevant qualifications and a history of working in that field. It is too difficult to make scientific advancements without the necessary background knowledge and expertise. If someone cares enough about advancing a given field, they will study it. If it's important, verify their backgrounds.

It's Part of a Larger Body of Work

“Science, my lad, is made up of mistakes, but they are mistakes which it is useful to make, because they lead little by little to the truth.” —Jules Verne

We all like to stand behind the maverick. But we should be cautious of doing so when it comes to evaluating the quality of science. On the whole, science does not progress in great leaps. It moves along millimeter by millimeter, gaining evidence in increments. Even if a piece of research is presented as groundbreaking, it has years of work behind it.

Researchers do not work in isolation. Good science is rarely, if ever, the result of one person or even one organization. It comes from a monumental collective effort. So when evaluating research, it is important to see if other studies point to similar results and if it is

an established field of work. For this reason, meta-analyses, which analyze the combined results of many studies on the same topic, are often far more useful to the public than individual studies. Scientists are humans and they all make mistakes. Looking at a collective body of work helps smooth out any problems. Individual studies are valuable in that they further the field as a whole, allowing for the creation of meta-studies.

Science is about evidence, not reputation. Sometimes well-respected researchers, for whatever reason, produce bad science. Sometimes outsiders produce amazing science. What matters is the evidence they have to support it. While an established researcher may have an easier time getting support for their work, the overall community accepts work on merit. When we look to examples of unknowns who made extraordinary discoveries out of the blue, they always had extraordinary evidence for it.

Questioning the existing body of research is not inherently bad science or pseudoscience. Doing so without a remarkable amount of evidence is.

It Doesn't Promise a Panacea or Miraculous Cure

Studies that promise anything a bit too amazing can be suspect. This is more common in media reporting of science or in research used for advertising.

In medicine, a panacea is something that can supposedly solve all, or many, health problems. These claims are rarely substantiated by anything even resembling evidence. The more outlandish the claim, the less likely it is to be true. Occam's razor teaches us that the simplest explanation with the fewest inherent assumptions is most likely to be true. This is a useful heuristic for evaluating potential magic bullets.

It Avoids or at Least Discloses Potential Conflicts of Interest

A conflict of interest is anything that incentivizes producing a particular result. It distorts the pursuit of truth. A government study into the health risks of recreational drug use will be biased towards finding evidence of negative risks. A study of the benefits of breakfast cereal funded by a cereal company will be biased towards finding plenty of benefits. Researchers do have to get funding from somewhere, so this does not automatically make a study bad science. But research without conflicts of interest is more likely to be good science. High-quality journals require researchers to disclose any potential conflicts of interest. But not all journals do. Media coverage of research may not mention this (another reason to go straight to the source). And people do sometimes lie. We don't always know how unconscious biases influence us.

It Doesn't Claim to Prove Anything Based on a Single Study

In the vast majority of cases, a single study is a starting point, not proof of anything. The results could be random chance, or the result of bias, or even outright fraud. Only once other researchers replicate the results can we consider a study persuasive. The more replications, the more reliable the results are. If attempts at replication fail, this can be a sign the original research was biased or incorrect.

A note on anecdotes: they're not science. Anecdotes, especially from people close to us or those who have a lot of letters behind their name, have a disproportionate clout. But hearing something from one person, no matter how persuasive, should not be enough to discredit published research. Science is about evidence, not proof. And evidence can always be discredited.

It Uses a Reasonable, Representative Sample Size

A representative sample represents the wider population, not one segment of it. If it does not, then the results may only be relevant for people in that demographic, not everyone. Bad science will often also use very small sample sizes.

There is no set target for what makes a large enough sample size; it all depends on the nature of the research. In general, the larger, the better. The exception is in studies that may put subjects at risk, which use the smallest possible sample to achieve usable results. In areas like nutrition and medicine, it's also important for a study to last a long time. A study looking at the impact of a supplement on blood pressure over a week is far less useful than one over a decade. Long-term data smooths out fluctuations and offers a more comprehensive picture.

The Results Are Statistically Significant

Statistical significance refers to the likelihood, measured in a percentage, that the results of a study were not due to pure random chance. The threshold for statistical significance varies between fields. Check if the confidence interval is in the accepted range. If it's not, it's not worth paying attention to.

It Is Well Presented and Formatted

"When my information changes, I alter my conclusions. What do you do, sir?" —John Maynard Keynes

As basic as it sounds, we can expect good science to be well presented and carefully formatted, without prominent typos or sloppy graphics.

It's not that bad presentation makes something bad science. It's more the case that researchers producing good science have an incentive to make it look good. As Michael J. I. Brown of Monash University explains in *How to Quickly Spot Dodgy Science*, this is far more than a matter of aesthetics. The way a paper looks can be a useful heuristic for assessing its quality. Researchers who are dedicated to producing good science can spend years on a study, fretting over its results and investing in gaining support from the scientific community. This means they are less likely to present work looking bad. Brown gives an example of looking at an astrophysics paper and seeing blurry graphs and misplaced image captions—then finding more serious methodological issues upon closer examination. In addition to other factors, sloppy formatting can sometimes be a red flag. At the minimum, a thorough peer-review process should eliminate glaring errors.

It Uses Control Groups and Double-Blinding

A control group serves as a point of comparison in a study. The control group should be people as similar as possible to the experimental group, except they're not subject to whatever is being tested. The control group may also receive a placebo to see how the outcome compares.

Blinding refers to the practice of obscuring which group participants are in. For a single-blind experiment, the participants do not know if they are in the control or the experimental group. In a double-blind experiment, neither the participants nor the researchers know. This is the gold standard and is essential for trustworthy results in many types of research. If people know which group they are in, the results are not trustworthy. If researchers know, they may (unintentionally or not) nudge participants towards the outcomes they want or expect. So a double-blind study with a control group is far more likely to be good science than one without.

It Doesn't Confuse Correlation and Causation

In the simplest terms, two things are correlated if they happen at the same time. Causation is when one thing causes another thing to happen. For example, one large-scale study entitled "Are Non-Smokers Smarter than Smokers?" found that people who smoke tobacco tend to have lower IQs than those who don't. Does this mean smoking lowers your IQ? It might, but there is also a strong link between socio-economic status and smoking. People of low income are, on average, likely to have lower IQ than those with higher incomes due to factors like worse nutrition, less access to education, and sleep deprivation. A study by the Centers for Disease Control and Prevention entitled "Cigarette Smoking and Tobacco

Use Among People of Low Socioeconomic Status,” people of low socio-economic status are also more likely to smoke and to do so from a young age. There might be a correlation between smoking and IQ, but that doesn’t mean causation.

Disentangling correlation and causation can be difficult, but good science will take this into account and may detail potential confounding factors of efforts made to avoid them.

Conclusion

“The scientist is not a person who gives the right answers, he’s one who asks the right questions.” —Claude Lévi-Strauss

The points raised in this article are all aimed at the linchpin of the scientific method—we cannot necessarily prove anything; we must consider the most likely outcome given the information we have. Bad science is generated by those who are willfully ignorant or are so focused on trying to “prove” their hypotheses that they fudge results and cherry-pick to shape their data to their biases. The problem with this approach is that it transforms what could be empirical and scientific into something subjective and ideological.

When we look to disprove what we know, we are able to approach the world with a more flexible way of thinking. If we are unable to defend what we know with reproducible evidence, we may need to reconsider our ideas and adjust our worldviews accordingly. Only then can we properly learn and begin to make forward steps. Through this lens, bad science and pseudoscience are simply the intellectual equivalent of treading water, or even sinking.

Article Summary

- Most of us are never taught how to evaluate science or how to parse the good from the bad. Yet it is something that dictates every area of our lives.
- Bad science is a flawed version of good science, with the potential for improvement. It follows the scientific method, only with errors or biases.
- Pseudoscience has no basis in the scientific method. It does not attempt to follow standard procedures for gathering evidence. The claims involved may be impossible to disprove.
- Good science is science that adheres to the scientific method, a systematic method of inquiry involving making a hypothesis based on existing knowledge, gathering evidence to test if it is correct, then either disproving or building support for the hypothesis.
- Science is about evidence, not proof. And evidence can always be discredited.
- In science, if it seems too good to be true, it most likely is.

Signs of good science include:

- It's Published by a Reputable Journal
- It's Peer Reviewed
- The Researchers Have Relevant Experience and Qualifications
- It's Part of a Larger Body of Work
- It Doesn't Promise a Panacea or Miraculous Cure
- It Avoids or at Least Discloses Potential Conflicts of Interest
- It Doesn't Claim to Prove Anything Based on a Single Study
- It Uses a Reasonable, Representative Sample Size
- The Results Are Statistically Significant
- It Is Well Presented and Formatted
- It Uses Control Groups and Double-Blinding
- It Doesn't Confuse Correlation and Causation

Step 45-Content Of Critical Review

Content of Critical Review

1. Always Read Both sides of the story to come to your own conclusion.
2. The researcher needs to evaluate the research that has already been undertaken in the area of your research project,
3. Show and explain the relationship between published research findings and reference the literature in which they were reported.
4. Your review will also enable the readers to see your ideas against the background of previous published research in the area.
5. The researcher needs to be highly critical of the earlier research reported in the literature. If you want to be highly.
6. Critical the research must review the literature, explain clearly why it is problematic, and justify your own idea.
7. Considering content of critical review, the research need
 - A. To include the key academic theories within chosen area of research.
 - B. To demonstrate that your knowledge of chosen area is up to date.
 - C. Through clear referencing, enable those reading your project report to find the original publications which you cite.
 - D. The research needs to avoid plagiarism.
8. Have you ensured that the literature covered relates clearly to your research question?
9. Have you covered the most relevant and significant theories of recognised experts in the area?
10. Have you covered the most relevant and significant literature or at least a representative sample?
11. Have you included up to date literature?
12. Have you referenced all the literature used in the format prescribed in the assessment criteria?
13. What is really meant by being critical about the content
14. There are 5 aspects of critical approach that should e fostered by researcher:
 - A. Critique of rhetoric-this means appraising or evaluating a problem with effective use of language. In the context of your critical literature review, this emphasises the need for you, as the reviewer to use your skills both of making reasoned judgements and of arguing effectively in writing.

- B. Critique of tradition.
 - C. Critique of authority.
 - D. Critique of objectivity.
15. Questioning everything you read, and be sceptic. This means you need to be consistently considering and justifying with clear arguments your own critical stance.
 16. Part of the researcher judgement will inevitably mean being able to identify the most relevant and significant theories and recognised experts highlighted.
 17. The researcher needs to:
 - A. Refer to and assess research by recognised experts in chosen area.
 - B. Consider and discuss research that supports and research that opposes the idea.
 - C. Make reasoned judgement regarding the value of others' research, showing clearly how it related to the topic of the research.
 - D. Justify the arguments with valid evidence in a logical manner.
 - E. Distinguish clearly between facts and opinions.
 18. The researcher needs to read widely on the research topic and have good knowledge and understanding of literature.
 19. The researcher needs to comment on merits and faults of key literature within the chosen area.
 20. Have you shown how your research question related to previous research reviewed?
 21. Have you assessed the strengths and weaknesses of the previous researched reviewed?
 22. Have you been objective in your discussion and assessment of another people's research?
 23. Have you included referenced to research that is counter to your own opinion?
 24. Have you distinguished clearly between facts and opinions?
 25. Have you make reasoned judgement about the value and relevance of others' research to your own?
 26. Have you justified clearly your own ideas?
 27. Have you highlighted those areas where new research (yours) is needed to provide fresh insights and taken these into account in your arguments? In particular:
 - A. Where there are inconsistencies in current knowledge and understanding?
 - B. Where there are omissions or bias in published research?
 - C. Where research findings need to be tested further?
 - D. Where evidence is lacking, inconclusive contradictory or limited?
 28. Have you justified your arguments by referencing correctly published research?

*Step 46 - The Funding of Book, Author,
Publisher, Speaker, Presenter, School,
Government, Politician, Companies,
Influencer, Newspaper, Journalist or Other
Person.*

Rule 0- Listen and Follow The Books in The Following Folders:

- 1. Archeology Folder**
- 2. Atlas Folder**
- 3. Concordance Folder**
- 4. Cultural practice Folder**
- 5. Dictionary Folder**
- 6. Discourse Analysis Folder**
- 7. Encyclopedia Folder**
- 8. Fake News Folder**
- 9. Figure of Speech Folder**
- 10. Geography Folder**
- 11. Handbook Folder**
- 12. Introduction to Old and New Testament Folder**
- 13. Legal analysis Folder**
- 14. Literature Review Folder**
- 15. Mathematics Folder**
- 16. Military and War Folder**
- 17. Politics Folder**
- 18. Probability and Statistics Folder**
- 19. Religious Customs Folders**

- 20. Rhetorical Review Folder**
- 21. Statistics Folder**
- 22. Survey of Old and New Testament Folder**
- 23. Symbols folder**
- 24. Systematic Theology Folder**

Rule 1-Sponsor and Follow the money.

1. Who is the sponsor?
2. Watch What Sponsors Do and Not What they talk.
3. Who gave the funds? One person or group of people?
4. Why are they have been sponsored?
5. How much were they sponsored?
6. Almost at the end ask questions about the funds provided to the author, presenter, researcher, speaker, publisher and find out about the source of the funds provided.
This is the outside research needs to be done. Follow the money
7. Who funded this whole scheme and situation?
8. Where the funds came from?
9. Where the funds where? Who received the funds?
10. Were these funds for influencing?
11. Were these funds for political reason?
12. Where these funds for legal reason?
13. Where these funds for lobbyism?
14. Does this type of funding influence research?
15. Follow the money and funding.
16. Research who is behind the funding; name, companies, politicians etc.
17. Who paid for this situation to occur?
18. Who sponsored this event. Situation? Show the diagram.
19. How much was it paid to the people for this event?
20. How did they paid this? Was it directly, indirectly or off shore companies, companies, charity, charity groups, other groups, people from the company?
21. What currency was it paid?
22. What other reward was at stake for these people? New job, some incentive?
23. Make a line of web who I sponsoring and who is gaining?
24. How these people related to the lobbyist or sponsor?
25. Was it use different?
26. How did the transaction happened?
27. What has been used to sponsor those people?
28. What did they do with the funds?
29. What people incentives were?

Rule 2-Corruption and follow the money

1. What are the corruption scheme in this situation/government, company, person or group of people?
2. Ask for the full names, job titles and locations of:
3. The persons who solicited or received the bribe and the persons or companies that paid the bribe, or offered to do so.
4. Any agents, middlemen and subcontractors involved in the payments.
5. Try to get as many details as possible of the alleged bribes, including:
6. How much money was involved in the bribe payments and the overall transactions?
7. What the bribe payments were for, for example, to be selected, to get a contract amendment, to be paid promptly, etc.?
8. How the payments were made – by cash, wire transfer or check, or in the form of goods or services – and how the payments were recorded – for example, as a “consulting fee” or commission or miscellaneous expenses. Ask who was involved in these transactions.
9. Try to identify the account (or at least the bank) or source of funds from which the payments were made, and the bank or accounts to which they were made.
10. Ask about documentation of the bribe payments and the evidence corrupt influence. This could include, of course, bank account records, wire transfer receipts, or false invoices and receipts to disguise the payments. Evidence of corrupt influence could include documentation showing inflated pricing, acceptance of poor quality work, approval of unnecessary change orders, etc. Ask who has the records and where are they? Request copies. Ask for emails or other communications regarding the scheme.
11. Get the names and location of other persons who might know of the scheme, such as former employees or competitors of the bribe payer (who also might have been approached for bribes), associates or subordinates of the bribe taker.

Rule 3-Legal VS Illegal Schemes

1. What are the corruption diagrams in this situation by government, company, person or group of people?
2. Was this legal scheme?
3. Was there any hidden in the accounting? What was hidden? What was tried to be hidden? Why was hidden?
4. What scheme did they use regarding funding?
5. Was this legal?

6. What are the schemes? Legal vs illegal? What are the evidence or proof?
7. Does this violated any law or regulations? Constitution, tax, finance economic, legal or other regulations?
8. What are the names who involved in this scheme:
 - A. Names
 - B. Addresses
 - C. Company names
 - D. Charity
 - E. Group names
 - F. Government agencies
 - G. Regulation agencies
 - H. Government bodies
 - I. Name in the government
9. How did the corruption occurred.
10. What is corruption?
11. Which countries are the most corrupt?
12. What are the common characteristics of countries with high corruption?
13. What is the magnitude of corruption? (5) Do higher wages for bureaucrats reduce corruption?
14. Can competition reduce corruption?
15. Why have there been so few (recent) successful attempts to fight corruption?
16. Does corruption adversely affect growth?
17. Do you know or suspect, or have you heard, that kickbacks are being paid?
18. Questions to identify parties and potential witnesses include:
 - Please identify all persons and organizations that might be involved in suspect transactions, including all:
 - I. Contractors
 - II. Subcontractors
 - III. Suppliers
 - IV. Agents or middlemen
 - V. Project or government officials
19. Have any bidders filed protests or complaints or voiced suspicions?
20. Are any unnecessary or questionable agents or middlemen involved in any contracts?
21. Are any agents or middlemen paid unreasonably high fees?

22. Do any project or government officials refer contractors to certain suppliers, subcontractors or agents?

23. Questions about selection and performance include:

- Are questionable selection methods, e.g., unjustified sole source awards, employed?
- Do any contractors charge unreasonably high prices, which are accepted by project or government officials?
- Do any contractors receive an unusually high volume of contracts?
- Is the quality of any contractor's work consistently unsatisfactory, but accepted by project or government officials?
- Do any contractors consistently miss delivery or completion dates without penalty?
- Do any contractors receive questionable, or an unusually high number of, change orders?

24. Questions about the behavior of the project or government officials include:

- Do any project or government officials:
 - I. Give favorable treatment to certain contractors?
 - II. Routinely ignore or excuse poor or late service by particular contractors?
 - III. Have an unusual interest in the selection or success of a particular contractor, or in a particular contract?
 - IV. Take any actions with regard to certain contractors, or contracts, that are outside, or below, their normal duties?
 - V. Routinely ignore standard policy and procedure to benefit a certain contractor?

25. Questions about the relationship between parties include:

- Is there close socialization or a "less than arm's length relationship" between any contractor and project or government officials?
- Do any project or government officials:
 - I. Accept inappropriate gifts, travel or entertainment from any contractors?
 - II. Display new or unexplained wealth?
 - III. Appear to have financial problems?
 - IV. Officials have outside business interests or companies?
- Have all project and government officials filed required conflict of interest and financial disclosure forms?

26. Questions about contract documentation include:

- Do any contractors submit inflated or questionable invoices, or fail to provide adequate documentation for them?
- Do any project or government officials routinely ignore or tolerate the submission of inadequate documentation by certain contractors?
- Are change order requests and payments adequately documented for all contractors?
- Are controls and procedures to prevent bribes and kickbacks in place and enforced?

Rule 4-Conflict of Interest

1. Was there Conflict of interest?
2. How does the Conflict of Interest occur?
3. How do we know that Conflict of Interest Occurred?

Rule 4-Trust of the Source

1. Where did the data has been found?
2. Can I trust sources of the information?

Rule 5-Who is interesting in the situation

1. Watch What They Do and Not What they talk.
2. Deep State, Who is in the deep state: Names, Ages, What are their position, Where did they study, Who are they studied with, who are their parents. Where they lived.
3. Who are the Shadow People or person who controls everything in government? Names, Ages, What are their position, Where did they study, Who are they studied with? who are their parents. Where they lived.
4. Who is the CEO, CFO, Risk managers, Board of Directors, Shareholders, stakeholders of the company, Organisation? Names, Ages, What are their position, Where did they study, Who are they studied with? who are their parents. Where they lived
5. Who are the shadow CEO, CFO, Risk manager, Board of Directors, shareholders, stakeholders of the company, organisation: Names, Ages, What are their position, Where did they study, Who are they studied with, who are their parents. Where they lived.
6. Who has interest in this situation?
7. Who is the interested group or party? Do the diagram of how they are related to this situation and how they would gain out of this situation?
8. Who lobbying this?
9. Who is the person/organisation or group that this situation is the most useful?
10. Who is the person/organisation or group that this situation is least useful?
11. Did the author used all AVAILABLE SOURCES, INFORMATION, FACTS AND ARGUMENTS TO HIM/HER?
12. Does the author trying to rewrite facts, information, history of the subject to fit his/her arguments and situation?
13. Did the author do honest analysis of all available sources, information, arguments, evidence and facts?
14. Whom this situation is the most useful?
15. Whom this situation is the least useful?
16. What Capital Group is winner in this situation?
17. What Capital Group is Loser in this situation?
18. Who is the winner of this situation?
19. Who is the loser of this situation?
20. Who is the victim in this situation?
21. Who is not the victim in this situation?
22. Who is the most likely used this situation to his/her/their advantage?

23. Who is the least likely used this situation to his/her/their advantage?
24. Who got harm in this situation?
25. Who did not get harm in this situation?
26. Almost at the end ask questions about the funds provided to the author, presenter, researcher, speaker, publisher and find out about the source of the funds provided.
This is the outside research needs to be done. Follow the money
27. Who or what is the most influenced in this situation?
28. What are the corruption scheme in this situation/government, company, person or group of people?
29. What are the corruption diagrams in this situation by government, company, person or group of people?
30. Who is at fault in this situation?
31. Who is not at fault in this situation?
32. Who funded this whole scheme and situation?
33. Where the funds came from?
34. Where the funds where? Who received the funds?
35. Was this legal scheme?
36. Is the current situation or crisis or breaking news is there to cover something bigger behind? Like trying to pass new laws or corruption or purchase which are illegal. What are these things that been tried to hid behind big news. Research everything?
37. Who losing the most in this situation?
38. Who is losing least in this situation?
39. Who is winning the most in this situation
40. Who is the winning least in this situation?
41. Does the person tried to incorrectly paraphrase the arguments or facts or evidence?
42. Is there conflict of interest between these two parties?
43. Who is the breaking conflict of interest?
44. Was there are any Break a law, code of, GDPR?
45. Was there any hidden in the accounting? What was hidden? What was tried to be hidden? Why was hidden?
46. What or who the person tried to protect?
47. Was there any motivation behind some of the actions?
48. What was the motivation behind these actions?
49. What are the mathematical formulas behind?

50. What are the flow chart of decision. What would be outcome if they would decide one way or the other?
51. Was the person who speaking, presenting, author, researcher representing other side correctly and honestly?
52. Was the speaker, presenter, author and researcher were paid by somebody to do the propaganda and throw the dirt on other people?
53. Was there any propaganda used in the speech, research, book or article so that they/ he/ she advising about other side incorrectly?
54. Did I use evidence, facts and sources for every argument, premise, conclusion and sentence?
55. Did the other side used sources, facts, evidence for every sentence, premise, argument and conclusion?
56. Did the analogies are correct?
57. Did the analogies really represent other side or my side?
58. What type of arguments presented by other side?
59. Was other side used epithets about other side? Was this is logical fallacy? Did I use the epithets? Did the other side understand this epithets? Why did they think this was appropriate way or time to say this? Was this what other person think? Was this objectively true or not? Was this breaking any law?
60. Does the other side understand the definition of this term?
61. Was this is a troll who is not looking to get the correct information, but troll others and me?
62. Is this person looking appropriate discussion?
63. Is this person trying to persuade you appropriately with full information which is correct or incorrect?
64. Would you apologise if provided facts and evidence were wrong for the arguments which were lead to wrong conclusion?
65. Does the person know or understand that he/she/they are wrong or right?
66. Why they they think they are right?
67. Why they think they are wrong?
68. How do we know that this happened exactly the way he said? Do we have facts? Evidence?
69. Use **What, who, why, when, where, how, do , did, can, may do not, did not, cannot may not, might, might not, does, does not.**
70. Does the person has the education to speak about this subject.

71. Does the person has honestly went through the criticism of the opposing ideas? Did the person found the reason he opposing to the other person?
72. Does the person have serious intention to confuse audience?
73. How well does the person do the job to confuse the audience?
74. Did the person introduced new terms or arguments.
75. Did the other person did a good job to research his her ideas and opposing person ideas?
76. What is the reason the person trying to confuse audience?
77. What propaganda tools did the author, speaker, writer used in analysing this idea and opposing person idea?
78. Did the person understood or understand that he used propaganda tools.
79. What sources did the other person used in analysing opposing person arguments?

Rule 6-Complaint

1. The full names, job titles and contact information for all persons and organizations allegedly involved.
2. The details (who, what, when, where, why and how much) of the allegations.
3. The dates or time period of the key events.
4. How much money or losses are involved.
5. Are there any records or documents that support the allegations? If so, what and who has them? Ask for electronic and paper copies.
6. The names, location and contact information of other persons who might know of the wrongdoing and be willing to discuss it.
7. Are there other similar transactions? If so, get the details, and find out who knows about them.
8. How does the complainant know about the allegations? If from other persons, who and where are they?
9. Is the scheme currently on-going? If so, do the subject(s) know of the complainant's report? (This helps to determine whether a covert investigation would be feasible.)
10. Will the complainant agree to testify or sign a statement? (Many will not, but their information is still useful to identify leads, documents and other witnesses who will testify. Assure the witness that he or she will not be compelled to testify if unwilling to do so.)
11. What is the complainant's motive to report? (In most cases, the complainant's motive is not as important as his or her credibility.)
12. Try to determine if there is any reason to suspect the complainant's credibility, such as a personal interest in the transactions, a history of disputes between the parties or a criminal record.

Rule 7-Power in Society

1. Who has the power in society?
2. Watch What Sponsors Do and Not What they talk.
3. List of the groups, companies government who has the power in society?
4. Why do I think this group has the power in the society?
5. Who is the shadow controlling?
6. Who is shadow government?
7. Who is in the control behind?
8. Make a list of the groups who control behind?
9. Why do I think this group is in control?

Rule 8-Why author choose these facts

1. Why the author choose these facts?
2. Why author choose these figures?
3. Why author choose these evidences?
4. Does these facts or facts or evidence make stronger the argument or weaken?

Rule 9-Rewrite History

1. Does the author, presenter, speaker tries to rewrite the history or story?
2. Why does the author, presenter, speaker tries to rewrite the history or story?
3. What facts does the author hides or suppress to rewrite the history?
4. What is the reason of the author, presenter, speaker tries to rewrite the history or story?

Rule 10-Dividing groups into smaller groups

1. Does the author, presenter, speaker tried to divide the nation or the group into different groups? What are the groups the author, presenter or speaker tries to divide the people? Make a list
2. How is the author, presenter and speaker tries to divide the group of people?
3. Does the author tries to set up each group against each other? Why do the author tries to set up two groups against each other?
4. Does the author or presenter or speaker tries to segregate the people? Into what groups does the author, speaker, presenter tries to segregate the people into?

5. What is the reason does the author, presenter or speaker tries to divide and segregate people into? Is there any motivation?

Rule 11-Affiliating with Political party

1. Does the presenter or speaker or author affiliate to one of the political party? What party does the author, speaker presenter belongs to?
2. Why is the author belongs to the party?
3. Why is the author not belong to the party?

Rule 12-Affiliating with organisation

1. Does the author, presenter or speaker belongs to the organisation? What organisation does the author, presenter or speaker belongs to?
2. What does the organisation doing? How they try to influence the world?

Rule 13-Influence the world

1. Does the author, presenter, speaker tries to influence the world?
2. How does the author , presenter, speaker tries to influence the world?
3. What way does the author, presenter, speaker tries to influence the world?
4. Why does the author, presenter, speaker tries to influence the world? To gain political, military, financial power? What other power does the author, presenter, speaker tries to gain?

Rule 13-Does the author tries to provoke?

1. Does the author, speaker, presenter tries to provoke some sort of disruption?
2. Why are the reason of this provoked disruption?

Rule 15-Influence with mass media

1. Does the shadow government tries to influence people through the mass media?
2. Who is sponsoring mass media?
3. How they are trying to influence through mass media?
4. What reforms does the shadow government tries to pass in order to satisfy shadow government

Rule 16-Destroy

1. Is anybody tries to destroy the foundation of the following:
 - Government
 - Mass media
 - Family
 - Nation
 - Institution
 - Education
 - Moral
 - Ethics
 - Etc
2. Who are trying to destroy the foundation?
3. Why are they trying?
4. How are they trying?
5. What are they doing to destroy?

Rule 17-Ethical vs Unethical Manner

1. Did the author used the details in ethical manner?
2. Did the author or presenter used the research in ethical manner?
3. Was there unethical behaviour with the research and the sources?

Rule 18-Impact Others

1. How does this situation impact others?
2. How does the speech, writing, presentation impact others?
3. Why is this impact others?
4. What are the reasons that this would or is impacting others?
5. Global impact of the author, presenter, speaker, writer, situation to other.
6. Geopolitical impact analysis.
7. Why is this impact on the other people.
8. Who will this be impacted?
9. How this research impact others?
10. Make a list who will be impacted
11. Make a mind map how they will be impacted.

Rule 19-Lie

1. Where does the author, researcher, writer, presenter and speaker lying ?
2. Is this intentional lying or accidental?
3. Who this lie will impact?
4. What this lie impact?
5. What are the reason of this lie?
6. Why do I think this is lie?

Rule 20-Information and knowledge Fit

1. How this piece in the world of knowledge?
2. How this will impact the world and other people?
3. How does the information fit with each other?
4. How does the information relation with each other?
5. How does the information fit with each other in the world.
6. How does the information relation with each other in the world?

Rule 21-Interested party and groups in Narrative

1. What interested party has the most interest in this narrative??
2. What interested party has the least interest in this narrative?
3. What interest party controls this narrative?
4. Is this narrative based on truth or lie?
5. Why is this narrative is based on truth?
6. Why is this narrative is based on Lie?
7. Why author, speaker, researcher, journalist, presenter lying to the audience?
8. Why author, speaker, researcher, journalist, presenter telling truth to the audience?
9. What is the reason of this lie?
10. What is the reason of this truth?
11. What narrative does the author, researcher, speaker, journalist, presenter trying to push? Why is this? What is the reason?
12. What narrative does the author, researcher speaker, journalist, presenter tries to represent? What is the reason? Why?
13. Is this narrative has strategic point, target? Why?
14. Why does the author says the truth? What is it up to? Is this strategic decision to tell a truth? Does the author tries to do moral, ethical or strategic? Is this selective or not?

15. Why does the author say the Lie? What is it up to? Is this strategic decision to tell a Lie? Does the author try to do moral, ethical or strategic? Is this selective or not?
16. What group or interested party does the author represent? What is the reason and why?
17. What worldview does the author, researcher, speaker, journalist, present try to create with this lie or truth?
18. What are they trying to achieve with this lied or truthful narrative?
19. What are they trying to achieve by lie or truth? What end of result they are trying to achieve?
20. Has the author, presenter, researcher, speaker try to wash out themselves by using lie or truth?
21. Does the author, representative, presenter, researcher, speaker try to wash out the interested group or party by showing how good is this party is?
22. Does the author use selective narrative in representation of the worldview?
23. Make a list of following"
 - I. How many truth statements made
 - II. How many truth facts made
 - III. How many lie statements made
 - IV. How many lie facts made
 - V. What conclusion can we make out of this

Rule 22-Tools author, presenter, writer, researcher, speaker representative used

1. Why do the author, presenter, researcher, speaker, representative use emotional tools to persuade audience? What emotional tools used?
2. Why do the author, presenter, researcher, speaker, representative use psychological tools to persuade audience? What tools do they use?
3. What are the performing arts tools?
4. What are the visual arts tools?
5. What are history tools?
6. What are language tools
7. What are linguistic and literature tools?
8. What are Law tools?
9. What are philosophy tools?
10. What are theology tools?
11. What are anthropology tools?
12. What are archeology tools?
13. What are economical tools?
14. what are geography tools?
15. What are political science tools?
16. What are psychology tools?
17. What are sociology tools?
18. What are social work tools?
19. What are biology tools?
20. What are chemistry tools?
21. What are earth science tools?
22. What are space science tools?
23. What are physics tools?
24. What are computer science tools?
25. What are mathematics tools?
26. What are agriculture tools?
27. What are architecture and design tools?
28. What are business tools?
29. What are divinity tools?
30. What are education tools?
31. What are engineering tools?

32. What are technological tools?
33. What are environmental and forestry tools?
34. What are family and consumer science tools?
35. What are human physical performance and recreation tools?
36. What are journalism tools?
37. What are media studies and communication tools?
38. What are library and museum studies?
39. What are medicine and health tools?
40. What are military science tools?
41. What are public administration tools?
42. What are social work tools?
43. What are transportation tools?
44. What are financial tools?
45. What are managerial tools?
46. What are the accounting tools?
47. What are financial advisor tools?
48. What are the financial analyst tools?

Rule 23-Did the author, writer, representative, speaker, researcher talked with both sides?

1. Follow the money.
2. History Tends to repeat. Always try to understand historical facts and build on that understanding of the history.
3. Do not fear objective facts and evidence, even if the facts goes against your arguments, which then you drop if goes against the facts. This helps to understand the context, narrative and see who is manipulating those facts and lying. This helps to understand how the world works and how different things has happened and what history tells you overall. When you know the truth it helps to move on. The truth shall set you free. Always investigate both sides and try to understand their facts, arguments, evidence, who is lying, manipulating, why they do this, who is behind this, what is their purpose, what are they gain from this. Check people background, family history. Do the research always yourself, listen both sides and see the objective facts, how they presenting, why they presenting. Never manipulate information, facts, evidence, and Numbers.
4. Watch What They Do and Not What they talk.
5. Do the diagram how it relates to each other
6. Why has author, presenter, researcher, speaker, representative decide to take this topic or theme to analyse, investigate, talk, write, report, present?
7. Does the author is related to one of the side? Does the author will take one side or both sides to analyse the situation?
8. Does the author talk to one side or both sides to analyse the situation?
9. Does the author, presenter, researcher, speaker, representative do this investigation to push agenda, narrative or story to one side or the other? Is the author objectively allow both sides to speak and present both sides of the story to get full picture?
10. Does the author, presenter, researcher, speaker, representative try to deceive audience? What method does she, he use to deceive?
11. Is the author, presenter, researcher, speaker, representative selective or being selective in:
 - I. Presenting sides
 - II. Presenting facts
 - III. Presenting Historical Facts
 - IV. Presenting evidence
 - V. Presenting argument.

Rule 24-Did the author, writer, representative, speaker, researcher selective and non selective information of the story?

1. Why is the author, presenter, researcher, speaker, representative is so selective or non-selective in the story?
2. Does the author, presenter, researcher, speaker, representative use propaganda in this investigation?
3. Does the author, presenter, researcher, speaker, representative break law in this investigation?
4. Does the author, presenter, researcher, speaker, representative tries to make:
 - I. Emotional conclusion
 - II. Deceiving conclusion
 - III. Not fully informative conclusion
 - IV. Informative conclusion
 - V. Truthful conclusion
 - VI. Brainwashed conclusion
 - VII. Propaganda conclusion
 - VIII. Selective conclusion
 - IX. Realistic conclusion
 - X. Wrong conclusion

Rule 25-Did the author, writer, representative, speaker, researcher manipulating information?

1. Who id manipulating information?
2. Who is manipulating facts?
3. Who is manipulating people to behave one way or the other?
4. Who is manipulating people do this is sort of things?
5. By changing the law, whom this will be most useful and valued?
6. What interested group this will be most useful and whom this will be least useful and valued?
7. By introducing new tax or add more tax and citizens needs to pay more for tax, whom this tax reform or add tax is most useful or valued?
8. Who would win in this situation?
9. What interested group this tax reform is least useful? Who will loose in this situation? What interested group this tax is least valued?
10. What interest group this politician, scientist, author, speaker, government official, military official or other group of people represent?
11. How much does get for this representation? Any gift, money other type of reward?
12. Is this politician, scientist, military official, government official or other group of people corrupt? Why do I think he, she corrupt? Why do I think he, she is not corrupt? What are the facts, evidence and arguments
13. When presented the story or narrative or article or research, does one side:
 - I. Make deceitful comments about other side? Does one side misrepresent the other side? Does both side provide full truthful, deceitful information? What was deceitful, truthful
 - II. What signs show that they told truth, deceive.
 - III. Facts
 - IV. Dates
 - V. Body language
 - VI. Eyes
 - VII.The way they said
 - VIII.Emotions
 - IX. Behavior

Rule 26-Did the author, writer, representative, speaker, researcher representing interested party or group

1. What interested party does the writer, author, researcher, speaker, representative represent
2. Does this conflict of interest?
 - I. Does the author, writer, researcher, speaker representative presents both sides?
 - II. Why they represent this specific interested party or group
 - III. Do they get paid?
 - IV. Who financed?
 - V. What figure or people behind this
 - VI. Follow the money?
 - VII. Follow the people or main player or figure behind the money
3. Follow power and the main figure or player behind all of this power? Why are they in-charge?
4. What is their end place or target and what is their end result?
5. Why are they going there?
6. What is the reason?
7. What is their psychological portrait?
8. What psychological issues do they have?

Rule 27-Who is behind the Chaos?

1. Who sponsor-what amount?
2. Why they sponsor?
3. Who are interested party or groups
4. Who are the main figure behind sponsoring?
5. Who are the minor figure behind sponsoring
6. Who are the main and minor figures in the group?
7. What end result do the sponsor wants?
8. What end result do the group wants?
9. Why is this end result?
10. Who behind those people?
11. Who is the shot caller
12. Is this group organised or not?
13. Who is the people power?
14. Do they want more power?
15. Do they do for the power grab?
16. Are they for money, power or both or good cause or greed?
17. What is in their heart
18. What is the main problem? Is it sin and depravity?

Rule 27a-Who is Shadow Government Like, Blackrock, Vanguard, State Street, other Banks, Asset Management etc?**Rule 27b-Who is the shadow person?**

Rule 28-Deceiving, truth and Lie

1. Does the author, researcher, speaker, writer, representative intentionally or unintentionally deceiving the author?
 - I. What is up to author, researcher, speaker, writer, representative and what does she, he receives?
 - II. What does she, he received? Money or other reward?
 - III. Does the author, researcher, speaker, writer, representative receives some smaller sentence?
 - IV. Does she, he believes what himself, herself saying?
 - V. Does the author, researcher, speaker, writer, representative says because of reward?
 - VI. Is thus the best what author can provide? In regard facts, arguments, dates, people, other information?
2. How do we know that this is true or lie? Based on what?
3. Do we have witness?
4. Do the witness tell a lie?
5. Do the witness tell a truth?
6. How do we know that the witness tell the truth or lie? What are evidence of lie or truth?
7. What is the reason of lie or truth?
8. What do they gain or loose by tell truth or lie?
9. Does the witness use selective info to present? Why does the witness do?
10. Does author, writer, researcher, speaker representative use selective information to present the argument case for? What info does the author did not include which would reduce strength of argument or case?
11. Does the author represent on side? Why? What are reason does the author suppress other side?
12. Does the author represent both sides equally? Why? What reason? If not, why not?

Rule 29-Definition change

1. Was there definition changed to fit the narrative of corporation, group of interested people, government, elite or somebody else?
2. When was changed?
3. Was there theory changed to fit narrative corporation, group of interested people, government, elite or somebody else?

Rule 30-Interested groups

1. How this information being used by newspaper, interested groups, oligarchs and other groups of people
2. What information is being useful for ideological, religious, political, cultural, financial or other agenda?
3. Is this information is pressure to censor freedom of speech, movement one or the other groups?
4. Who funded this person, newspaper, speaker, groups of people or interested groups?
5. What is the reason they have funded these groups?
6. What is their agenda by funded these groups?
7. At what angle the author, newspaper or interested groups showing this information? Why they have showed at this angle and why?
8. Does the author, speaker or interested group do what she, he, they talked? How did they show this? How they did not show this?
9. Does the character does what she, he, they said they will do?
10. What is the ideological, political, cultural, financial, religious agenda of the interested party or groups?
11. Did the author selected who she/they will present the information first?
12. Did the author selected newspaper, journalists or group of interested people who will be presented this information for some sort of agenda?
13. Why did she, he, they choose this group of people to reveal information? What is the person agenda? What is the group interested agenda?
14. What are the interested groups? Make a list of the interested groups? What are the signs and features of those particular groups
15. Does the author, speaker, journalist, activist, writer, academic belongs to one of the interested group?
16. Does the audience belongs to the particular groups? What are the signs and features of particular group?
17. Follow the money? Where does the money flow from? What group of interested are funding? Do the interested group hid the money and secretly funding those groups?
18. What are the list of interested groups are ruling?
19. What are the capital groups? Who do they funding? What groups do they fund? Make a list. Why do they fund these groups? Make a list of reasons

20. Is there any trolls? What are their agenda? Who do they belong to? What group do they represent? Are they paid trolls? What country, city, age, education, marital status? How much do they receive from this work?
21. Was the information manipulated or twisted to fit the narrative of one of the interested groups? What capital group this group belongs?
22. What group this situation is the most useful? Make a list of interest groups
23. What group this situation is the least useful? Make a list of interest groups

Rule 31-List of Interested groups and parties

1. Watch What They Do and Not What they talk.
2. What is the current political, government ruling? Dictatorship, democratic, communism, socialism, monarchism, authoritarian, Oligarchy, aristocracy, theocracy, colonialism, totalitarianism, military dictatorship, anarchy, confederation, unitary state, federation, autocracy, democracy, direct democracy, electoracy, liberal democracy, liquid democracy, representative democracy, social democracy, soviet democracy, totalitarian democracy
3. Abortion
4. Agriculture and Food
5. Animals and wildlife
6. Arts
7. Entertainment
8. History
9. Budget
10. Spending
11. taxes
12. Business and consumers
13. Corporations
14. Capital
15. Campaign finance
16. Civil Liberties
17. Civil Rights
18. Constitution
19. Criminal Justice and death penalty
20. Defence and military.

21. Military industry Complex
22. Biggest Companies
23. Asset Management Companies
24. Drug and cartels
25. Economy, and fiscal
26. Education
27. Election
28. Employment and affirmative action
29. Entitlement and safety net
30. Family
31. Federal relation
32. State and local relations
33. Banking and finance and wall street
34. Fiscally conservative
35. Fiscally liberal
36. Food processing and sakes
37. Financial capital
38. Wall Street
39. economic interests
40. cause groups
41. public interests
42. private and public institutional interests
43. Political power in the political system
44. Non-associational groups and interests.
45. government policy makers and well-financed as prime movers in interest-group activity
and policy making
46. Neo-corporatism
47. Corporatism and corporation
48. Lobbyist and tactics
49. Multinational corporation
50. Transnational corporation
51. Global corporation
52. Groups that have capital
53. Religious groups
54. Sects

55. Occults
56. Worship groups
57. Foreign affair
58. Foreign countries
59. Foreign aid
60. Gambling and gaming industry
61. Government budget and spending
62. Political party
63. lobbyist
64. Government operation
65. Guns
66. Health and health care
67. Big Pharma
68. Scientist
69. Insurance
70. Health insurance
71. Housing and property
72. Higher education
73. Immigration
74. Indigenous people
75. Infrastructure
76. Judicial branch
77. Courts
78. Solicitor and judges
79. K-12 Education
80. Infrastructure
81. Labor union
82. Union groups
83. legal
84. Legislative branch
85. Politician
86. Liberal
87. Marijuana
88. Marriage
89. Military and militarization groups

- 90. Minors and children
- 91. National security
- 92. Natural Resources
- 93. Oil and Gas industries
- 94. Religion
- 95. Reproduction
- 96. Science and research and academy and universities
- 97. Senior citizens
- 98. LGBT
- 99. SOCIAL
- 100. SOCIALLY CONSERVATIVE
- 101. Socially liberal
- 102. Taxes
- 103. Technology, social media communication
- 104. Mass media and communication
- 105. Taxes
- 106. Trade union
- 107. Trade
- 108. Transportation
- 109. Unemployment and low income
- 110. Veterans
- 111. Woman and man
- 112. Any other interested groups are out there?
- 113. Suppliers
- 114. Customers
- 115. Partners
- 116. Employees
- 117. Investors
- 118. Owners
- 119. Bankers
- 120. Regulatory bodies
- 121. Unions
- 122. Competitors

123.Society

124.Opposing pressure groups

125.Internal interested party examples:

- I. Management
- II. Employees
- III. Corporate
- IV. Owners

126.External interested party examples:

- I. Customers
- II. Suppliers
- III. Community
- IV. Bankers
- V. Investors
- Regulators
- VI. Unions
- VII. Trade Associations
- VIII. Utilities
- IX. Law Enforcement
- X. Society
- XI. Intellectual Property Owners
- XII. Joint Venture Partners
- XIII. Business Partners
- XIV. Emergency Responders
- XV. Industry Groups
- XVI. Special Interest Groups
- XVII. News Media
- XVIII. Competitors
- XIX. Consider these *six market categories* when identifying interested parties:

127. Customer: buyers, consumers, clients, end users, and retailers.

128. Supplier: producers, vendors, contractors, and distributors.

129. Intermediary: referral sources, connectors, agencies, and networks.

130. Influencer: financial markets, regulatory markets, and government.
131. Internal: employees, staff, managers, and business units
132. Alliance: joint ventures and business partners
133. **Responsibility** – investors, etc.
134. **Influence** – pressure groups, etc.
135. **Proximity** – neighbours, etc.
136. **Dependency** – employees, etc.
137. **Representation** – trade unions, etc.
138. **Authority** – regulators, etc
139. Foreign [governments](#) and [international organizations](#). Countries maintain a wide array of embassies and consulates in foreign countries, and they often use these and hired lobbyists to work for such benefits as [foreign aid](#) and military support, as well as to boost the country's image abroad. International organizations (e.g., [UNESCO](#), [Asia-Pacific Economic Cooperation](#), the [Arab League](#), and the [Organization of American States](#)) use their resources in manners similar to governments.
140. [Multinational corporations](#) (e.g., [McDonald's](#), [Coca-Cola](#), [Honda](#), [Volvo](#), and) and business trade associations (e.g., the International Chamber of Commerce and the European Association of Manufacturers of Business Machines and Information Technology). These often have extensive global or regional reach. Their major concerns in lobbying relate to similar issues that they have within individual countries and include ensuring favourable labour codes and tax structures, making trade as free as possible, ensuring favourable laws regarding government regulation of their product (e.g., food and drink) or service (e.g., telecommunications), and trying to minimize added costs such as those involving environmental regulations. Because of their extensive resources and the fact that the government relies on the economic advantages provided by these multinational corporations, they are often successful in achieving their lobbying goals.
141. Special interest and [cause groups](#). These include the [World Council of Churches](#), the [Baptist World Alliance](#), the [Anglican Communion](#), international networks of LGBTQ-rights groups, and the Inuit Circumpolar Conference, an organization

of indigenous peoples of the Arctic and subarctic regions of [North America](#), Europe, and Asia. Such groups and organizations are involved in international lobbying for a variety of reasons and with mixed success. Some, such as churches, often lobby simply for the right to operate in a country and on behalf of human and [civil rights](#) and the poor. Others, such as indigenous groups, lobby for the rights of their compatriots in terms of preserving their customs and language and repatriating artifacts that may have been taken to other countries and are now housed in museums around the world (particularly in countries that were former colonizers).

142. International public interest groups ([nongovernmental organizations](#) [NGOs]). NGOs embrace a wide range of groups that focus on issues of broad public concern, such as human rights, [child welfare](#), and the status of women, as opposed to the specific interests of particular businesses or sectors of society, such as automobile manufacturers and physicians. At the meeting in 1945 in [San Francisco](#) that drew up the UN charter, some 1,200 NGOs were in attendance. Though there is no current, reliable count of NGOs, they mushroomed in the period after World War II and may number as many as 10,000; in [Latin America](#) alone it is estimated that there are some 2,000 NGOs, many of which work in several countries. Significant among the multitude of NGOs operating in world politics today are [Human Rights Watch](#), [Oxfam International](#), [CARE](#), [Greenpeace](#), the [World Wide Fund for Nature](#), and the [Women's International League for Peace and Freedom](#). NGOs enjoy mixed success in their political activities, partly because governments rarely rely on these groups to maintain themselves in office. Most operate far from public view, and their successes may receive little publicity. Some, however, such as Greenpeace, receive major publicity for their campaigns.

Rule 32- Who Will Use This Situation

- A. Who is the person/organisation or group that this situation is the most useful?
- B. Who is the person/organisation or group that this situation is least useful?
- C. Did the author used all AVAILABLE SOURCES, INFORMATION, FACTS AND ARGUMENTS TO HIM/HER.
- D. Does the author trying to rewrite facts, information, history of the subject to fit his/her arguments and situation?
- E. Did the author do honest analysis of all available sources, information, arguments, evidence and facts?
- F. Whom this situation is the most useful?
- G. Whom this situation is the least useful?
- H. Who is the winner of this situation?
- I. Who is the loser of this situation?
- J. Who is the victim in this situation?
- K. Who is not the victim in this situation?
- L. Who is the most likely used this situation to his/her/their advantage?
- M. Who is the least likely used this situation to his/her/their advantage?
- N. Who got harm in this situation?
- O. Who did not get harm in this situation?
- P. Almost at the end ask questions about the funds provided to the author, presenter, researcher, speaker, publisher and find out about the source of the funds provided. This is the outside research needs to be done. Follow the money.
- Q. Who or what is the most influenced in this situation?
- R. What are the corruption scheme in this situation/government, company, person or group of people?
- S. What are the corruption diagrams in this situation by government, company, person or group of people?
- T. Who is at fault in this situation?
- U. Who is not at fault in this situation?
- V. Who funded this whole scheme and situation?
- W. Where the funds came from?
- X. Where the funds where? Who received the funds?
- Y. Was this legal scheme?

Z. Is the current situation or crisis or breaking news is there to cover something bigger behind? Like trying to pass new laws or corruption or purchase which are illegal. What are these things that been tried to hid behind big news. Research everything?

AA.Who losing the most in this situation?

BB.Who is losing least in this situation?

CC.Who is winning the most in this situation

DD.Who is the winning least in this situation?

EE.Does the person tried to incorrectly paraphrase the arguments or facts or evidence?

FF.Is there conflict of interest between these two parties?

GG.Who is the breaking conflict of interest?

HH.Was there are any Break a law, code of, GDPR?

II. Was there any hidden in the accounting? What was hidden? What was tried to be hidden? Why was hidden?

JJ. What or who the person tried to protect?

KK.Was there any motivation behind some of the actions?

LL.What was the motivation behind these actions?

MM.What are the mathematical formulas behind?

NN.What are the flow chart of decision. What would be outcome if they would decide one way or the other?

OO.Was the person who speaking, presenting, author, researcher representing other side correctly and honestly?

PP.Was the speaker, presenter, author and researcher were paid by somebody to do the propaganda and throw the dirt on other people?

QQ.Was there any propaganda used in the speech, research, book or article so that they/ he/ she advising about other side incorrectly?

RR.Did I use evidence, facts and sources for every argument, premise, conclusion and sentence?

SS.Did the other side used sources, facts, evidence for every sentence, premise, argument and conclusion?

TT.Did the analogies are correct?

UU.Did the analogies really represent other side or my side?

VV.What type of arguments presented by other side?

WW.Was other side used epithets about other side? Was this is logical fallacy? Did I use the epithets? Did the other side understand this epithets? Why did they think this was

appropriate way or time to say this? Was this what other person think? Was this objectively true or not? Was this breaking any law?

XX.Does the other side understand the definition of this term?

YY.Was this is a troll who is not looking to get the correct information, but troll others and me?

ZZ.Is this person looking appropriate discussion?

AAA.Is this person trying to persuade you appropriately with full information which is correct or incorrect?

BBB.Would you apologise if provided facts and evidence were wrong for the arguments which were lead to wrong conclusion?

CCC.Does the person know or understand that he/she/they are wrong or right?

DDD.Why they they think they are right?

EEE.Why they think they are wrong?

FFF.How do we know that this happened exactly the way he said? Do we have facts? Evidence?

GGG.Use **What, who, why, when, where, how, do , did, can, may do not, did not, cannot may not, might, might not, does, does not.**

HHH.Does the person has the education to speak about this subject?

III. Does the person has honestly went through the criticism of the opposing ideas? Did the person found the reason he opposing to the other person?

JJJ.Does the person have serious intention to confuse audience?

KKK.How well does the person do the job to confuse the audience?

LLL.Did the person introduced new terms or arguments?

MMM.Did the other person did a good job to research his her ideas and opposing person ideas?

NNN.What is the reason the person trying to confuse audience?

OOO.What propaganda tools did the author, speaker, writer used in analysing this idea and opposing person idea?

PPP.Did the person understood or understand that he used propaganda tools.

QQQ.What sources did the other person used in analysing opposing person arguments?

Rule 32- Do Research archeology on the Book.

Rule 33- Do Research Geography.

Rule 34- Cultural Practice.

Rule 35. Legal Analysis of the Book.

Rule 36- Literature Review.

Rule 37- Mathematical Analysis.

Rule 38- Statistical and Probability Analysis.

Rule 39- Religious Customs.

Rule 40- Rhetorical Analysis.

Rule 41- Engineering Analysis.

Rule 42- Audience Analysis.

Rule 43. Circle of Context analysis.

- Immediate context.
- Book Context.
- Author's Corpus of Writing Context in other books (Where Available).
- Historical Context
- Logical Context
- Rhetorical contexts

Rule 44-Analyse Semantically

Rule 45- Syntax Analysis

Rule 46 Historical Background

Rule 47 Cultural Background

Rule 48 Economic Background

Rule 49 Technological Background

Rule 50 Legal Background

Rule 51 Environmental Background

Rule 52 Social Culture

Rule 53 Philosophy Gap

Rule 54 Theology Gaps

Rule 55 Anthropology Gaps

Rule 56 Political Science Gaps

Rule 57 Psychology Gaps

Rule 58 Sociology Gap

Rule 59 Biology Gap

Rule 60 Chemistry Gaps

Rule 61 Earth Science Gaps

Rule 62 Science Gaps

Rule 63 Physics Gaps

Rule 64 Computer Science Gaps

Rule 65 Mathematical Gaps

Rule 66 Business Gaps

Rule 67 Engineering Gaps

Rule 68 Medicine and Health Gaps

Rule 69 Sociological Gap

Rule 70 Anthropological Method

Rule 71 Statistical Method

Rule 72. Who are the experts in this Area, Topic, Discipline. What do The experts say? Do they agree with the author? If yes, why, and if no Why?

Step 47-Was There Propaganda or Conspiracy Theories Or Trust In Science Theories. In the Book and Propaganda Analysis.

1. Review the Propaganda of the following:

- Text
- Writing
- Book, Journal, Article, Report.
- Bible
- Sermon
- Dissertation
- Government Documents
- Theses and Dissertation
- Newspaper, Magazines
- Audiobook
- Sermon and Preaching
- Public Speaking
- TV
- Radio
- Podcast
- Communication, Talk. Speak, Conversation, discussion, Debates

2. These are the following books to use for Review and Analysis of Propaganda:

- All Art of Propaganda by George Orwell.
- Computational Propaganda by Samuel Woolley.
- Fake News, Propaganda and plain old lies by Donald Barclay.
- How Propaganda Works by Jason Stanley.
- Propaganda and Persuasion by Garth Jowett.

- **Media, persuasion and Propaganda by Marshall Soules.**
- **Primetime Propaganda by Ben Shapiro.**
- **Propaganda Studies by Jonathan Auerbach.**

3. Do Lateral Reading:

- **Question & Research Task** We know not to believe everything we hear, but what about what we read? What about what we see? The online world is full of misinformation: false or inaccurate information, especially that which is intended to deceive. One way to avoid being fooled by misinformation is by practicing lateral reading, a tool used by professional fact checkers. Lateral reading focuses on using many sources to corroborate, or confirm, information, instead of just relying on one authentic looking source. In today's lesson you are going to learn about and practice lateral reading.
- **Information Sources** Now it's time to learn more about lateral reading and investigate some sources using this technique.
 - What is lateral reading?
 - How do we do it, and why is it important? Use paper or a word processing document to answer these questions as you review the sources below and on the right.
 - The ART of Reading Laterally
 - Stanford scholars observe 'experts' to see how they evaluate the credibility of information online
 - Students Fall for Misinformation Online. Is Teaching Them to Read Like Fact Checkers the Solution?
- **Student Activity** Use your new knowledge about reading laterally to analyze the truth and accuracy of at least three of these sources.
- **Assessment Activity.** Now that you're an expert on lateral reading, it's time to share what you've learned! Imagine your principal has asked you to prepare a brief (two paragraph) article for the school's website about lateral reading. The purpose of the article is to persuade your classmates to use lateral reading in their own research. Your article should answer our inquiry question: "How can lateral reading help you avoid being fooled by fake information online?" Use your research and analysis from class today as evidence for your article. Use the success criteria on this rubric to self-assess your work.
- 2. Don't forget to take the Lateral Reading Schoology Quiz as assigned by your teacher or librarian to show what you've learned about lateral reading.
- **Open A New Tab in Your Browser.**
- **Search The Name of the Unfamiliar Source.**
- **Check What Trustworthy Sites say about it**

- If the Source Seems Untrustworthy, Don't Waste Your Time On IT. Find A Better Source.
- **Check for previous work:** Look around to see whether someone else has already fact-checked the claim or provided a synthesis of research. [Some places to look: [Wikipedia](#), [Snopes](#), [Politifact](#) and NPR's own [Fact Check](#) website.]
- **Go upstream to the source:** Most Web content is not original. Get to the original source to understand the trustworthiness of the information. Is it a reputable scientific journal? Is there an original news media account from a well-known outlet? If that is not immediately apparent, then move to step 3.
- **Read laterally:** Once you get to the source of a claim, read what other people say about the source (publication, author, etc.). **The truth is in the network.**
- **Circle back:** If you get lost or hit dead ends or find yourself going down a rabbit hole, back up and start over.

4. Best Way Fighting with Disinformation and misinformation are the following:

A. What Does the Information Provides, Use Star Method

- Situation- What the information given?
- Task- Does the information describe the task and responsibility?
- Action-does information explains exactly the steps
- Result- What is the result?

B. Use Questions:

- Who? What? When? Where? Why?
- How?
- Can? Could?
- Would? Should?
- Do or Does
- Has or have?

C. Always question even the most obvious.

D. Has this information passed three filters?

- First Filter is that of truth. Are you completely sure that, what information is going to tell me is true in all its aspects?
- Second Filter is that of Goodness. Is what you are going to tell me something good or beneficial?
- Third filter is necessity. Is it necessary for you to tell me this about my friend?
- If it's not true, nor good, nor necessary, then it does not deserve to be heard.

- E. Was there used photoshop, Filters or any other changes?
- F. Was This AI Generated Propaganda?
- G. Always ask Questions Using Socratic Method and Questioning
- H. Understand that Facts do not care about your feeling
- I. Do the Fact Checking, Do the figure check and Verification of the Data.
- J. Is this data from reputable source? Why do you think even reputable source can be trusted and rely on?
- K. Can I check this information on another media platform?
- L. Has the information provided evidence and robust investigation rather fabricated ideas that intrigue?
- M. Was this witnessed by more than 1 person? How do you know that the witnesses are not lying, and Not CONSPIRE Against?
- N. Does the information contradict with other information? Where does the contradictory occurs? How can we know that one side and the other side is telling the truth?
- O. Was there any inconsistencies? Inconsistency is a failed argument.
- P. Has anybody verified and fact and figure checked already?
- Q. Has there been two opposite experience, and how to validate both? Why should I rely on one person experience and not on the other person experience?
- R. Do not share information without thinking
- S. Was there enough information out there to gather information to make some sort of conclusion?
- T. Was information hidden by one group of people? If yes, then why was this hidden? Why do they think, we should not have this information?
- U. Has there been debate between two side of experts who disagree on these issues? Have they had any official debate? Who provided more logical and common sensical arguments, Conclusions and evidences based on the all available information?
- V. If there was no debate, why was this? Which side did not want to participate?
- W. Was there any censorship on this information? why was this censored? Who was responsible for censorship?
- X. Does anybody trying to prevent you to make a decision for yourself? Why is that? What ways they are preventing for you to get this information?
- Y. Do the one or other side care about the truth? What is their agenda?

Z. Do One of the side wants honest conversation and debate? Use Rhetoric, William Lane Craig, Greg Koukl, Aristotle, Socratic Method, Plato dialogue And Socratic Questioning ETC. Pages 323-338 and 1423-1455 and 1599-1641

AA. Who had gain for censoring this information?

BB. Believe should be based on the objective facts, logic, Reason, Evidence. Does the Premises leads to the conclusion or not? Do the reasoning align with the reality. Does the world works and align with the reality.

CC. Add The William Lane Craig method on top regarding the Debate. William Lane Craig Debate Method is on Rules of Reading Page 323-338 and 1423-1455.

Conspiracy Theories.

1. What?
2. Who?
3. Where?
4. When?
5. Why?
6. How?
7. Analyse the Conspiracy Theory by Eric Weinstein:

A. Rule 1-One should not attempt to allege type of conspiracy that has never been encountered before. Over the years many conspiracy has been discovered.

There is a menu of proven conspiracies with which we can figured out whether this conspiracy theory is possible. Ask Yourself The following Questions:

- I. Is it possible that mainstream media can be weaponised by intelligence agency for the purpose of destroying well know or ordinary person Reputation by planting stories in mainstream media. What are examples of this type of case? Destruction of (Give the name of the Person)?
- II. Does the Governments have ability by using intelligence agency to make sure the person is gone from this earth for doing something good?
- III. Can you have a highly coordinated silent hit with tremendous complexity going off almost without a hitch?
- IV. Is it possible that a person was suicided by intelligence agency by let them know that they will turn their live into living hell, as the person thinking commuting suicide is the only way out?
- V. Was there any time when intelligence agency contemplating examine using organize crime in order to carry out act that they did not want to do themselves?
- VI. Would have every had that intelligence agency used party or honey pots and trap with elaborately constructed backstory in which an actor and the character that they played are completely different? Example of this Elis Kone.
- VII. Is there intelligence community interesting to control the media. Example mockingbird.
- VIII. Is there any attempt to gain control of innocent influencers. Are there any circumstances in which people simply have a crime by being influential used against them?

B. Rule 2- Is there a possibility of this Conspiracy theory in reality?

8. Does The Conspiracy theory Has a ground in reality?
9. Always ask central questions is there any government or intelligence agency involved in this case or situation?
10. Who pulling the strings?
11. Was there any documents that are important in this situation or Case? Are those documents are classified or open source, like trading documents, invoices, emails, contracts or any other important documents.
12. What is the structure in this situation and case?
13. What is the time line of this situation or case?
14. Was the person/people or the company or government has spending like billionaire? Do they have a mean to do it?
15. What is behaviour pattern of the person, people or company, government or any other entity in one group or other group.
16. Was there any media interest in this case? If yes or No, then why was or was not?
17. Have these groups somehow connected to each other?
18. Have one of the person, people group gave interview? What has been said and why this been said this way but not the other way in this situation or case or for this situation or for those case?
19. What does the person, company, corporation group of people wanted message to be in the interview?

Trust In Science Theories.

1. What?
2. Who?
3. Where?
4. When?
5. Why?
6. How?
7. Does the claim made by author suggest the trust in science that is called scientism?
8. Does the author states that science is only way to truth or only option for rational thinking person and everything is fairy stories?
9. Was there push to believe that Science is only answer to everything without providing any evidence?
10. Are the person who says trust in science thinks that the one who does not trust are unreasonable morally deficient?
11. Does the person think that the science is a new saviour?
12. Does the person understand limitation of Science?
13. Can the person that trust fully in science answer the following questions?
 - A. Who Am I?
 - B. Where Do I come From?
 - C. Where am I going to?
 - D. What is the meaning of life?
 - E. Where do I get moral Compass
14. What are the science limitation?
15. Where does the Scientism leads to?
16. Does the person promotes Naturalism? The nature that it is?

Step 48-What Did I take From the Book.

A. Read or listen 25min and 5min break

- Read or Listen 20 pages an Hour according Mortimer Adler

B. Read or Listen between 1-50 times the book

C. Speed of Audiobook

- Analysing audiobook listen between 75 words per minute to 285 words per minute
or listen between 0.5-1.9 times speed

D. What did I read?

E. What did it mean to me?

F. What characters, stories or ideas from this book most stood out to you?

G. What character can you connect with the most in the book? Why?

H. Does this character reminds me of somebody I know?

I. Which part of the book am I having the most difficult understanding or connect with?
Why do I think this is?

J. What was most surprising, intriguing or challenging to you about this book?

K. What are the next steps for you after reading this book? What would you like to do,
read, or learn more about?

L. What were some of the differences between this book and the books you typically
read?

M. What did I learn from this book? What will you take from this book moving forward?

N. How do themes and ideas from this book relate to things you are learning in and out of
the classroom?

O. What questions do I have about the book I read?

P. What event did I attend and why did I choose it?

Q. Describe the event. What did you learn from it? What was most surprising or interesting
to you about the event?

R. What are the next steps for you after attending this event? What would you like to do,
read, or learn more about?

S. Non-Fiction Reflection questions

1. While you were reading today, describe what you pictured in your mind about the story.
2. Which character can you connect with the most in your book? Why?

3. This character reminds me of somebody I know.
4. Which part of your book are you having the most difficulty understanding or connecting with? Why do you think this is?
5. What have you done that is similar to what the characters experience in your book
6. How does the part that you read today fit together with the parts that you read earlier?
7. Predict what will happen in the next few chapters/remainder of the book. Support your prediction with facts/quotes from the story.
8. Based on what the characters say or do, what can you infer about their attributes/personalities?
9. Describe the setting. What is its significance to the story? How would the story be different in a different time or place?
10. What motivates the protagonist (main character)? How do you know? Use evidence from the book to support your answer.
11. What are the major obstacles that your protagonist faces? Explain why you think these are most important.
12. Write a letter from one character to another. Be sure to use two quotes from the text within the letter.
13. Create a diary entry in the voice of a character. Be sure to use two quotes from the text within your entry.
14. Find a quote that stands out to you and explain why you chose it.
15. Choose a character from this chapter. What do you like the most or the least about them? Why?
16. How realistic is the plot of your book?
17. Find some interesting dialogue. Explain what is happening between the characters involved.
18. If you could "jump" into your book right now, what would you do in the story and why?
19. Which character would you like to have as a friend and why?
20. Which part of the story caused the strongest feelings in you? Why?
21. I wonder what this part means
22. This part is very realistic/unrealistic because.
23. The character I most admire is....because
24. I love the way

25. I can't believe that
26. If I were, I would
27. I'm not sure that ...
28. I like the way the author
29. I felt sad/elated/apprehensive when
30. My favourite part of the book so far is
31. This part of the story reminds me of (another title) because
32. What were your feelings after reading the opening chapter of this book?
33. Did this book make you laugh? Cry? Cringe? Smile? Cheer? Explain.
34. What connections are there between the book and your life? Explain.
35. What is the most important event in the book? Explain.
36. Who should or shouldn't read this book? Why?
37. What are the best parts of the book? Why?
38. What are the worst parts? Why?
39. Do you like the ending of the book? Why or why not? Do you think there is more to tell? What do you think should happen next?
40. What came as a surprise in the book? Why?
41. What parts of the book seem most believable or unbelievable? Why?
42. What makes you wonder in this book?
43. What confuses you in the book?
44. In what ways are you like any of the characters? Explain.
45. Do any of the characters remind you of friends, family members, or classmates? Explain.
46. Which character would you like to be in this book? Why?
47. What would you and your favourite character talk about in a conversation? Begin the conversation.
48. Do you think the title fits the book? Why or why not?
49. What do you know now that you didn't know before?
50. What questions in this book would you like answered?
51. What do I think will happen next?
52. What are some words I don't know or questions I have?
53. What does the writer's purpose seem to be?
54. My favourite character is because....
55. I can relate to....
56. If I were the author, I'd change....

57. Something that doesn't make sense about this story is...
58. What I think will happen next is....
59. If I were (character in story), I'd....
60. I believe the author wants the reader to....
61. Something unrealistic or too coincidental in the story is....
62. My favourite sentence so far is because....
63. The most important character is because...
64. Write a poem from a character's viewpoint
65. Write a poem about the setting.
66. Write a poem about a character.
67. If you could be related to a character, who would it be and why?
68. Write a solution for a problem a character has that is different from anything suggested in the book.
69. In the sequel to this book, the following should happen....
70. Choose a food that represents this book and explain why.
71. Create a theme song with lyrics for the book.
72. Write a letter to the author of your book.
73. Choose a character and decide what would be two appropriate birthday presents for that character and explain why.
74. What type of reader would enjoy this book and why?
75. This book has made me reconsider or think twice about ... because....
76. Discuss a conflict in the book that is "timeless" and "universal."
77. If I could step into the book, the first thing I would do is....
78. I can't understand why (character) doesn't just
79. I laughed aloud when....
80. I felt like crying when....
81. I was furious when....
82. I was surprised when.....
83. This book reminds me of the fairy tale _____because...
84. If I were making this book into a movie, the part(s) I would cut out or change would be...because...
85. Create a cluster showing the interrelationships of the characters.
86. Discuss how (character) shows his/her personality through the dialogue in the story.
87. Discuss how (character) shows his/her personality by the actions he/she takes.

88. Discuss how (character) shows his/her personality by what other characters say or do toward this character.
89. Create an award for this book. Explain the award and why this book received it

T. Non Fiction questions

1. Which part of the book are you having the most difficulty understanding or connecting with? Why do you think this is?
2. How does the part you read today connect with what you already knew about the topic?
3. Find a quote that is interesting to you and explain why you chose it.
4. I can't believe that
5. My favourite part of the book so far is
6. Who should or shouldn't read this book and why?
7. What do you know now that you didn't know before?
8. What are some words I don't know or some questions I have?
9. I believe that the author wants the reader to
10. Write a letter to the author of this book.
11. This book has made me think twice about
12. Create an award for this book. Explain the award and why this book received it.
13. Now that I've read this book, I want to learn more about
14. I used to think, but now I know
15. I got off track in reading whenbecause
16. Describe a part you had to read twice and why.
17. I've always wanted to learn more about
18. A career in which I could use this information would be
19. Does the content in the book affect your life? How so?
20. What solutions does the author propose? Do you agree with them and why?
21. What text features does the author include? Which ones were of particular help to you in reading the book?
22. Of the information you learned, what would you like to share with someone else?
23. What kind of research do you think this author had to do in order to write this book?
24. Which questions would you ask the author if you had the chance to meet him/her?
25. Would the book be different if it had been written 10 years ago? Why or why not?

26. Did you discover anything that may help you outside of school?
27. Who is the author? What are the author's credentials and how reputable is the author?
28. What inferences are you expected to make when you read this book?
29. What are the implications of this issue?
30. Is there a call to action or a caution within this book?
31. What is the author's intent in writing the book?
32. What are some interesting vocabulary words that you have learned from this book?
33. This book reminded me of
34. If I wrote a book about this topic, I would include
35. The most exciting thing I learned from this book is
36. I would recommend this book tobecause
37. The part of this book I had difficulty understanding is

Step 49-Implication of The Book.

A. Implication

- **What are implication of this?**
- **Implication-process in min implication of the text.**

Step 50-My Arguments For Or Against The Author, Writer, Speaker, Debater.

Rule 1 What Is Your Opinion, Arguments About:

- A. Logic.
- B. Grammar.
- C. hermeneutic.
- D. Book.
- E. Topic.
- F. Authors arguments.
- G. Authors opinion.
- H. Facts.
- I. Evidence.

Rule 2 My analysis and arguments and Objections

- A. Re-read 5 times, my objections to review if I been honest and did not make the following
- B. Think very careful how to answer these objections? Did I correctly understood these objections?
- C. Did I carefully reviewed the arguments and objections
- D. When I criticised the book, topic, authors arguments, authors opinion, facts, logic, grammar hermeneutic. Did I make any Logical fallacies and did I take all things into account?
- E. Did I try my best to criticise fairly the topic or Book or article or speech or Comment by author
- F. Think very careful how to answer these objections? Did I correctly understood these objections?
- G. Did I carefully reviewed the arguments and objections
- H. What is the best way to prepare for response to the objections? Did I checked all my sources and facts that these facts would not be incorrect?
- I. Write the objections which would be very well researched.
- J. Where did the author used incorrect information, statistics, facts or made logical fallacy in presentation, writing, speech, talk, discussion, debate etc.
- K. Did I take the best arguments from opposing side on the topic, book, argument, facts from opposite side
- L. Did I PROVIDE THE BEST arguments against the opposing side and provide: best analysis, did not make any fallacies, honest and in the context analysis, provide correct facts, statistics.
- M. Did I provide date in my arguments?
- N. Were they truthful and honest?
- O. Am I data driven person in providing the arguments?
- P. Am I data driven person in providing and analysing opposite arguments and my own arguments
- Q. Was my arguments were strong or weak?
- R. Did I try my best to be honest with the other opposing side arguments and data? out what ideologies behind these arguments?
- S. Arrange nicely all book
- T. Does the author, presenter, speaker, writer calling opposing person by name to discredit him/her/ them?

- U. Why do they want to discredit?
- V. Did the author used all AVAILABLE SOURCES, INFORMATION, FACTS AND ARGUMENTS TO HIM/HER
- W. Does the author trying to rewrite facts, information, history of the subject to fit his/her arguments and situation?
- X. Do The author provides alternative Worldview to my arguments?
- Y. Do I provide Alternative Worldview to The author arguments?
- Z. Did the author do honest analysis of all available sources, information, arguments, evidence and facts?

Rule 3 Evidence and lead

- 1. Did I allow the evidence to lead whatever it takes?
- 2. Why I have not allowed?
- 3. How do I allow the evidence to lead whatever it takes?

Rule 4 Fit to my Knowledge

- 1. Where does this fit in my knowledge about the topic and the world?
- 2. Where does this fit?
- 3. Does this fill the gap in my knowledge? Or deepen the gap in the knowledge about topic or the world?
- 4. Make a Mind map how this fit to my personal knowledge.
- 5. Make a mind map how this fit to the world knowledge.

Rule 5 Did I Follow the Evidence

- A. Did I follow the evidence where it leads to?
- B. How did I follow the evidence?
- C. Did I Push the goalpost for acceptability farther than at the beginning of the analysis of the topic?

Rule 6 Was there any prediction of the future

- A. Was there any prediction of the future by author, writer, presenter, speaker?
- B. What are the predictions?

Step 51-Improve My Arguments and I would Have Another Chance, how would I Approach.

Where Do I need to Improve on my argumentation

- A. Read More sources?
- B. Listen more different perspectives on the same subject?
- C. Improve my grammar
- D. Improve my logical analysis
- E. Improve my hermeneutical analysis
- F. Improve mathematical logic
- G. Improve mathematical facts
- H. Improve statistical facts
- I. Provide more facts
- J. Provide more evidence
- K. Ask more questions
- L. Use socratic method and questions and tactics in my approach?
- M. Did I represent other side honestly
- N. Did I represent other side argument in full and without any omit information?
- O. Be better in my presentation?
- P. Be better in my body language
- Q. Be better in controlling emotions?
- R. What is the best approach in this situation?
- S. Was I honest in the whole approach?
- T. Was I HONEST IN My analysis?
- U. Did I use all available information, facts and arguments to me, when responding to the objections?

If I WOULD ANOTHER CHANCE, HOW WOULD I Approach

- A. Analyse the argument
- B. Analyse information
- C. Analyse facts
- D. Analyse Evidence
- E. Analyse my arguments to response to the other party
- F. Would there be any change in my response?
- G. What would be differently?
- H. How differently?
- I. How would I approach? Body language, tone, argumentation, facts provision, evidence provision, research tactic- asking questions, Socratic method and questions

Step 52 - Basic Exploration, Experimentation and Practice.

1. Step 1-Basic Exploration, Experimentation and Practice.

- I. The primary goal here is to simply explore based on your instincts without attempting to achieve any particular purpose. The experimentation is obviously with respect to the particular module you are focusing.
- II. If your modules focus on some technology-orientated topic, then in this step you play around with different software to familiarise yourself with these different tools to understand ways in which they functions.
- III. If your topic is something more theoretical, then you would need to ponder what exactly you want to learn about and then form some hypotheses about how those concepts or process manifest themselves, and the best way you can start learning them.
- IV. The goal of this step is to stipulate (demand) our mind to start asking the right questions about our modules. These questions will be most important outcome of this step.
- V. This step entails answering the questions you came up with in the previous step.
- VI. In this steps you will attempt to answer at least some of these questions if not all of them. For this, you would need to revisit the various resources you aggregated earlier and use them to first, answer all the questions you came up. Second to acquire as much knowledge as you can. Continue this process until you believe you have learned enough about this specific module.
- VII. You would need to go back and forth between learning new things and applying them practically to reinforce your newfound knowledge.
- VIII. Split time between learning and practical application.
- IX. Experiment on trial and error.

Step 53 - Note Taking

1. The Blank Sheet

The single biggest change you can make to getting more out of the books you read is using the blank sheet method.

Over the years I've tested multiple approaches and this one works best for simplicity and effectiveness — it will 10x your comprehension overnight.

The blank sheet primes your brain for what you're about to read and shows you what you're learning.

Here's how it works:

1. Before you start reading a new book, take out a blank sheet of paper. Write down what you know about the book / subject you're about to read — a mind map if you will.
2. After you finish a reading session, spend a few minutes adding to the map with a different color.
3. Before you start your next reading session, review the page.
4. When you're done reading, put these 'blank sheets' into a binder that you periodically review.

2. Conventional Notes

Forget the teacher that yelled at you for writing in your book when you were a kid. You bought this thing. It's your property. You need to [write in the margins](#).

Here is a very [simple process to take notes while reading](#):

- At the end of each chapter write a few bullet points that summarize the main idea or specific points. Use your own words and not the authors. Try and connect it to something in your life — a memory or another idea. Also, make note any unanswered questions you had while reading.
- When you're done the book, put it down for a week.
- Pick up the book again and go through all your notes. In a lot of cases, reading your notes will be as good as reading the book again.
- On the inside cover write out the main idea of the book using your own words. If you find yourself stuck, review your notes. (This is called [the Feynman Technique](#)). Writing is the process by which we often discover we don't know what we are talking about.
- You can even make a custom index on the back cover with themes or topics.
- (Optional) Copy out the excerpts by hand and put them on the back of your blank sheet from above or type them out and put them into Evernote. Tag accordingly.

3. Note Taking

- I. Normal note-taking with as much detail as you can.
 - Copy down the information you ordinarily you need to know as you encounter the material.
- II. Summarising the information in your own words, clarifying the significance and noting question.
 - Do not repeat the initial note, even if you took your notes in complete sentences.
 - Converting the note to language that helps you understand the meaning is essential.
 - Try to make connection and find relationship within the information.
 - List any questions you have about the notes you have took in step 1.
- III. Connecting this particular piece of information to the lesson at large.
 - State any connection you can find between the subject of that note and the broader topic you are studying.
 - Is there any cause and effect relationship with broader topic.
- IV. Answering remaining questions and then summarising each distinct page or section again.
 - Revisit, synthesise and transform the information you have learned.

4. Cornell Note Taking

This method of note taking is useful because it enables you to keep track of questions or thoughts that occur to you while making notes. It also allows you to go back and add comments to a page of notes or connect ideas from one source to another.

The Cornell note taking method serves multiple purposes:

- Notes from the lecture or readings, so that you have a record of information you may have forgotten (Details section).
- Summary of what was covered in the lecture or reading which you can easily look through (Summary section).
- A set of key points and/or questions that serve as a mini study guide (Main Ideas section).

Method

During class

- o take down information in largest area of the page.
- o when instructor moves to new point, skip a few lines.

After class

- o complete phrases & sentences as much as possible.
- o for all significant information, write cue in left margin.

After writing the notes in the main space, use the left-hand space to label each idea and detail with a key word or "cue"

An example of Cornell Note taking form is below – blank sample follows.

DATE:

IDEA/ Name of the lecture:

Main Ideas and Questions

Details

Summary of Notes After Class

Homework For Next Week or Months

Important Information For assignment, Exam or Other

5. Richard Feynman Note Talking Technique

- I. Choose a concept and Write At the TOP Page. Select a topic you're interested in learning about and write it at the top of a blank page in a notebook.**
 - A. Write What You do Know About The Topic or Concept. Write what you know, as if you were explaining to yourself.**
 - B. Write What you Do not Know About The Topic or Concept. You need to be specific. Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.**
 - C. What Book Explains the Best About This Topic.**
 - D. You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.**
 - E. Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.**
 - F. Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.**

G. Make it your own.

- Start with not knowing.
- Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
- Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.

H. Take Notes On the Topic From Study.

- I. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.

J. Don't write notes on notes: Life is short.

II. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

III. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

- IV. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.**
- V. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, podcast – and fill the gaps in your knowledge.**
- VI. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.**
 - A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
 - B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
 - C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

VII. each it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.

- A. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.
- B. Remove any jargon or complexity.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.
- G. **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught them in their own words. If they can't do this, your explanation is too complex — simplify it and use plain language.
- H. **You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes

you to tackle even more challenging subjects knowing you have a solid framework for learning.

VIII. Reflect, Refine, and Simplify.

- A. Only when you can explain the subject in simple terms do you understand it.**
- B. Simple is beautiful.**
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.**
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.**
- E. Go back to the source material, reviewing the parts you don't quite understand yet.**
- F. Repeat until you have a simple explanation.**

IX. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

X. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
- B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

XI. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

6. Flow Chart (More for the Debate, Discussion, Dialogue, Conversation and Communication)

A. Take Notes While the Opposition is speaking In Debate, Dialogue, Conversation and Communication:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.
- Opponent Answer.
- My response to the response of the opponent.

7. Use Cornell Note Taking.

- A. Name.**
- B. Date.**
- C. Class and Period.**
- D. Topic.**
- E. Essential Question at the Top of Page.**
- F. Questions and Main Ideas on the Left Page of the Blank Page.**
- G. Notes On the Right Page of the Blank Page.**
- H. Summary at the bottom of the page.**

8. **Analytical Learners: Outline/ List.** Good Works well for recording terms, definitions, facts and sequences.
9. **Sentence Method:** The goal is to jot down your thoughts as quickly as possible. Works well in meetings or lectures that lack organization. Use when information is being presented very quickly.
10. **SQ3R (Survey, Question, Read, Recite, Review).** Use for dense readings (like business books, text books, white papers, etc.). You start the process by skimming the material for bolded text, images, diagrams and summaries in order to produce a list of headlines or main topics.
11. **Mapping.** Mapping is a nonlinear system of note-taking that resembles a tree and root structure. Ideas stem from one major concept and are connected by lines (or “branches”). As a note-taking system, mapping works particularly well for visual learners, but it can also be a great tool for analytical-thinkers who have trouble brainstorming because it allows you to make connections you’d otherwise miss with a linear format. Works well for planning essays, recording meetings. Use for big-picture brainstorming sessions.
12. **Smart Wisdom.** It’s a tool optimised for active listening in lecture situations. Instead of taking notes in full sentences, you record only keywords and place them in a chain that maps the thought process.
13. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
14. **Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.
15. **Charting.** Charting is a great note-taking strategies when you need to compare and contrast ideas. The most widely used charting method is the Pro and Con list.

16. CERC.

- A. Claim.**
- B. Evidence.**
- C. Reasoning.**
- D. Conclusion.**

17. Use Smart Notes.

- A. What is big Idea.**
- B. Question.**
- C. Evidence.**
- D. Conclusion.**

Step 54-Simplify The Topic For Myself

First

I. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

Step 55-Reflect, Refine And Simplify

I. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

Step 56-Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

- 1. Use The Chosen Rules of Reading Method For Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method and Follow Each Steps Of The Method Until Finish All Steps, While Re-listen Lectures, Read Books or Lecture Notes 1-100 Times For Each Step.**
- 2. Following Rules of Reading Methods:**
- 3. Choose One of the Method of Rules of Reading For Following:.**
 - A. VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. VERY FAST READING- Entertainment.**
 - II. Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. Method 2-Use 80/20 Principle For Reading. Pages 68.**

- III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.
 - IV. Method 4-Flip Through Pages and Analyse. Page 70.
 - V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.
 - VI. Method 6-Devotional Bible Read. Pages 73-74.
- D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading-Complex Text.
- I. Method 1-Chapter Summary Method. Pages 143-147.
 - II. Method 2-Character Quality Method. Pages 148-160.
 - III. Method 3-Thematic Method. Pages 161-163.
 - IV. Method 4-Biographical Method. Pages 164-176.
 - V. Method 5-Topical Method. Pages 177-180.
 - VI. Method 6-Word Study Method. Pages 181-189.
 - VII. Method 7-Book Background Method. Pages 190-194.
 - VIII. Method 8-Book Survey Method. Pages 195-205.
 - IX. Method 9-Chapter Analysis Method. Pages 206-215.
 - X. Method 10-Paragraph Study. Pages 216-229.
 - XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.
 - XII. Method 12-Book Synthesis Method. Pages 235-238.
 - XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.
 - XIV. Method 14-Studying Bible Prophecy. Pages 246-259.
 - XV. Method 15-Typological Study Method. Pages 260-262.
 - XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.
 - XVII. Method 17-Inductive Bible Study Method. Pages 269-296.
 - XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.
 - XIX. Method 19-Theological Group of Principles. Pages 303-306.
 - XX. Method 20- How To Read A Book Pages 307.

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.

II. Method 22-How To Read A Book For Various Books. Pages 342-600.

III. Method 23- Syntopicon Pages 601-642.

IV. Method 24-The Craft of Research. Pages 644-882.

V. Method 25-Research Books can Be Used. Pages 883-897.

VI. Method 26-Investigative Journalism. Pages 898-923.

VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.

4. Learning should be iterative. More often than not, learning something challenging takes several attempts. With the Feynman Technique, returning to the source material is an explicit part of the learning process. When gaps in our knowledge arise and our explanations aren't quite right, revisiting our primary and secondary sources can help solidify what we're learning.
5. Getting it right will likely take several iterations. That's a good thing; the more you refine your explanations, the more your understanding will deepen. Learning becomes an iterative process. Rather than viewing learning as one-and-done, this step gives you permission to continuously refresh your knowledge.
6. You're actively engaged. Using sources to polish our own explanations and models is an active process. When we learn passively, committing details to memory is more challenging. When we're actively part of creating our own summaries and reasoning, drawing intentionally from original information to fill our blind spots, we can more readily commit knowledge to our long-term memory.
7. You expand your knowledge base. Paradoxically, the more we learn, the more *our capacity* to learn increases. Looking through a chapter of a textbook might feel like a different language the first time around. The second time it becomes more clear. The third time, with a strong base already, we pick up nuances we couldn't have possibly seen before.

*PART 7: Thinking, Logic and
Mental Model For Deep Work or
Deep Study, Or Bible Study*

Step 57-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 58 - NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 59-You Are Required To Do The Work For Thinking and Applying Mental Tool Models.

1. I will Always observe people and their behavior and their argument from aside. Do not tell my arguments, when nobody asked me to tell.
2. Never talk about other people behind their back.
3. Never backstabbing other people for my own gain.
4. Always Listen other people side of story, even I know this is completely lie and fabrication. This allows me to see how far person goes to cover their lies.
5. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
6. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some

oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.

- C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

- 7. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."

- 8. How Long Does it Take To Prepare:

- A. Depend on the topic and opponent, and how much he's written.
- B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
- C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

9. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.

- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

10. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XIII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIV. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.

XV.Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XVI.Never use cheap shots to win argument, like logical fallacies.

XVII.Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading Deductive and Inductive Methodology.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

11. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

12. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Stratagem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

13. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

- C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.
- D. Always allow the opponent allow to lay out his argument without interruption.
- E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.
- F. Be Honest.
- G. Be Open Minded.
- H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.
- I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.
- J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important?

1. After Reading, Analyse, Research and Arguing with the text, then I need to Decide and apply the Logic, Mental Models and thinking model that helps to understand the complexity of the world.
2. If you can think through things better than others, you'll have fewer problems and more free time. If you can't, you're going to spend a lot of time fixing your mistakes. Good decisions make the future easier, bad ones make it harder.
3. The investigators wanted to figure out how today's college students were able to multitask so much more effectively than adults. How do they manage to do it, the researchers asked? The answer, they discovered—and this is by no means what they expected—is that they don't. The enhanced cognitive abilities the investigators expected to find, the mental faculties that enable people to multitask effectively, were simply not there. In other words, people do not multitask effectively. And here's the really surprising finding: the more people multitask, the worse they are, not just at other mental abilities, but at multitasking itself.
4. Multitasking, in short, is not only not thinking, it impairs your ability to think. Thinking means concentrating on one thing long enough to develop an idea about it. Not learning other people's ideas, or memorizing a body of information, however much those may sometimes be useful. Developing your own ideas.
5. The best way to improve your ability to think is to spend large chunks of time thinking. Immersing ourselves in the problem offers insights that can't be gained otherwise. One way to force yourself to slow down and think is to write. Good writing requires good thinking.
6. Good writing, like good thinking, takes time.

7. One heuristic to tell how good someone is at making decisions is by how much time they have. The busiest people are often the ones who make the worst decisions. Not only do they have less time to dedicate to thinking about the problem, but they are often busy correcting poor decisions from the past.
8. Good thinking is expensive. Bad thinking costs a fortune. Rather than accept that good thinking requires time, most people try to bargain with reality. Unfortunately, that is not how the world works. If you want to think better, schedule time to write out your thoughts.
9. Why is important Different type of Thinking to the reality:
 - I. Using Multidisciplinary Thinking to Approach Problems in a Complex World. Complex outcomes in human systems are a tough nut to crack when it comes to deciding what's really true. Any phenomena we might try to explain will have a host of competing theories, many of them seemingly plausible.
 - II. Cross-checks" from a variety of sources of data, developing a 3D view of the landscape he's trying to assess
 - III. So why is it important to be a multidisciplinary thinker? The answer comes from the Austrian philosopher Ludwig Wittgenstein, who said, "To understand is to know what to do." Could there be anything that sounds simpler than that? And yet it's a genius line—"to understand is to know what to do." How many mistakes do you make when you understand something? You don't make any mistakes. Where do mistakes come from? They come from blind spots, a lack of understanding. Why do you need to be multidisciplinary in your thinking? Because as the Japanese proverb says, "The frog in the well knows nothing of the mighty ocean."
 - IV. You may know everything there is to know about your specialty, your silo, your "well," but how are you going to make any good decisions in life—the complex systems of life, the dynamic system of life—if all you know is one well?
 - V. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring. So out of necessity, we must approach the problem in a different way
 - VI. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).

- VII. Cross-checks” from a variety of sources of data, developing a 3D view of the landscape he’s trying to assess.
- VIII. *Look* we can’t just rely on “plausible narratives” generated by folks like the historians. There are too many possibilities that could be correct. Nor can we rely purely on correlations (i.e., the rise in literacy statistically tracking the decline in violence) — they don’t necessarily offer us a causative explanation. (Does the rise in literacy *cause* less violence, or is it vice versa? Or, does a third factor cause both?) However, if we layer in some other known facts from areas we can experiment on — say, psychology or cognitive neuroscience — we can sometimes establish the causal link we need or, at worst, a better hypothesis of reality.
- IX. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; “Demonstrable” aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- X. What we end up with is not necessarily a bulletproof explanation, but probably the best we can do if we think carefully. A good cross-disciplinary examination with quantitative and qualitative sources coming into equal play, and a good dose of judgment, can be far more rigorous than the gut instinct or plausible nonsense type stories that many of us lazily spout.
- XI. A Word of Caution: Although Pinker’s “multiple vertices” approach to problem solving in complex domains can be powerful, we always have to be on guard for phenomena that we simply cannot explain at our current level of competence: We must have a “too hard” pile when competing explanations come out “too close to call” or we otherwise feel we’re outside of our circle of competence. Always tread carefully and be sure to follow Darwin’s Golden Rule: Contrary facts are more important than confirming ones. Be ready to change your mind, like Darwin, when the facts don’t go your way.
- XII. Using a true multidisciplinary understanding of things, Peter identifies two often overlooked, parabolic “Big Ideas”: 1) Mirrored Reciprocation (go positive and go first) and 2) Compound Interest (being constant). A great “Life Hack” is to simply combine these two into one basic approach to living your life: “Go positive and go first, and be constant in doing it.” There may be no better formula for living the best life you could possibly live.

Step 61-Intradisciplinary Thinking

1. Step 1 Define Intradisciplinary Thinking-Intradisciplinary Thinking. Intradisciplinary Thinking is within a single academic discipline. This is simply thinking within a scope of one academic discipline. Intradisciplinary working is within one discipline. Like a single ingredient, clearly distinguishable. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.

IV. Listen and Apply The Following Books:

- **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
- **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next

question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle but never fool yourself about where it stands today, and never be afraid to say "I don't know."

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can't be bought. It can't be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They've paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it's difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we've got chauffeur knowledge. They've learned the talk. They may have a big head of hair, they may have fine temper in the voice, they'll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I've just described practically every politician in the United States. We have the people who don't do the work — they pretend. While they've learned to put on a good show, they lack understanding. They can't answer questions that don't rely on memorization. They can't explain things without using jargon or vague terms. They have no idea how things interact. They can't predict the consequences. The problem is that it's difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up

articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking.

I. Thinking Rate.

- **You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.**
- **When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.**
- **Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.**

II. Beyond The Hurry Culture

- **Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.**
- **All of these things increase pressure in the work environment and repeatedly reinforce the “hurry up!” message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.**
- **The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, “*Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking.*”**

III. Elements of Effective Thinking.

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.
- The 48 Laws of Power By Robert Greene
- How to Think By John Dewey

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.

- Thermodynamics.
- Inertia.
- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.

- Supporting Idea: Complex Adaptive Systems.
- Critical mass.
- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - **Algebra.**
 - **Permutations and combinations.**
 - **Algorithms.**
 - **Scale.**
 - **Compound interest.**
 - **Inflection point.**

- **Physics.**
 - **Scientific Method.**
 - **Breakpoint.**
 - **Critical mass.**
 - **Reciprocity.**
 - **Velocity.**
 - **Relativity.**
 - **Leverage.**
 - **Newton's Laws of Motion.**
 - **Chaos Theory.**
 - **Complex Adaptive Systems.**
 - **Activation Energy.**
 - **Laws of Thermodynamics.**
 - **Heisenberg Uncertainty Principle.**

- **Statistics.**
 - **Probabilistic thinking.**
 - **Bayes Theorem.**
 - **Power Law.**
 - **Regression to the Mean.**
 - **Game Theory.**
 - **Correlation and Causation.**
 - **Standard Deviation.**
 - **Law of large numbers.**
 - **Inversion.**
 - **Fragility / Robustness / Antifragility.**
 - **Black Swan.**

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Super response Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Thinking through Method.**
- X. Thinking design through the literature.**
- XI. Seeking Wisdom_ From Darwin to Munger.**
- XII. Thinking, Fast and Slow.**
- XIII. Investing_ The Last Liberal Art.**
- XIV. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XV. General Mental Models.**
- XVI. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XVII. Extreme Ownership.**
- XVIII. Good Strategy and Bad Strategy.**
- XIX. The Complete Art of War.**
- XX. Mental Models.**
- XXI. Rules of Thinking.**
- XXII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Developing critical thinking.**
- XV. critical-thinking-logic-amp-problem-solving-the-ultimate-guide-to-better-thinking-systematic-problem-solving-and-making-impeccable-decisions-with-secret-tips-to-detect-logical-fallacies.**
- XVI. The Art of problem solving**
- XVII. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies**

- XVIII.Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XIX.Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XX.Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XXI.Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**
- XXII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.**
- XXIII.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.**
- XXIV.Listen, Use and Apply Understanding Argument By Walter Sinnot Armstrong For Thinking.**
- XXV.CRITICAL THINKING_ Consider the Verdict**
- XXVI.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.**
- XXVII.Thinker's guide to Analytic Thinking.**
- XXVIII.Socratic Method Today.**
- XXIX.Socratic Logic_ _ A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles**
- XXX.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.**
- XXXI.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.**
- XXXII.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.**
- **Use Socratic Logic and Introduction to Logic for Thinking.**
 - **Basic Concepts and Terms and Words.**
 - **Language and definition.**
 - **Informal Fallacies.**
 - **Sentences, proposition, judgements.**
 - **Immediate inference.**
 - **Conversion.**
 - **Observion.**

- Contraposition.
- Contradiction.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII.Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII.Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX. Think like entrepreneur.**
- XX. Think Like Attorney.**
- XXI. Think like anthropologist.**
- XXII. Think Like Super GM.**
- XXIII. Think Like Stoicism.**
- XXIV. Think Like Rocket Scientist.**
- XXV. Think Like Grandmaster,**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**
- XVIII. System of logic By John Stuart Milton**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Applying-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

- 7. Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
- 8. Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around?** As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality?** In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas?** The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate?** Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles?** A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress?** Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 62 - Multidisciplinary Thinking

1. **Step 1 Define Multidisciplinary Thinking.** Multidisciplinary thinking taking combination of various disciplines that maintain their unique perspective unchanged. They share a connection that is not collaborative, but collective and can work together to create a more complicated picture of Reality. The topic of analysis will best expose its different characteristics by exploring different perspectives, using the techniques and observations provided by variety of developed disciplines. Multidisciplinarity is characterised within the literature as the least integrative form of integrated research—yet, equally, it is arguably the most attainable. Multidisciplinarity features several academic disciplines in a thematically based investigation with multiple goals—essentially, studies “co-exist in a context” . While researchers aim to share knowledge and compare results from the studies there is no attempt to cross boundaries or generate new integrative knowledge. Each member is able to contribute a professional perspective on the issue. Thus the advantage of this approach is that, while the research approaches are disciplinary, the different perspectives on the issue can be gathered into one report for assessment. There is some debate on the extent to which research is coordinated and integrated. While some suggest that multidisciplinary research is coordinated, but not integrated; others contend that there is no coordination, but there is integration at a low level. In general, it is hard to imagine that the research is not, in some way coordinated whilst maintaining even a slight degree of coherence, but it may indeed not be integrated. Multidisciplinary working brings disciplines together so they can learn from each other, drawing on the mix of disciplinary knowledge. It's like a salad: the original ingredients are intact, but the flavours begin to blend. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; “Demonstrable” aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- IV. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
 - **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a

clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still I to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.
- The 48 Laws of Power By Robert Greene
- How to Think By John Dewey

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.

- Thermodynamics.
- Inertia.
- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.

- Supporting Idea: Complex Adaptive Systems.
- Critical mass.
- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Thinking through Method.**
- X. Thinking design through the literature.**
- XI. Seeking Wisdom_ From Darwin to Munger.**
- XII. Thinking, Fast and Slow.**
- XIII. Investing_ The Last Liberal Art.**
- XIV. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XV. General Mental Models.**
- XVI. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XVII. Extreme Ownership.**
- XVIII. Good Strategy and Bad Strategy.**
- XIX. The Complete Art of War.**
- XX. Mental Models.**
- XXI. Rules of Thinking.**
- XXII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Developing critical thinking.**
- XV. critical-thinking-logic-amp-problem-solving-the-ultimate-guide-to-better-thinking-systematic-problem-solving-and-making-impeccable-decisions-with-secret-tips-to-detect-logical-fallacies.**
- XVI. The Art of problem solving**
- XVII. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies**

- XVIII.Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XIX.Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XX.Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XXI.Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**
- XXII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.**
- XXIII.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.**
- XXIV.Listen, Use and Apply Understanding Argument By Walter Sinnot Armstrong For Thinking.**
- XXV.CRITICAL THINKING_ Consider the Verdict**
- XXVI.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.**
- XXVII.Thinker's guide to Analytic Thinking.**
- XXVIII.Socratic Method Today.**
- XXIX.Socratic Logic_ _ A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles**
- XXX.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.**
- XXXI.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.**
- XXXII.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.**
- **Use Socratic Logic and Introduction to Logic for Thinking.**
 - **Basic Concepts and Terms and Words.**
 - **Language and definition.**
 - **Informal Fallacies.**
 - **Sentences, proposition, judgements.**
 - **Immediate inference.**
 - **Conversion.**
 - **Observion.**

- Contraposition.
- Contradiction.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII.Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII.Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX. Think like entrepreneur.**
- XX. Think Like Attorney.**
- XXI. Think like anthropologist.**
- XXII. Think Like Super GM.**
- XXIII. Think Like Stoicism.**
- XXIV. Think Like Rocket Scientist.**
- XXV. Think Like Grandmaster,**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**
- XVIII. System of logic By John Stuart Milton**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

- I. CORPORATE FINANCE An Introduction.**

P. Biology.

- I. Developmental Biology.**
- II. Encyclopedia of Biology.**
- III. Encyclopedia of evolutionary biology.**
- IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.**
- V. Human Embryology and Developmental Biology.**
- VI. Introduction to the Biology of Marine Life**
- VII. The Encyclopedia Of Molecular Biology.**

Q. Physics.

- I. College Physics - Physics and Astronomy.**
- II. Encyclopedia of applied physics.**
- III. Fundamentals of Physics Textbook.**
- IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.**
- V. Physics for Scientists & Engineers & Modern Physics.**

R. Chemistry.

- I. Physical_chemistry.**
- II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.**
- III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.**
- IV. Organic Chemistry.**
- V. Ullmann's Encyclopedia of Industrial.**

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 63 - CrossDisciplinary Thinking

1. **Step 1 Define CrossDisciplinary Thinking.** Crossdisciplinary thinking applies to several types of cross border interactions, looking at one discipline from an other's viewpoint. You will be working together to move knowledge from one discipline to the other. For example, views from political science are being used in fictional literature to understand political dispute. As part of the current university, cross-disciplinarity has a long background, particularly among disciplines that share borders or those with a shared focus. Physics and astronomy disciplines demonstrate this background. Physics studies a law that determines the universe; these laws extend to non-Earthly contexts (to the best of modern knowledge). Physics and astronomy programs are therefore usually located in the same academic department, providing for cross-disciplinary interaction. Crossdisciplinary working views one discipline from the frame of reference of another. It's like lots of different ingredients on a plate, but without chopping them up and mixing them. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- III. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- IV. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- V. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- VI. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**

- **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a

clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.
- The 48 Laws of Power By Robert Greene
- How to Think By John Dewey

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.

- Thermodynamics.
- Inertia.
- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.

- Supporting Idea: Complex Adaptive Systems.
- Critical mass.
- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Thinking through Method.**
- X. Thinking design through the literature.**
- XI. Seeking Wisdom_ From Darwin to Munger.**
- XII. Thinking, Fast and Slow.**
- XIII. Investing_ The Last Liberal Art.**
- XIV. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XV. General Mental Models.**
- XVI. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XVII. Extreme Ownership.**
- XVIII. Good Strategy and Bad Strategy.**
- XIX. The Complete Art of War.**
- XX. Mental Models.**
- XXI. Rules of Thinking.**
- XXII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Developing critical thinking.**
- XV. critical-thinking-logic-amp-problem-solving-the-ultimate-guide-to-better-thinking-systematic-problem-solving-and-making-impeccable-decisions-with-secret-tips-to-detect-logical-fallacies.**
- XVI. The Art of problem solving**
- XVII. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies**

- XVIII.Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XIX.Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XX.Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XXI.Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**
- XXII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.**
- XXIII.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.**
- XXIV.Listen, Use and Apply Understanding Argument By Walter Sinnott Armstrong For Thinking.**
- XXV.CRITICAL THINKING_ Consider the Verdict**
- XXVI.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.**
- XXVII.Thinker's guide to Analytic Thinking.**
- XXVIII.Socratic Method Today.**
- XXIX.Socratic Logic_ _ A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles**
- XXX.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.**
- XXXI.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.**
- XXXII.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.**
- **Use Socratic Logic and Introduction to Logic for Thinking.**
 - **Basic Concepts and Terms and Words.**
 - **Language and definition.**
 - **Informal Fallacies.**
 - **Sentences, proposition, judgements.**
 - **Immediate inference.**
 - **Conversion.**
 - **Observation.**
 - **Contraposition.**
 - **Contradition.**

- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII.Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII.Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX. Think like entrepreneur.**
- XX. Think Like Attorney.**
- XXI. Think like anthropologist.**
- XXII. Think Like Super GM.**
- XXIII. Think Like Stoicism.**
- XXIV. Think Like Rocket Scientist.**
- XXV. Think Like Grandmaster,**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**
- XVIII. System of logic By John Stuart Milton**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.

XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.

XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

- 7. Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
- 8. Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around?** As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality?** In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas?** The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate?** Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles?** A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress?** Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 64-Interdisciplinary Thinking

1. **Step 1 Define Interdisciplinary Thinking.** "Interdisciplinary" comes from the process of merging and integrating different disciplines together with their methodologies and presumptions. It includes crossing the formal borders between sciences and combining their methods in favor of a common purpose. "Methodologies and assumptions belonging to different disciplines are connected and modified in order to adapt to the needs of the research, creating new tools which allow for the investigation of difficult subjects that surpass the possibilities of a single discipline. In the field of architecture, for instance, complex topics such as SDGs, urban transitional, sustainability, and design imply various approaches that combine chemistry, drafting for design, engineering design, fundamentals of physics, architectural illumination and electrical systems. Interdisciplinarity may be regarded as a step up from multidisciplinary. Interdisciplinary studies focus on addressing specific 'real world' system problems and, as a result, the research process forces participants (from a variety of unrelated disciplines) to cross boundaries to create new knowledge. Essentially the major difference from multidisciplinary lies in the *level of integration and cooperation* as these projects seek to bridge disciplinary viewpoints and potentially enable the examination of existing accumulated knowledge from the perspective of a neighboring discipline. Huutoniemi *et al.* provide a relatively comprehensive typology of interdisciplinarity along with specific indicators for research teams to grasp on to. At the same time, Schmidt outlines the importance of a basic literacy in the philosophy of science related to doing such work as well as the kinds of interdisciplinarity. The necessity of bridging disciplinary viewpoints generally (as with transdisciplinarity) stems from the need to address complex "problems that involve an interface of human and natural systems" and, as such, the integration of natural and social scientists is standard practice for interdisciplinary research. This approach involves bringing people and ideas together from different disciplines to jointly frame a problem, agree on a methodological approach, and analyze data. Thus interdisciplinary research requires a much more collaborative approach to problem formulation and methodological development than multidisciplinary research. Interdisciplinary

working starts to take a new form, integrating knowledge and methods from different disciplines and synthesising into a new whole. It's like a stew: the original ingredients are still partly distinguishable, but the overall is a blended pot of mixed flavours. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- III. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- IV. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- V. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- VI. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
 - **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the

complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.
- The 48 Laws of Power By Robert Greene
- How to Think By John Dewey

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.

- Thermodynamics.
- Inertia.
- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.

- Supporting Idea: Complex Adaptive Systems.
- Critical mass.
- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - **Algebra.**
 - **Permutations and combinations.**
 - **Algorithms.**
 - **Scale.**
 - **Compound interest.**
 - **Inflection point.**

- **Physics.**
 - **Scientific Method.**
 - **Breakpoint.**
 - **Critical mass.**
 - **Reciprocity.**
 - **Velocity.**
 - **Relativity.**
 - **Leverage.**
 - **Newton's Laws of Motion.**
 - **Chaos Theory.**
 - **Complex Adaptive Systems.**
 - **Activation Energy.**
 - **Laws of Thermodynamics.**
 - **Heisenberg Uncertainty Principle.**

- **Statistics.**
 - **Probabilistic thinking.**
 - **Bayes Theorem.**
 - **Power Law.**
 - **Regression to the Mean.**
 - **Game Theory.**
 - **Correlation and Causation.**
 - **Standard Deviation.**
 - **Law of large numbers.**
 - **Inversion.**
 - **Fragility / Robustness / Antifragility.**
 - **Black Swan.**

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Thinking through Method.**
- X. Thinking design through the literature.**
- XI. Seeking Wisdom_ From Darwin to Munger.**
- XII. Thinking, Fast and Slow.**
- XIII. Investing_ The Last Liberal Art.**
- XIV. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XV. General Mental Models.**
- XVI. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XVII. Extreme Ownership.**
- XVIII. Good Strategy and Bad Strategy.**
- XIX. The Complete Art of War.**
- XX. Mental Models.**
- XXI. Rules of Thinking.**
- XXII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII.ACCA F7 INT Study Text Financial Reporting.**
- VIII.ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII.ACCA P3 Business Analysis.**
- XIII.ACCA P4 - Advanced Financial Management.**
- XIV.ACCA P5 - Advanced Performance Management.**
- XV.ACCA P6 Advanced Taxation.**
- XVI.ACCA P7 - Advanced Audit and Assurance.**
- XVII.Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII.Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX.Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX.Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Developing critical thinking.**
- XV. critical-thinking-logic-amp-problem-solving-the-ultimate-guide-to-better-thinking-systematic-problem-solving-and-making-impeccable-decisions-with-secret-tips-to-detect-logical-fallacies.**
- XVI. The Art of problem solving**
- XVII. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies**

- XVIII.Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XIX.Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XX.Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XXI.Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**
- XXII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.**
- XXIII.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.**
- XXIV.Listen, Use and Apply Understanding Argument By Walter Sinnot Armstrong For Thinking.**
- XXV.CRITICAL THINKING_ Consider the Verdict**
- XXVI.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.**
- XXVII.Thinker's guide to Analytic Thinking.**
- XXVIII.Socratic Method Today.**
- XXIX.Socratic Logic A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles**
- XXX.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.**
- XXXI.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.**
- XXXII.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.**
- **Use Socratic Logic and Introduction to Logic for Thinking.**
 - **Basic Concepts and Terms and Words.**
 - **Language and definition.**
 - **Informal Fallacies.**
 - **Sentences, proposition, judgements.**
 - **Immediate inference.**
 - **Conversion.**
 - **Observion.**

- Contraposition.
- Contradiction.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX. Think like entrepreneur.**
- XX. Think Like Attorney.**
- XXI. Think like anthropologist.**
- XXII. Think Like Super GM.**
- XXIII. Think Like Stoicism.**
- XXIV. Think Like Rocket Scientist.**
- XXV. Think Like Grandmaster,**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**
- XVIII. System of logic By John Stuart Milton**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

- 7. Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
- 8. Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around?** As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality?** In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas?** The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate?** Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles?** A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress?** Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 65-Transdisciplinary Thinking

1. **Step 1 Define Transdisciplinary Thinking.** Transdisciplinary For one of the first times was stated in a 1973 OECD report on environmental education. Transdisciplinarity describes a study that focuses on issues that cross the borders of two or even more disciplines “when a common set of axioms prevail, related to but lying beyond and complementing traditional disciplines. With the other word, principles or techniques originally developed by one discipline but now commonly used by others. Transdisciplinarity is probably the most desirable and yet difficult to obtain form of integrated research. Some researchers are, in fact, skeptical about whether it can be achieved at all. For example, Pohl observes that the extent of the requirements for transdisciplinary research suggest that it is to some extent “a ‘megalomaniac’ endeavour.” In addition, Tress *et al.* note that, despite the best intentions, “Transdisciplinary landscape research is an exception, even interdisciplinarity is seldom reached.” Such studies seek a transcendence of disciplinary perspectives (in some cases “redrawing the disciplinary map” into a broader framework in “true systemic fashion” that involves practical engagement with “local and regional issues of concern”. In this sense transdisciplinarity is the highest form of integrated project, involving not only multiple disciplines, but also multiple *non-academic participants* (e.g., land managers, user groups, the general public) in a manner that combines interdisciplinarity with participatory approaches. Walter *et al.* suggest that transdisciplinary research is characterised by “a process of collaboration between scientists and non-scientists on a specific real world problem” and combines scientific research with the generation of decision-making capacity for the involved stakeholders or as Schmidt describes it a “problem with the problems”. While Mobjörk *et al.* suggest that transdisciplinarity can be divided into “consulting” (stakeholders are consulted but not incorporated in the research process) and “participatory” (stakeholders are incorporated and considered equally valuable) forms, we argue that non-participatory forms of transdisciplinarity are, in fact, interdisciplinarity as transdisciplinary approaches are widely defined by their engagement of non-scientists in the research process. The variety included in many transdisciplinary frameworks is largely the result of the strong problem solving

objectives of the research and the need for flexible methodologies in transdisciplinary research is driven by this problem solving approach as “methodologies employed in transdisciplinary research needs to correspond to and reflect the problem and context under investigation”. To ensure that all relevant disciplines are represented within transdisciplinary projects, a pluralistic (rather than unitary) approach to methodology is standard. This focus on the problem, rather than the disciplines excludes the possibility of unidirectional research. As Hadorn *et al.* observe, within a transdisciplinary environment, no single discipline has intellectual precedence. In fact, some researchers go so far as to equate transdisciplinarity with holism, arguing that “It solves disagreements and differences in knowledge and scientific approaches through dialectic thinking, not majority rule, tradition or compromise” [5] or that it is “a different manner of seeing the world, more systematic and more holistic”. As such, Rapport suggests that “the essential element of transdisciplinarity is ‘transcendence’—a creative process whereby a framework for characterizing larger level processes transcends frameworks used to characterize the parts”. (For more on creativity and serendipity involved in research that reaches beyond a single discipline.) Political ecology is an example of a transdisciplinary sub-discipline that has emerged from the transcendence of a number of disciplines—and has existed under the umbrella of a larger disciplinary body (Geography) since the 1970s though others associate with interdisciplinary work . In promoting a holistic perspective, transdisciplinarity requires considerable effort on the part of engaged researchers to open up their research to alternative ways of thinking, or, as Giri suggests to “overcome one’s disciplinary chauvinism” and develop “an openness to perspectives of other disciplines”. The adoption of a holistic perspective leads to another key feature of transdisciplinarity—that it has high aims of reconstituting and rearranging the nature of disciplinary knowledge thus creating, through fusion across arbitrary intellectual boundaries, new synthesized disciplines with which to address the real-world problems at hand explicitly through collaboration. The demands placed on researchers to collaborate and ‘overcome chauvinism’ means that transdisciplinarity, of all the integrated research forms, has a strong focus on the building of personal relationships and joint understandings. Establishing trust and understanding between researchers within the projects is thus a key objective of building

transdisciplinary capacity. Transdisciplinary working produces a new, novel form or way of working beyond the original disciplinary boundaries. It's like a cake: you can no longer see the form of the ingredients as they have taken on a different shape and flavour. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- III. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- IV. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- V. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- VI. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
 - **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the

complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking?

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.
- The 48 Laws of Power By Robert Greene
- How to Think By John Dewey

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.

- Thermodynamics.
- Inertia.
- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.

- Supporting Idea: Complex Adaptive Systems.
- Critical mass.
- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Thinking through Method.**
- X. Thinking design through the literature.**
- XI. Seeking Wisdom_ From Darwin to Munger.**
- XII. Thinking, Fast and Slow.**
- XIII. Investing_ The Last Liberal Art.**
- XIV. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XV. General Mental Models.**
- XVI. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XVII. Extreme Ownership.**
- XVIII. Good Strategy and Bad Strategy.**
- XIX. The Complete Art of War.**
- XX. Mental Models.**
- XXI. Rules of Thinking.**
- XXII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Developing critical thinking.**
- XV. critical-thinking-logic-and-problem-solving-the-ultimate-guide-to-better-thinking-systematic-problem-solving-and-making-impeccable-decisions-with-secret-tips-to-detect-logical-fallacies.**
- XVI. The Art of problem solving**
- XVII. Critical thinking, Logic & Problem Solving_ The Ultimate Guide to Better Thinking, Systematic Problem Solving and Making Impeccable Decisions with Secret Tips to Detect Logical Fallacies**

- XVIII.Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XIX.Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XX.Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XXI.Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**
- XXII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.**
- XXIII.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.**
- XXIV.Listen, Use and Apply Understanding Argument By Walter Sinnott Armstrong For Thinking.**
- XXV.CRITICAL THINKING_ Consider the Verdict**
- XXVI.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.**
- XXVII.Thinker's guide to Analytic Thinking.**
- XXVIII.Socratic Method Today.**
- XXIX.Socratic Logic_ _ A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles**
- XXX.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.**
- XXXI.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.**
- XXXII.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.**
- **Use Socratic Logic and Introduction to Logic for Thinking.**
 - **Basic Concepts and Terms and Words.**
 - **Language and definition.**
 - **Informal Fallacies.**
 - **Sentences, proposition, judgements.**
 - **Immediate inference.**
 - **Conversion.**
 - **Observion.**
 - **Contraposition.**
 - **Contradition.**

- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.
- Science and Superstition.

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII.Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII.Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX. Think like entrepreneur.**
- XX. Think Like Attorney.**
- XXI. Think like anthropologist.**
- XXII. Think Like Super GM.**
- XXIII. Think Like Stoicism.**
- XXIV. Think Like Rocket Scientist.**
- XXV. Think Like Grandmaster,**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**
- XVIII. System of logic By John Stuart Milton**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 66-Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**
2. **Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.**
 - **First, he would learn everything he could about it and prepare physically as best as possible.**
 - **Once the physical prep was done, he'd take care of the mental prep with visualization.**
 - **Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.**
 - **Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.**
 - **Side note: visualization is great, but it's no substitute for preparation.**

Step 67-Letting The World Do The Work For You

1. Listen and Apply book

III. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works

2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding

Step 68-Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**
2. **Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.**
 - **First, he would learn everything he could about it and prepare physically as best as possible.**
 - **Once the physical prep was done, he'd take care of the mental prep with visualisation.**
 - **Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.**
 - **Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.**
 - **Side note: visualisation is great, but it's no substitute for preparation.**

Step 69-Letting The World Do The Work For You

1. Listen and Apply book

XII. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works

2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
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how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

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example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 8: Simplify Explanation and Creating Analogies

Step 70-Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious.

- I. **Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.**
 - A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
 - B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
 - C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

PART 9: Reflect, Refine and Simplify

Step 71-Reflect, Refine, and Simplify.

I. Reflect, Refine, and Simplify.

- A. Only when you can explain the subject in simple terms do you understand it.**
- B. Simple is beautiful.**
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.**
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.**
- E. Go back to the source material, reviewing the parts you don't quite understand yet.**
- F. Repeat until you have a simple explanation.**

PART 10: Organise And Review.

Step 72 - Organise And Review.

I. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

PART 11: Deep Work and Application

Step 73 - The Focus to Say No

1. The difference between average results and exceptional ones is what you avoid. Saying no to mediocre opportunities is easy. Saying no to good opportunities is hard.
2. We all have the same number of hours in a week. What separates people is how they use them. You can do anything, but you can't do everything.
3. The Hidden Cost of Yes
 - I. Saying yes creates an obligation. Saying yes commits you to something. The things we say yes to have a habit of growing.
 - II. Saying yes should make the future easier, not harder.
 - III. Saying yes to a request feels good in the moment. So we say yes to things we know won't move us forward. We say yes because we don't want to hurt someone's feelings. We say yes to be polite. We say yes out of obligation. We say yes because we 'should.'
4. When dealing with anyone other than friends or family, saying yes should ultimately lead to results.
5. Saying yes carries a cost that is often paid in the days, weeks, or even years ahead. What starts as a single meeting becomes a weekly one. A small project becomes a large one. A one-time event with colleagues turns into a weekly session.
6. Be quick to say no and slow to say yes. Saying yes consumes time, saying no creates time. Never say yes on the spot. Always give yourself some space. Make it a rule. Tell people. That's what Daniel Kahneman does. When he's on the phone he says 'my rule is I never say yes on the phone. I'll email you later after I think about it more.' And when I asked him how often he later says yes, he responded 'rarely.'

Step 74-Half Life. The Decay of Knowledge and What to Do About It.

1. The Decay of Knowledge and What to Do About It.

- I. **The Basics-**A half-life is the time taken for something to halve its quantity. The term is most often used in the context of radioactive decay, which occurs when unstable atomic particles lose energy. Twenty-nine elements are known to be capable of undergoing this process. Information also has a half-life, as do drugs, marketing campaigns, and all sorts of other things. We see the concept in any area where the quantity or strength of something decreases over time. Radioactive decay is random, and measured half-lives are based on the most probable rate. We know that a nucleus will decay at some point; we just cannot predict when. It could be anywhere between instantaneous and the total age of the universe. Although scientists have defined half-lives for different elements, the exact rate is completely random. Half-lives of elements vary tremendously. For example, carbon takes millions of years to decay; that's why it is stable enough to be a component of the bodies of living organisms. Different isotopes of the same element can also have different half-lives. Three main types of nuclear decay have been identified: alpha, beta, and gamma. Alpha decay occurs when a nucleus splits into two parts: a helium nucleus and the remainder of the original nucleus. Beta decay occurs when a neutron in the nucleus of an element changes into a proton. The result is that it turns into a different element, such as when potassium decays into calcium. Beta decay also releases a neutrino — a particle with virtually no mass. If a nucleus emits radiation without experiencing a change in its composition, it is subject to gamma decay. Gamma radiation contains an enormous amount of energy.
- II. **The Discovery of Half-Lives.** The discovery of half-lives (and alpha and beta radiation) is credited to Ernest Rutherford, one of the most influential physicists of his time. Rutherford was at the forefront of this major

discovery when he worked with physicist Joseph John Thompson on complementary experiments leading to the discovery of electrons. Rutherford recognized the potential of what he was observing and began researching radioactivity. Two years later, he identified the distinction between alpha and beta rays. This led to his discovery of half-lives, when he noticed that samples of radioactive materials took the same amount of time to decay by half. By 1902, Rutherford and his collaborators had a coherent theory of radioactive decay (which they called “atomic disintegration”). They demonstrated that radioactive decay enabled one element to turn into another — research which would earn Rutherford a Nobel Prize. A year later, he spotted the missing piece in the work of the chemist Paul Villard and named the third type of radiation gamma. Half-lives are based on probabilistic thinking. If the half-life of an element is seven days, it is most probable that half of the atoms will have decayed in that time. For a large number of atoms, we can expect half-lives to be fairly consistent. It’s important to note that radioactive decay is based on the element itself, not the quantity of it. By contrast, in other situations, the half-life may vary depending on the amount of material. For example, the half-life of a chemical someone ingests might depend on the quantity. In biology, a half-life is the time taken for a substance to lose half its effects. The most obvious instance is drugs; the half-life is the time it takes for their effect to halve, or for half of the substance to leave the body. The half-life of caffeine is around 6 hours, but (as with most biological half-lives) numerous factors can alter that number. People with compromised liver function or certain genes will take longer to metabolize caffeine. Consumption of grapefruit juice has been shown in some studies to slow caffeine metabolism. It takes around 24 hours for a dose of caffeine to fully leave the body. The half-lives of drugs vary from a few seconds to several weeks. To complicate matters, biological half-lives vary for different parts of the body. Lead has a half-life of around a month in the blood, but a decade in bone. Plutonium in bone has a half-life of a century — more than double the time for the liver. Marketers refer to the half-life of a campaign — the time taken to receive half the total responses. Unsurprisingly, this time varies among media. A paper catalog may have a half-life of about three weeks, whereas a tweet might have a half-life of a few minutes. Calculating

this time is important for establishing how frequently a message should be sent.

III. The Half-Life of Facts-In *The Half-Life of Facts: Why Everything We Know Has an Expiration Date*, Samuel Arbesman (see our [Knowledge Project interview](#)) posits that facts decay over time until they are no longer facts or perhaps no longer complete. According to Arbesman, information has a predictable half-life: the time taken for half of it to be replaced or disproved. Over time, one group of facts replaces another. As our tools and knowledge become more advanced, we can discover more — sometimes new things that contradict what we thought we knew, sometimes nuances about old things. Sometimes we discover a whole area that we didn't know about. The rate of these discoveries varies. Our body of engineering knowledge changes more slowly, for example, than does our body of psychological knowledge. Arbesman studied the nature of facts. The field was born in 1947, when mathematician Derek J. de Solla Price was arranging a set of philosophical books on his shelf. Price noted something surprising: the sizes of the books fit an exponential curve. His curiosity piqued, he began to see whether the same curve applied to science as a whole. Price established that the quantity of scientific data available was doubling every 15 years. This meant that some of the information had to be rendered obsolete with time. Scientometrics shows us that facts are always changing, and much of what we know is (or soon will be) incorrect. Indeed, much of the available published research, however often it is cited, has never been reproduced and cannot be considered true. In a controversial paper entitled "[Why Most Published Research Findings Are False](#)," John Ioannides covers the rampant nature of poor science. Many researchers are incentivized to find results that will please those giving them funding. Intense competition makes it essential to find new information, even if it is found in a dubious manner. Yet we all have a tendency to turn a blind eye when beliefs we hold dear are disproved and to pay attention only to information confirming our existing opinions. As an example, Arbesman points to the number of chromosomes in a human cell. Up until 1965, 48 was the accepted number that medical students were taught. (In 1953, it had been declared an established fact by a leading cytologist). Yet in 1956,

two researchers, Joe Hin Tjio and Albert Levan, made a bold assertion. They declared the true number to be 46. During their research, Tjio and Levan could never find the number of chromosomes they expected. Discussing the problem with their peers, they discovered they were not alone. Plenty of other researchers found themselves two chromosomes short of the expected 48. Many researchers even abandoned their work because of this perceived error. But Tjio and Levan were right (for now, anyway). Although an extra two chromosomes seems like a minor mistake, we don't know the opportunity costs of the time researchers invested in faulty hypotheses or the value of the work that was abandoned. It was an emperor's-new-clothes situation, and anyone counting 46 chromosomes assumed they were the ones making the error. As Arbesman puts it, facts change incessantly. Many of us have seen the ironic (in hindsight) doctor-endorsed cigarette ads from the past. A glance at a newspaper will doubtless reveal that meat or butter or sugar has gone from deadly to saintly, or vice versa. We forget that laughable, erroneous beliefs people once held are not necessarily any different from those we now hold. The people who believed that the earth was the center of the universe, or that some animals appeared out of nowhere or that the earth was flat, were not stupid. They just believed facts that have since decayed. Arbesman gives the example of a dermatology test that had the same question two years running, with a different answer each time. This is unsurprising considering the speed at which our world is changing. As Arbesman points out, in the last century the world's population has swelled from 2 billion to 7 billion, we have taken on space travel, and we have altered the very definition of science. The order Arbesman describes mimics the decay of radioactive elements. Whenever new information is discovered, we can be sure it will break down and be proved wrong at some point. As with a radioactive atom, we don't know precisely when that will happen, but we know it will occur at some point. If we zoom out and look at a particular body of knowledge, the random decay becomes orderly. Through probabilistic thinking, we can predict the half-life of a group of facts with the same certainty with which we can predict the half-life of a radioactive atom. The problem is that we rarely consider the half-life of information. Many people assume that whatever they learned in school remains true years or decades

later. Medical students who learned in university that cells have 48 chromosomes would not learn later in life that this is wrong unless they made an effort to do so. OK, so we know that our knowledge will decay. What do we do with this information? Arbesman says, Simply knowing that knowledge changes like this isn't enough. We would end up going a little crazy as we frantically tried to keep up with the ever changing facts around us, forever living on some sort of informational treadmill. But it doesn't have to be this way because there are patterns. Facts change in regular and mathematically understandable ways. And only by knowing the pattern of our knowledge evolution can we be better prepared for its change. Recent initiatives have sought to calculate the half-life of an academic paper. Ironically, academic journals have largely neglected research into how people use them and how best to fund the efforts of researchers. Research by Philip Davis shows the time taken for a paper to receive half of its total downloads. Davis's results are compelling. While most forms of media have a half-life measured in days or even hours, 97 percent of academic papers have a half-life longer than a year. Engineering papers have a slightly shorter half-life than other fields of research, with double the average (6 percent) having a half-life of under a year. This makes sense considering what we looked at earlier in this post. Health and medical publications have the shortest overall half-life: two to three years. Physics, mathematics, and humanities publications have the longest half-lives: two to four years.

- IV. The Half-Life of Secrets-According to Peter Swire, writing in "The Declining Half-Life of Secrets," the half-life of secrets (by which Swire generally means classified information) is shrinking. In the past, a government secret could be kept for over 25 years. Nowadays, hacks and leaks have shrunk that time considerably. Swire writes: Swire notes that there are three main causes: "the continuing effects of Moore's Law — or the idea that computing power doubles every two years, the sociology of information technologists, and the different source and methods for signals intelligence today compared with the Cold War." One factor is that spreading leaked information is easier than ever. In the past, it was often difficult to get information published. Newspapers feared legal repercussions if they shared classified information. Anyone can now release secret information,

often anonymously, as with WikiLeaks. Governments cannot as easily rely on media gatekeepers to cover up leaks. Rapid changes in technology or geopolitics often reduce the value of classified information, so the value of some, but not all, classified information also has a half-life. Sometimes it's days or weeks, and sometimes it's years. For some secrets, it's not worth investing the massive amount of computer time that would be needed to break them because by the time you crack the code, the information you wanted to know might have expired. (As an aside, if you were to invert the problem of all these credit card and SSN leaks, you might conclude that reducing the value of possessing this information would be more effective than spending money to secure it.)

- V. The Half-Lives of Careers and Business Models. The issue with information having a half-life should be obvious. Many fields depend on individuals with specialized knowledge, learned through study or experience or both. But what if those individuals are failing to keep up with changes and clinging to outdated facts? What if your doctor is offering advice that has been rendered obsolete since they finished medical school? What if your own degree or qualifications are actually useless? These are real problems, and knowing about half-lives will help you make yourself more adaptable. While figures for the half-lives of most knowledge-based careers are hard to find, we do know the half-life of an engineering career. A century ago, it would take 35 years for half of what an engineer learned when earning their degree to be disproved or replaced. By the 1960s, that time span shrank to a mere decade. Today that figure is probably even lower. In 1966 paper entitled "The Dollars and Sense of Continuing Education," Thomas Jones calculated the effort that would be required for an engineer to stay up to date, assuming a 10-year half-life. According to Jones, an engineer would need to devote at least five hours per week, 48 weeks a year, to stay up to date with new advancements. A typical degree requires about 4800 hours of work. Within 10 years, the information learned during 2400 of those hours would be obsolete. The five-hour figure does not include the time necessary to revise forgotten information that is still relevant. A 40-year career as an engineer would require 9600 hours of independent study. Keep in mind that Jones made his calculations in the 1960s. Modern estimates

place the half-life of an engineering degree at between 2.5 and 5 years, requiring between 10 and 20 hours of study per week. Welcome to the treadmill, where you have to run faster and faster so that you don't fall behind. Unsurprisingly, putting in this kind of time is simply impossible for most people. The result is an ever-shrinking length of a typical engineer's career and a bias towards hiring recent graduates. A partial escape from this time-consuming treadmill that offers little progress is to recognize the continuous need for learning. If you agree with that, it becomes easier to place time and emphasis on developing heuristics and systems to foster learning. The faster the pace of knowledge change, the more valuable the skill of learning becomes. A study by PayScale found that the median age of workers in most successful technology companies is substantially lower than that of other industries. Of 32 companies, just six had a median worker age above 35, despite the average across all workers being just over 42. Eight of the top companies had a median worker age of 30 or below — 28 for Facebook, 29 for Google, and 26 for Epic Games. The upshot is that salaries are high for those who can stay current while gaining years of experience. In a similar vein, business models have ever shrinking half-lives. The nature of capitalism is that you have to be better last year than you were this year — not to gain market share but to maintain what you already have. If you want to get ahead, you need asymmetry; otherwise, you get lost in trench warfare. How long would it take for half of Uber or Facebook's business models to be irrelevant? It's hard to imagine it being more than a couple of years or even months. In *The Business Model Innovation Factory: How to Stay Relevant When the World Is Changing*, Saul Kaplan highlights the changing half-lives of business models. In the past, models could last for generations. The majority of CEOs oversaw a single business for their entire careers. Business schools taught little about agility or pivoting. Kaplan writes: During the industrial era once the basic rules for how a company creates, delivers, and captures value were established[,] they became etched in stone, fortified by functional silos, and sustained by reinforcing company cultures. All of a company's DNA, energy, and resources were focused on scaling the business model and beating back competition attempting to do a better job executing the same business model. Companies with nearly identical business models slugged

it out for market share within well-defined industry sectors. Those days are over. The industrial era is not coming back. The half-life of a business model is declining. Business models just don't last as long as they used to. In the twenty-first century business leaders are unlikely to manage a single business for an entire career. Business leaders are unlikely to hand down their businesses to the next generation of leaders with the same business model they inherited from the generation before.

VI. The Burden of Knowledge-The flip side of a half-life is the time it takes to double something. A useful guideline to calculate the time it takes for something to double is to divide 70 by the rate of growth. This formula isn't perfect, but it gives a good indication. Known as the Rule of 70, it applies only to exponential growth when the relative growth rate remains consistent, such as with compound interest. The higher the rate of growth, the shorter the doubling time. For example, if the population of a city is increasing by 2 percent per year, we divide 70 by 2 to get a doubling time of 35 years. The rule of 70 is a useful heuristic; population growth of 2 percent might seem low, but your perspective might change when you consider that the city's population could double in just 35 years. The Rule of 70 can also be used to calculate the time for an investment to double in value; for example, \$100 at 7 percent compound interest will double in just a decade and quadruple in 20 years. The average newborn baby doubles its birth weight in under four months. The average doubling time for a tumor is also four months. We can see how information changes in the figures for how long it takes for a body of knowledge to double in size. The figures quoted by Arbesman (drawn from *Little Science, Big Science ... and Beyond* by Derek J. de Solla Price) are compelling, including:also gives figures for the time taken for the available knowledge in a particular field to double, including:The doubling of knowledge increases the learning load over time. As a body of knowledge doubles so does the cost of wrapping your head around what we already know. This cost is the burden of knowledge. To be the best in a general field today requires that you know more than the person who was the best only 20 years ago. Not only do you have to be better to be the best, but you also have to be better just to stay in the game. The corollary is that because there is so much to know, we

specialize in very niche areas. This makes it easier to grasp the existing body of facts, keep up to date on changes, and rise to the level of expert. The problem is that specializing also makes it easier to see the world through the narrow focus of your specialty, makes it harder to work with other people (as niches are often dominated by jargon), and makes you prone to overvalue the new and novel.

Step 75 - Power of I do not know

1. It's ok to say I don't know.
2. Just because you vomit out an opinion on something doesn't make it so. Too often we fail to consider that maybe what we're reading or writing is wrong. We're scared to say I don't know.
3. Do Not Have the Opinion and do not make any judgement about Anything, I see and hear, If I did not work Hard to have an opinion. I need to Read, Analyse, Research the topic from every angle, so that I can have an opinion or Make Judgement on the topic.

Step 76-Application From The Book

Record Application

A. Read or listen 25min and 5min break.

- Read or Listen 20 pages an Hour according Mortimer Adler.

B. Read or Listen following Tools to Use Application.

1. Folder Application+ Introduction to Hermeneutics Chapter 12.
2. Speed of Tool Books:Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed to Find Application.

C. Speed of Audiobook.

- Analysing audiobook listen between 75 words per minute to 285 words per minute or listen between 0.5-1.9 times speed to **Use Application.**

D. Depending on which topics you have chosen, the best way to integrate them is to try and find points of convergence (meet).

E. **Review application side rules of reading, how would I respond and what does it mean to you. Ask myself if I done the analysis of each part of how to rules of reading and how can I apply these ideas to my life that it is most accurately.**

F. Six Stages of learning transfers:

- Non Specific transfer-Everything we learn is acquired as result of what we have learned in past.
- Application transfer-involves applying the knowledge.
- Context Transfer-involves use of your knowledge for situation that is slightly different from the one in which you initially acquired it. Example non- academic writing requires linguistic skills that are somewhat different and persisting with formal language.
- Near Transfer-continue to apply your acquired knowledge in situation that are similar to the one where you were originally exposed to it. Example car with manual transmission use the knowledge to use truck with manual transmission.
- Far Transfer-test your ability to take a piece of learned knowledge and apply it in some context that is entirely dissimilar to the one where you acquired.
- Displacement or creative transfer-takes the integrative skills we acquired in previous step to the next level. Example: you jump in the air and feel yourself being pulled down due to gravitational force. Later you enter an elevator and feel yourself accelerated upwards at similar rate as the one that pulled you down while jumping.

If you connect the dots, the upward acceleration from lift and the downward pull of gravity are actually the same thing. Ask yourself questions.

- Does this subject connect well to another domain of knowledge that related or unrelated?
- Where else have I come across this idea?
- How difficult was it for me to grasp this?
- Can I break down into smaller parts?
- How would I explain this to a child?
- Why is this important to know?
- What questions does this raise for me?
- What, if anything surprises me about this?

G. Use 5W and 1H

1. Who?
2. What?
3. When?
4. Where?
5. Why?
6. How?
7. So What?

H. What does the writer wants me to learn?

1. Philosophy.
2. Motivation.
3. Finance.
4. Economics.
5. Philosophy.
6. Linguistics.
7. Language.
8. Logic.
9. Reasoning.
10. Morality.
11. Ethics.
12. Dilemmas.
13. Liberty.

14. Freedom.
15. Freedom of speech.
16. Archeology.
17. Religion.
18. Humanity.
19. Human condition.
20. God.
21. Human behaviour.
22. Values.
23. Challenges.
24. beliefs.
25. Atheism.
26. Beauty and etc.
27. Any Other Values, Roles, Behavior or anything else.

I. How to I know that this idea applicable in reality?

1. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. The problem is we often think the world *should* work differently than it does. The word “should” is important. Because we think the world should work in a way that it doesn’t, our approach is suboptimal.
2. Part of the answer is we don’t listen to the feedback of reality. When we don’t get the outcome we’re seeking, the last place we look is with our actions. It’s too easy to wiggle out of responsibility by blaming others and circumstances. It’s not that this approach is entirely ineffective. We eventually get the job half done in twice the time. The person working with the world, however, gets the job fully done in half the time.
3. The most common source of feedback is people not reality. One problem with feedback from people is that it’s hard to give someone else high quality feedback. Think about it. People will tell you a few helpful things but they’ll often avoid the big thing that’s holding you back. They don’t want to hurt your feelings. They want you to like them. That’s not the biggest problem. The biggest problem is that people rarely know much more than you do. If they had all the answers, they’d get better results.

4. Another form of people feedback comes from groups, institutions, and society. This is the way things have been done. And while there might be good reason for doing things the same way they've always been done, if you take your feedback from these folks, you'll incrementally improve what's already exists rather than use first principles to design something new. If exiting institutions knew what they were doing, we wouldn't have startups or bankruptcy lawyers.
5. How do we identify how the world really works? Outcome over ego. You are accountable for your outcomes. When you take responsibility for your outcomes you get feedback from reality. When you get feedback from reality, you adjust your behaviour.

J. Applying Lessons from the Past

1. Review History Written by Losers as well, this helps to review and see big picture of the world.
2. "History is written by the winners" is the popular view. But your winner may not be my winner. A lot depends on the narrative you are trying to build.
3. History is rewritten all the time. Sometimes it is rewritten because new information has come to light, perhaps from an archeological find or previously classified documents. When this happens, it is exciting. We joyfully anticipate that more information will deepen our understanding. But rewriting frequently happens in the service of building a cultural or national narrative. We highlight bits of the past that support our perceived identities and willfully ignore the details that don't fit. We like our history uncomplicated. It's hard for us to understand our groups or our countries, and by extension ourselves, as both good and not-good at the same time.
4. Culture is a collective memory. It's the interwoven stories that we use to explain who we are as nations, organizations, or just loosely formed groups. "Collective memory is more about the present than the past because it is integral to how the group sees itself." And "while collective memory is usually grounded in fact, it need not be."
5. We have seen how people justify all kinds of mistakes to preserve the personal narratives they are invested in, and groups also engage in this behavior. Countries rewrite their histories, from the textbook up, to support how they see themselves now. Instinctively we may recoil from this idea, believing that it's better to turn over all the rocks and confront what is lurking underneath. However,

as MacMillan writes, “It can be dangerous to question the stories people tell about themselves because so much of our identity is both shaped by and bound up with our history. That is why dealing with the past, in deciding on which version we want, or on what we want to remember and to forget, can become so politically charged.”

6. MacMillan warns that the danger of abusing history is that it “flattens out the complexity of human experience and leaves no room for different interpretations of the past.” Which leaves us asking, What do we want from history? Do we want to learn from it, with the hopes that in doing so we will avoid mistakes by understanding the experiences of others? Or do we want to practice self-justification on a national level, reinforcing what we already believe about ourselves to justify what we did and what we are doing? After all, “you could almost always find a basis for your claims in the past if you looked hard enough.”
7. If we selectively use the past only to reinforce our claims in the present, then the situation becomes precarious when there is pressure to change. Instead of looking as objectively as possible at history, welcoming historians who challenge us, we succumb to confirmation bias, allowing only those interpretations that are consistent with the narrative we are invested in. Consider what MacMillan writes about nationalism, which “is a very late development indeed in terms of human history.”
8. When we selectively reach back into the past to justify claims in the present, we reduce the complexity of history and of humanity. This puts us in an awkward position because the situations we are confronted with are inherently complex. If we cut ourselves off from the full scope of history because it makes us uncomfortable, or doesn’t fit with the cultural narrative in which we live, we reduce our ability to learn from the past and apply those lessons to the situations we are facing today. MacMillan says, “There are also many lessons and much advice offered by history, and it is easy to pick and choose what you want. The past can be used for almost anything you want to do in the present. We abuse it when we create lies about the past or write histories that show only one perspective. We can draw our lessons carefully or badly. That does not mean we should not look to history for understanding, support and help; it does mean that we should do so with care.”
9. We need to accept that people can do great things while still having flaws. Our heroes don’t have to be perfect, and we can learn just as much from their

imperfections as from their achievements. We have to allow that there are at least two sides to every story, and we have to be willing to listen to both. There are no conflicts in which one side doesn't feel morally justified in their actions; that's why your terrorist can be my freedom fighter. History can be an important part of bridging this divide only if we are willing to lift up all the rocks and shine our lights on what is lurking underneath.

10. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.

K. How can this idea be applied in real life?

L. Has this idea stood the test of time?

M. What steps do I need to take to apply this idea in reality?

1. We have to contextualise the knowledge. When does it work?
2. When doesn't it work? Where can I apply it?
3. What are the key variables?

N. In what area of life this idea applicable?

O. Is this idea still applicable in present time?

P. What does this idea improves in my life?

Q. What of it?

R. What follows?

S. What difference does it make?

T. What was my favourite part of the book? Why?

U. Who was the favourite character? Why?

V. What was the most interesting thing I learned from the book?

W. Would I have ended the book differently? Did it end the way I thought it would?

X. If I could change one thing in the book, what would it be?

Y. Do I know example of someone who is like one of the characters in the story?

Z. If I could have conversation with one of the characters in the story, which character would I choose and what I talk about it?

AA. What am I believe?

BB. How will I reveal my faith and my knowledge through my actions?

CC. What I understood about Jesus, Father and Holy Spirit from the Bible? And what I understood about other things from the books?

DD.How that encourage me?

EE.What I could learn from this?

FF. Do I find bad/good examples from the books?

GG.Do I find any commandment that I must obey?

HH.Do I find any warnings?

II. Do I find any promise?

JJ. Do I find the sin that I have to repent?

KK.What truths God have revealed to me?

LL. What truths about others have revealed to me?

MM.How can I do practically?

NN.What the main thought do I have to remember?

OO.How can I show my life fruit, character, love, faith and maturity in my daily life?

PP.How do I have desire to be discipline character in fruit, faith that he is ejected to authorised and filled with Christ?

QQ.What a thing is blocking me from God's work?

RR.How can I contribute with God work and discipline my self to complete the work?

SS.What can I do that God's work will be functional and better and stronger and faster even then. When I have doubt, uncertainty and stress?

TT. What can I do practical?

UU.What example can I be? To learn and teach others?

VV.Question that I do not understand in the paragraph?

WW.Don't Overheard Complaining, not even to yourself. If you have fewer Opinion, if you just accept things as they are, you have less to complain about

XX.So step by step action by action, no-one can stop you from that. Focus on the part of the things that is up to you, and trust , if you follow the process that more times than not, you will get the outcome you want.

YY.Worst Enemy of The Person is her his own Tongue, as the person will always boast or Talk out their ideas and thoughts. Always observe the person, as the person will always boast about their ideas, winning and thoughts, and do not interrupt the person. Bible tells about tongue in James 3: It corrupts the whole person, sets the whole course of his life on fire, and is itself set on fire by hell. but no man can tame the tongue. It is a restless evil, full of deadly poison. With the tongue we praise our Lord and Father, and with it we curse men, who have been made in God's likeness.

ZZ.How To Put Ideas into Practice. How The Idea can be put into practice.

AAA.Do not watch what they talking, but watch what they are doing, to determine what type of person she/he is.

BBB.We needs to work on the things that we not good at, and not just things that we are strong at. This would make you better as whole.

CCC.If the Product is for Free, then You are the Product for the company.

DDD.There is no free Lunch, if somebody offers something for free, then there is something behind that offer.

EEE.Always remember Nobody is going to come to rescue and your family and do not put faith into politicians and other people as they are humans and put all the trust into God.

How Will I Add This Information In My Own Life.

How Will I Apply This Information In My Life.

Step 77-Application Mental Models To the Real Life

1. Understand Mental Models

Start by familiarising yourself with various mental models. Mental models are frameworks for understanding how the world works. They help you interpret information, make decisions, and solve problems.

Some common mental models include first principles thinking, Occam's Razor, second-order thinking, probabilistic thinking, inversion, and the map-territory distinction.

0. All Models Are Wrong

All Models Are Wrong

Closely related to the map-territory relation, it's an aphorism in statistics commonly stating: All models are wrong, but some are useful. Attributed to statistician George Box, the thinking is considered applicable to all scientific models.

Primary source: George Box

How is your journey towards understanding Farnam Street's [latticework of mental models](#) going? Is it proving useful? Changing your view of the world? If the answer is that it's going well that's good. There's just one tiny hitch.

All models are wrong.

Yep. It's the truth. However, there is another part to that statement:

All models are wrong; some are useful.

Those words come from the British statistician, [George Box](#). In a groundbreaking 1976 paper, Box revealed the fallacy of our desire to categorize and organize the world. We create models (a term with many applications), once to confuse them for reality.

Box also stated:

Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful.

What Exactly Is A Model?

First, we should understand precisely what a model is.

The dictionary definition states a model is 'a representation, generally in miniature, to show the construction or appearance of something' or 'a simplified description, especially a mathematical one, of a system or process, to assist calculations and predictions.'

For our purposes here, we are better served by the second definition. A model is a simplification which fosters understanding.

Think of an architectural model. These are typically a small scale model of a building, made before it's built. Its purpose is to show what the building will look like and to help

people working on the project to develop a clear picture of the overall feel. In the iconic scene from Zoolander, Derek (played by Ben Stiller) looks at the architectural model of his proposed 'school for kids who can't read good' and shouts "What is this? A center for ants??"

That scene illustrates the wrong way to understand models: Too literally.

Why We Use Models- And Why They Work

At Farnam Street, we believe in using models for the purpose of building a massive, but finite amount of fundamental, invariant knowledge about how the world really works.

Applying this knowledge is the key to making good decisions and avoiding stupidity.

"Scientists generally agree that no theory is 100 percent correct. Thus, the real test of knowledge is not truth, but utility. Science gives us power. The more useful that power, the better the science."

— Yuval Noah Harari

Time-tested models allow us to understand how things work in the real world. And understanding how things work prepares us to make better decisions without expending too much mental energy in the process.

Instead of relying on fickle and specialized facts, we can learn versatile concepts.

The mental models we cover are intended to be widely applicable.

It's crucial for us to understand as many mental models as possible. As the adage goes, a little knowledge can be dangerous and creates more problems than total ignorance. No single model is universally applicable – we find exceptions for nearly everything. Even hardcore physics has not been totally solved.

"The basic trouble, you see, is that people think that "right" and "wrong" are absolute; that everything that isn't perfectly and completely right is totally and equally wrong."

— Isaac Asimov

Take a look at almost any comment section on the internet and you are guaranteed to find at least one pedant raging about a minor perceived inaccuracy, throwing out the good with the bad. While ignorance and misinformation are certainly not laudable, neither is an obsession with perfection.

Like heuristics, models work as a consequence of the fact they are usually helpful in most situations, not because they are always helpful in a small number of situations.

Models can assist us in making predictions and forecasting the future. Forecasts are never guaranteed, yet they provide us with a degree of preparedness and comprehension of the future. For example, a weather forecast which claims it will rain today may get that wrong. Still, it's correct often enough to enable us to plan appropriately and bring an umbrella.

Mental Models and Minimum Viable Products

Think of mental models as minimum viable products.

Sure, all of them can be improved. But the only way that can happen is if we try them out, educate ourselves and collectively refine them.

We can apply one of our mental models, Occam's razor, to this. Occam's razor states that the simplest solution is usually correct. In the same way, our simplest mental models tend to be the most useful. This is because there is minimal room for errors and misapplication.

"The world doesn't have the luxury of waiting for complete answers before it takes action."

— Daniel Gilbert

Your kitchen knives are not as sharp as they could be. Does that matter as long as they still cut vegetables? Your bed is not as comfortable as it could be. Does that matter if you can still get a good night's sleep in it? Your internet is not as fast as it could be. Does that

matter as long as you can load this article? Arguably not. Our world runs on the functional, not the perfect. This is what a mental model is – a functional tool. A tool which maybe could be a bit sharper or easier to use, but still does the job.

The statistician David Hand made the following statement in 2014;

In general, when building statistical models, we must not forget that the aim is to understand something about the real world. Or predict, choose an action, make a decision, summarize evidence, and so on, but always about the real world, not an abstract mathematical world: our models are not the reality.

For example, in 1960, Georg Rasch said the following:

When you construct a model you leave out all the details which you, with the knowledge at your disposal, consider inessential.... Models should not be true, but it is important that they are applicable, and whether they are applicable for any given purpose must, of course, be investigated. This also means that a model is never accepted finally, only on trial.

Imagine a world where physics like precision is prized over usefulness.

We would lack medical care because a medicine or procedure can never be perfect. In a world like this, we would possess little scientific knowledge, because research can never be 100% accurate. We would have no art because a work can never be completed. We would have no technology because there are always little flaws which can be ironed out.

“A model is a simplification or approximation of reality and hence will not reflect all of reality ... While a model can never be “truth,” a model might be ranked from very useful, to useful, to somewhat useful to, finally, essentially useless.”

— Ken Burnham and David Anderson

In short, we would have nothing. Everything around us is imperfect and uncertain. Some things are more imperfect than others, but issues are always there. Over time, incremental improvements happen through unending experimentation and research.

The Map is Not the Territory

As we know, the map is not the territory. A map can be seen as a symbol or index of a place, not an icon.

When we look at a map of Paris, we know it is a representation of the actual city. There are bound to be flaws; streets which have been renamed, demolished buildings, perhaps a new Metro line. Even so, the map will help us find our way. It is far more useful to have a map showing the way from Notre Dame to Gare du Nord (a tool) than to know how many meters they are apart (a piece of trivia.)

Someone who has spent a lot of time studying a map will be able to use it with greater ease, just like a mental model. Someone who lives in Paris will find the map easier to understand than a tourist, just as someone who uses a mental model in their day to day life will apply it better than a novice. As long as there are no major errors, we can consider the map useful, even if it is by no means a reflection of reality. Gregory Bateson writes in Steps to an Ecology of Mind that the purpose of a map is not to be true, but to have a structure which represents truth within the current context.

“A map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness.”

— Alfred Korzybski

Physical maps generally become more accurate as time passes. Not long ago, they often included countries which didn't exist, omitted some which did, portrayed the world as flat or fudged distances. Nowadays, our maps have come a long way.

The same goes for mental models – they are always evolving, being revised – never really achieving perfection. Certainly, over time, the best models are revised only slightly, but we must never consider our knowledge “set”.

Another factor to consider in using models is to take into account what they’re used for. Many mental models (e.g. entropy, critical mass and activation energy) are based upon scientific and mathematical concepts. A person who works in those areas will obviously need a deeper understanding of it than someone who want to learn to think better when making investment decisions. They will need a different map and a more detailed one showing elements which the rest of us have no need for.

“A model which took account of all the variation of reality would be of no more use than a map at the scale of one to one.”

— Joan Robinson

In his essay *Partial Enchantments of the Quixote*, Jorge Luis Borges provides an even more interesting analysis of the confusion between models and reality:

Let us imagine that a portion of the soil of England has been leveled off perfectly and that on it a cartographer traces a map of England. The job is perfect; there is no detail of the soil of England, no matter how minute that is not registered on the map; everything has there its correspondence. This map, in such a case, should contain a map of the map, which should contain a map of the map of the map, and so on to infinity. Why does it disturb us that the map be included in the map and the thousand and one nights in the book of the Thousand and One Nights? Why does it disturb us that Don Quixote be a reader of the Quixote and Hamlet a spectator of Hamlet? I believe I have found the reason: these inversions suggest that if the characters of a fictional work can be readers or spectators, we, its readers or spectators, can be fictions.

How Do We Know If A Model Is Useful?

This is a tricky question to answer. When looking at any model, it is helpful to ask some of the following questions:

- How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam’s razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
- Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
- Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn’t belong. Mind Feynman: “You must not fool yourself, and you’re the easiest person to fool.”)
- How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
- Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
- Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model

based on infinite regress is likely to require extensive knowledge of a particular topic, and have minimal real-world application.

When using any mental model, we must avoid becoming too rigid. There are exceptions to all of them, and situations in which they are not applicable.

Think of the latticework as a toolkit. That's why it pays to do the work up front to put so many of them in your toolbox at a deep, deep level. If you only have one or two, you're likely to attempt to use them in places that don't make sense. If you've absorbed them only lightly, you will not be able to use them when the time is at hand.

If on the other hand, you have a toolbox full of them and they're sunk in deep, you're more likely to pull out the best ones for the job exactly when they are needed.

Too many people are caught up wasting time on physics-like precision in areas of practical life that do not have such precision available. A better approach is to ask "Is it useful?" and, if yes, "To what extent?"

Mental models are a way of thinking about the world that prepares us to make good decisions in the first place.

0a. What is the mental model.

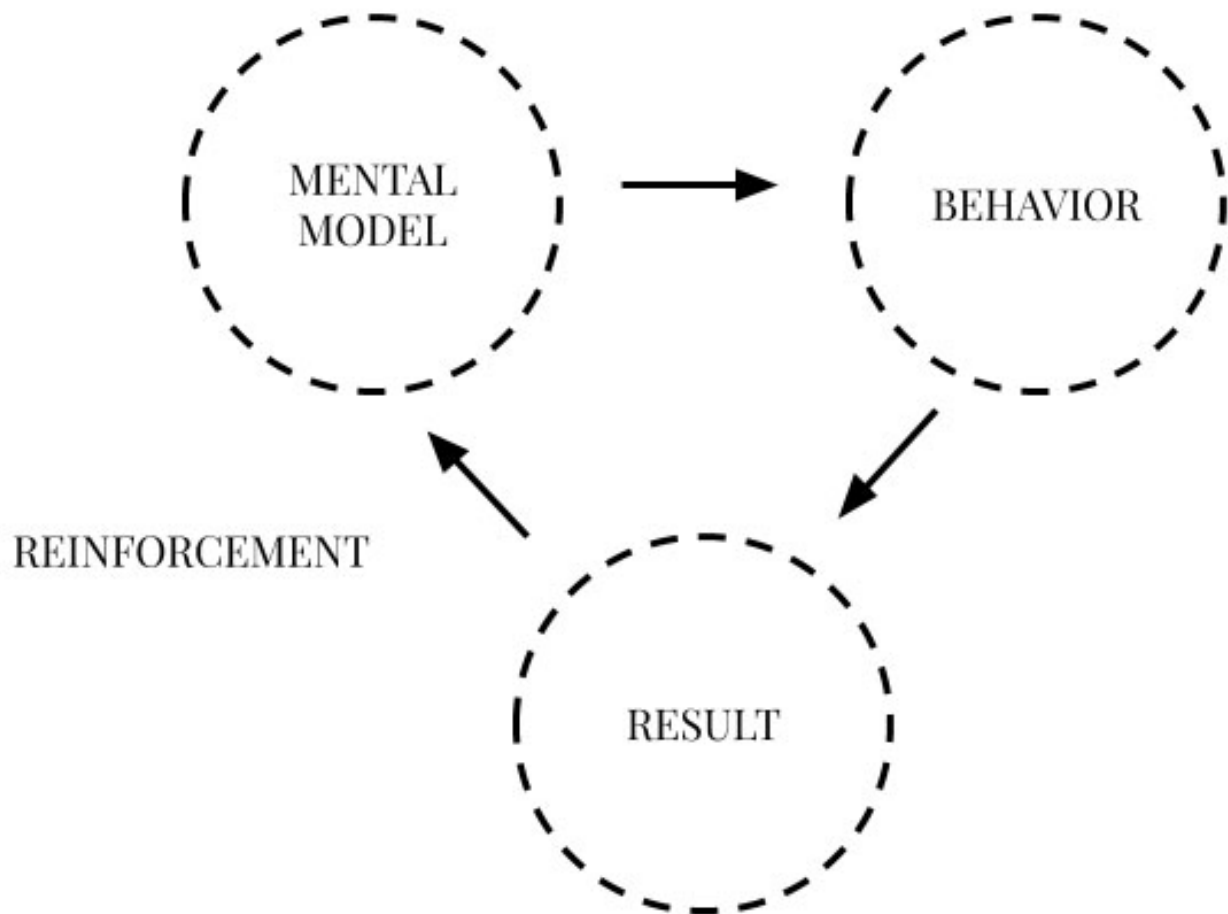
Mental model is representation of how the world works. We operate in a very complex world, and it is hard to understand all the variables of the world. We use different types of ideas and models that we do understand to aid us to learn about the things we do not understand and the way the world works. You learn fundamental concepts of other disciplines to help you to get a bigger picture of the world and also a toolbox to see the world through. The more models you have, the more lenses you can use while you look at the world, the fewer blind spots you can have.

In other words, mental models are nothing more than pre-design frameworks, that you can pull out, whenever a situation requires a decision, you just plug different variables and out pops an answer. This is a systematized process of good judgement. Once you regularly tapping into these frameworks, the quality of my decision developed in life and other things you do.

How to Apply mental models

How to use mental models

If all you have is a hammer, everything looks like a nail. A common misconception is that mental models should be dutifully practiced and applied in order to improve your mental performance. There are actually many mental models which you should work hard to *avoid*. For example, having an "illusion of control" can be particularly dangerous in some situations.



In order to grow as a human being, you need to be able to *identify* mental models, whether you are using them, or the person you are talking to is. Ideally, you need to make it a conscious choice to use them or not, instead of falling prey to the automatic thinking our brain loves so dearly.

“To break a mental model is harder than splitting the atom.”

Albert Einstein (but probably not)

So how can you challenge your mental models, identify them in others, and use them in a way that is actually effective and beneficial?

Here are a few tips you can apply to master mental models, rather than being enslaved by them.

- Be aware of your thinking by asking yourself provoking questions
- Gather information to challenge your thinking with actual facts
- Inquire into other people’s thinking and challenge their views
- Resist jumping to conclusions and suspend your assumptions
- Look for recurring thought patterns and unlearn them

A tool is only as good as its user. Only once you're aware of your mental models, you can use them effectively to achieve your goals.

How to build your own mental models

In a fast-moving environment, mental models can be extremely useful to help you think fast and make decisions. After all, they're great at giving you rules of thumb so you can, if done well, predict likely outcomes or behaviours.

- **Observe people.** One great way to develop your own mental models is to find inspiration in people. When you read a biography, ask yourself: why did they make this decision? What were they thinking? What mental model(s) did they use? It doesn't have to be famous entrepreneurs or creatives. We all have a friend or a colleague whose work we admire. When you see them make a specific choice in a complex situation, ask them how they came to that decision.
- **Take note of nature.** Nature follows many rules that can apply to human decision making. For example, the tendency to minimise our energy output can be observed in many natural conditions, and incentives are a key drive in all creatures' behaviour.
- **Ask for feedback.** Ask a friend or a colleague to observe how you act and to help you identify behaviours that may not be obvious to you. This can be an incredibly uncomfortable but mind-expanding exercise.

Don't limit yourself to constructive mental models. You will observe mental models which you'd rather *not* reproduce. These are great to study as well, because it's easier to avoid a thought pattern when you know how to spot it in yourself and others. Constructive or destructive, name your mental models and write them down.

Why Are Mental Models Important To Understand?

In our heads, we carry models of how the world works.

Scientists label mental models as, "cognitive representations of external reality."

Let's return to the clouds for a moment to visualize this a bit better.

You see a cloud in the sky. And while your eyes see a cushy shape. Your brain turns this shape into something meaningful – an animal, or the face of the friendly superhero, Spider-Man, for example.

But is the cloud actually trying to imitate the shape of an animal, or is just your mind playing tricks?

Of course, it's the latter.

If you ask another person. He'll either see just a cloud or imagine something completely different.

Why?

Because he has a different set of mental models in his head.

And while looking at clouds and imagining superheroes is not dangerous.

What do you think will happen if you misinterpret an outside event while investing in stocks?

You lose money.

What do you think will happen if you misinterpret an email from a colleague?

It might lead to a pointless argument or not doing your job right.

But there is more...

A common thing we all do is be a victim of our biases.²

For example, by looking at people who made it in a particular field, we convince ourselves that we'll make it, too.

Also known as the survivorship bias. Brands are constantly using this to persuade us to buy courses, products, Notion templates (like we don't have enough already), etc.

Consider this for a moment... When you go to a website that sells Ebook Readers, for example. The page showcase only the positive reviews. All the benefits of using the device. Of course, nothing negative is mentioned. That's why we start to believe that we'll also improve our reading experience if we purchase this fancy tool.

But is it really that helpful?

It might be. But that's not guaranteed.

As it is not guaranteed that starting a business will result in a successful business. Starting a business and a successful business are two quite different things.

Of course, we start one hoping to eventually become successful but hope, alone, won't make it profitable.

Understanding that what we think. What we form in our heads is not reality can save you from embarrassing dialogue, making financially unstable decisions, and all kinds of other inadequate conclusions.

How Mental Models Are Formed?

Mental models are formed in our heads as we experience life. The more we expose ourselves to different events, the more mental models we are able to form.

However, as knowledge fades over time. We only keep the ones that are frequently used. Still, this doesn't stop us from drawing conclusions even if we spot unfamiliar things.

Here's an example: When we are young and we see something for the first time. We will draw conclusions from what is familiar to describe the unfamiliar.

That's why children will label tigers, pumas, cougars, leopards simply as cats. They don't know that these are different – they still don't have the extra lenses. But relying on what they know, they make conclusions to make sense of the world.

These are innocent mistakes.

But again, when we grow up. We can't afford to make such misjudgments. We need to form a latticework of mental models that will help us both avoid errors and consistently make good decisions.

How Mental Models Unlock Your Thinking

Ok, what do we know so far?

We know that mental models are the way we make sense of reality. But we also know that they can be flawed.

Since you can't go to the store and purchase a floppy disk containing the best thinking types used by all the astonishingly rich people of our time and insert it into your ordinary brain – like in the movie The Matrix when Neo learned jiu-jitsu in 10 minutes.

You need to do the hard work of creating a set of thinking concepts in your head while also considering the fact that some of the current ways you think are probably dangerous and need revision.

The question then becomes: "How can I ensure that what I see, and therefore believe, is not incorrect? And, how I can acquire a nice set of mental models that will help me make better decisions and also avoid misinterpretation?"

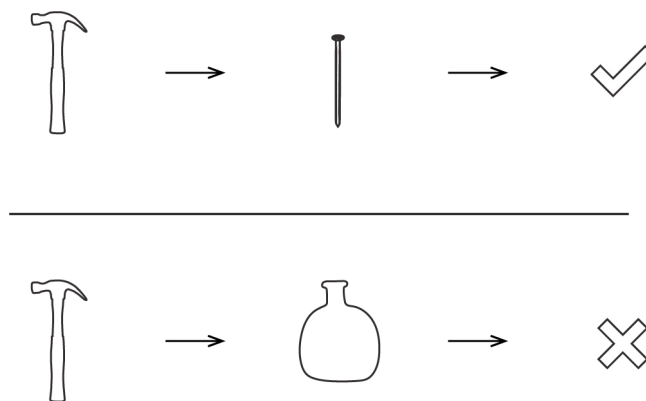
Charlie Munger, the person who popularized the use of multi-disciplinary mental models says the following:³

“As I said at the U.S.C. Business School, what you need is a latticework of mental models in your head. And you hang your actual experience and your vicarious experience (that you get from reading and so forth) on this latticework of powerful models. And, with that system, things gradually get to fit together in a way that enhances cognition. And you need the models – not just from one or two disciplines, but from all the important disciplines. You need the best 100 or so models from microeconomics, physiology, psychology particularly, elementary mathematics, hard science and engineering [and so on].” Charlie Munger

So, you can’t expect to improve your thinking when you study one area. You need to study *all* the important areas to bump up the IQ of your brain.

Shane Parrish, the person who founded the blog [Farnam Street](#) – the go-to place for mental models. Explains this as creating a mental toolbox for your brain. To visualize this better. I’m going to use the most cited quote about mental models, “If all you have is a hammer, everything looks like a nail.”

Obviously, you can’t bang everything with a hammer. We constantly encounter events that require a bit more grace.



So, how can you acquire a nice set of ways to think?

Extremely easy to say, but crazily hard to practice – you learn them.

Creating a Latticework of Mental Models



Mental models are kind of like keyboard shortcuts.

At the right time, you press a combo of keys and you perform a task faster.

Can you do a task without the shortcut? Yes. Is it more efficient? No.

But there is more.

As people who are obsessed with finding new keyword combinations. Knowing more keys helps you besides navigating around dozens of browsers. It clears the fog around what is possible.

Knowing more helps you see how more things are possible.

It removes the brick wall around your average brain.

Or in other words, expert developers see meaning in code while other people see gibberish.

How to learn more ways to think faster and better?

Two ways:

1. Experience more.
2. Learn more.

The first one doesn't guarantee that you will improve your thinking. Plus, it's a slower process.

If you work the same job for 20 years, this doesn't mean that you will master it. Usually, your performance will start to regress if you do the same things without pushing yourself outside your comfort zone.

The solution then, is to learn more techniques. Master what other people have already figured out.

Instead of throwing 100 mental models at you and hoping you will catch some. For the past couple of months, I was busy discovering and packaging the most important thinking concepts into categories.

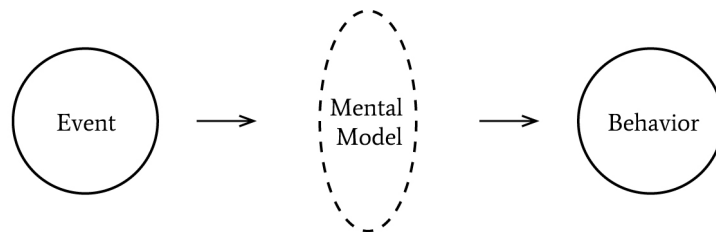
How to Use Mental Models

Above I mentioned that mental models are like tools inside a toolbox. The difference is that instead of objects, you have thinking concepts.

Personally, I prefer lenses instead of tools. Lenses that sit somewhere in our brain and distort reality based on the set of lenses we have.

Here's a more vivid example:

Since we experience life by observing what happens to us. When you see something, feel something. That event is immediately analyzed by our mental models. They are our first line of defense. And based on our thinking concept. We behave in a certain way.

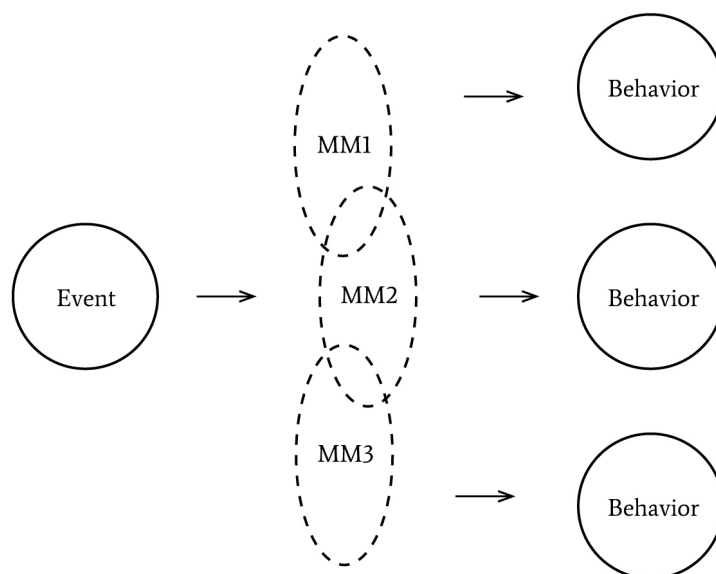


When you have a limited set of mental models, you will act always the same way regardless of the situation.

From there, since you can't change what happens to you. You will probably conclude that you should change your behavior. But that's not quite right.

Mental models filter the incoming information and assign tasks to the body – what the body should do. So, what you really need is to change your mental models, add new ones, and consider all possible scenarios based on the different thinking concepts. And more importantly, give yourself more time to think.

Not only because waiting will calm you down and prevent you from making an emotional decision instead of a rational one. But also because you will have more time to see the problem from different lenses and decide which behavior will lead to the most appropriate outcome.



When you have a wide set of mental tools. You can think about the different consequences when you choose something. Then, pick the best way to act depending on the situation.

When your portfolio of thinking concepts is bigger, you will have the ability to see different outcomes when different lenses are applied. Thus, make the best decision.

Here's a "real-life" example:

A friend introduces you to a new way to make money. A company that offers website-building services and uses AI to generate content. Given that the content is generated automatically. You do nothing. You simply pay a monthly fee and wait for results.

The process is presented as seamless. You go through an initial setup and then just see how articles are added and money is printed. The reviews on the website seem like everybody is making a good amount of money. So, you decide to join.

In this simple example, we can identify three mental patterns that convince us that we should join the platform:

- **Conformity:** Since the program was recommended by a friend, you are more likely to believe it.
- **Survivorship bias:** The positive reviews convince us that success is guaranteed. However, we see only the people who made it. We don't know how many people tried and failed.
- **Hyperbolic discounting:** We are designed to want immediate rewards over rewards that come later. It's one thing to start a website and earn money after a year – what actually happens. It's quite another to start a website and start earning today – what the website we are observing is trying to convince us.

If we think about it, however. And if we expand our set of lenses. We can spot errors in the service recommended by the friend:

- **Incentive:** What is the real incentive of the person? He can be sharing an affiliate link. Or, he can have a track record of a person who is always looking for quick-rich schemes.
- **The map is not the territory:** All websites that sell something present their services are super easy to use. However, maps are not reality. That's why, when we chew on it, we will find out that we can't expect a site that offers an easy way to make money to actually be easy.
- **Second-order thinking:** When we consider the consequences of our decision. We will probably find a couple of facts that will save us the agony of signing up for this imaginary service: Google doesn't like computer-generated income; Sites that offer easy money never deliver.

So, here's an easy framework that you can follow when you have to make a decision:

How to use mental models:

- Pause. Don't react immediately.
- Note down your initial decision.
- Gather additional information if needed.
- Observe the situation using different mental models.
- Challenge your assumptions.
- Try to estimate the likelihood of the different options.
- Imagine the worst that can happen.

One extra thing to be aware of is that you are your biggest enemy.

Since the whole process happens in your head – there is no one to give you feedback. It's of great importance to observe the situation objectively. If possible, ask someone for advice. This other person will surely give you a new way to think about the situation because his set of lenses is different.

How to Build Your Own Mental Models

There are plenty of [books on mental models](#). Quite a few blog posts that talk about them. And passionate online discussion about them, too.

You might think that all the mental models are already invented and documented. That's not the case.

You can create your own that best fit your conditions.

Like you can create shortcuts on your keyboard. You can also create your own thinking tools.

How to Create a Mental Model

Here's what you can do:

- **Observe your life:** Think about what type of decisions you are regularly facing. How do you usually respond? Why?
- **Observe the life of others:** Given the above. See how others respond in similar situations. What do they do differently? How do they act? And more importantly, how do they think? Since mental models are ways to think, questioning people to understand how they think when they face problems will give you important insights.
- **Pause, act, revise:** After the above two, you will have a better idea of how to respond to a particular situation. Once we have a new framework. The first thing we need to do is to pause – this prevents us from acting like we normally do. Then, act based on our new mental model. Finally, revise our thinking concept and make adjustments along the way.

Some Closing Thoughts

I see a lot of people talking about mental models but do little with them.

It's not that we have a problem with access to the best mental models. We have a problem with adopting them.

When we read about mental models we say, "Oh, that's good stuff!" But when we actually need to make a decision. We do what we normally do.

Our brain is cemented to our old beliefs and behavior.

The solution?

Increase the time you need to make a decision. Invite slow thinking (start with practicing slow reading and conducting a beliefs audit) and improve your fast thinking.

You need to prevent your initial statement to be your actual statement. Give yourself some time to invite the lenses – mental models – you have adopted while browsing online in your working memory.

Always think about the side effects.

And, as Peter Bevelin writes in Seeking Wisdom, "One way to reduce unintended consequences is to stop focusing on isolated factors and instead consider how our actions affect the whole system."

All of the above, I hope, will aid you in your quest to improve your thinking. Because improving your thinking is the first step towards improving all the areas in our lives.

2. Identify Relevant Disciplines.

Determine which disciplines are relevant to the problem or situation you're addressing.

This could include fields like psychology, economics, biology, engineering, sociology, and more.

Each discipline offers unique perspectives and methodologies that can enrich your understanding and analysis.

3. Analyse the Problem

Clearly define the problem you're trying to solve or the situation you're trying to understand.

Break down the problem into its constituent parts and consider how each part relates to different disciplines.

4. Understand how the world works.

The world is a complex system governed by various interconnected factors, including natural laws, human behavior, social structures, economic systems, political institutions, cultural dynamics, and technological advancements. Here's a simplified breakdown:

1. **Natural Laws:** The physical world operates according to fundamental principles such as gravity, thermodynamics, electromagnetism, and quantum mechanics. These laws govern everything from the movement of celestial bodies to the behavior of atoms.
2. **Human Behavior:** Human actions and interactions are influenced by a combination of biological, psychological, and social factors. Understanding human behavior involves disciplines such as psychology, sociology, anthropology, and economics.
3. **Social Structures:** Societies are organized into various structures such as families, communities, institutions, and governments. These structures shape norms, values, roles, and power dynamics within society.
4. **Economic Systems:** Economies determine how goods and services are produced, distributed, and consumed within a society. Different economic systems, such as capitalism, socialism, and mixed economies, prioritize different principles and values.
5. **Political Institutions:** Governments and political systems establish laws, regulations, policies, and governance structures that influence the distribution of power and resources within a society. Political ideologies shape how societies are governed.

6. **Cultural Dynamics:** Culture encompasses beliefs, customs, traditions, language, arts, and values shared by a group of people. Cultural dynamics influence social interactions, identities, and perceptions of the world.
7. **Technological Advancements:** Technology drives innovation, productivity, communication, and globalization. It shapes how people live, work, and interact with each other and the environment.

Understanding how the world works involves studying and analyzing the interactions between these various factors and their impacts on individuals, societies, and the environment. It's a multidisciplinary endeavor that draws on fields such as science, humanities, social sciences, and interdisciplinary studies.

Sure, here's a list of steps to let the world work for you:

1. **Identify Your Strengths and Passions:** Determine what you're good at and what you enjoy doing. Your strengths and passions will guide you towards areas where you can excel with less effort.
2. **Set Clear Goals:** Define what you want to achieve in both the short term and long term. Clear goals provide direction and motivation.
3. **Build a Network:** Connect with people who share your interests and goals. Networking can open doors to opportunities you might not have found on your own.
4. **Delegate Tasks:** Learn to delegate tasks that others can do more efficiently or effectively than you can. This frees up your time and energy for tasks that require your expertise.
5. **Leverage Technology:** Use tools and technology to automate repetitive tasks and streamline processes. Technology can help you work smarter, not harder.
6. **Stay Informed:** Keep up-to-date with industry trends, market developments, and new opportunities. Being informed allows you to spot opportunities and adapt to changes in the environment.
7. **Seek Feedback:** Welcome feedback from others to learn and improve. Constructive criticism can help you refine your approach and achieve better results.
8. **Stay Flexible:** Be open to new ideas and be willing to adapt your strategies as needed. Flexibility allows you to capitalize on unexpected opportunities and navigate challenges more effectively.
9. **Focus on High-Impact Activities:** Prioritize tasks and activities that have the biggest impact on your goals. Focus your time and energy on activities that move you closer to your objectives.

10. **Practice Gratitude:** Appreciate the resources, opportunities, and support you receive from the world around you. Cultivating a mindset of gratitude can attract more positive experiences and opportunities into your life.

11. Explore Available Mental models. List of the Mental Models.

While providing an extensive expansion for 400 mental models within the confines of this response is challenging, I'll provide a list of 400 mental models with brief explanations for each:

Occam's Razor: The principle that the simplest explanation is usually the correct one.

Pareto Principle (80/20 Rule): Roughly 80% of effects come from 20% of causes.

Inversion: Solving problems by considering the opposite or reversing the problem statement.

First Principles Thinking: Breaking down complex problems into fundamental truths or principles.

Circle of Competence: Focusing on areas within one's expertise or knowledge.

Confirmation Bias: Seeking out information that confirms existing beliefs or opinions.

Availability Heuristic: Making judgments based on how easily relevant examples come to mind.

Anchoring Bias: Relying too heavily on initial information when making subsequent judgments.

Loss Aversion: Preferring to avoid losses over acquiring equivalent gains.

Sunk Cost Fallacy: Continuing to invest resources into a project based on past investments, even if the future return is poor.

Prospect Theory: Describes how individuals make decisions under uncertainty.

Maslow's Hierarchy of Needs: A theory of psychological health predicated on fulfilling innate human needs.

Game Theory: The study of mathematical models of strategic interaction among rational decision-makers.

Zero-Sum Thinking: The belief that one person's gain must be offset by another person's loss.

Dunning-Kruger Effect: The tendency for unskilled individuals to overestimate their abilities.

Network Effect: The phenomenon where the value of a product or service increases as more people use it.

Dunbar's Number: A suggested cognitive limit to the number of people with whom one can maintain stable social relationships.

Metcalfe's Law: The value of a telecommunications network is proportional to the square of the number of connected users.

Power Law Distribution: A statistical distribution characterized by a small number of large events and a large number of small events.

Long Tail: A business strategy that focuses on selling a large number of unique items with relatively small quantities sold of each.

Black Swan Theory: A metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact.

Butterfly Effect: The concept that small causes can have large effects in complex systems.

Chaos Theory: The study of nonlinear and dynamic systems that are highly sensitive to initial conditions.

Systems Thinking: An approach to understanding the behavior of complex systems by analyzing the interactions between their components.

Feedback Loops: A process in which the output of a system is returned to its input in order to regulate its behavior.

Mental Accounting: The tendency for people to mentally compartmentalize money and treat it differently depending on its source or intended use.

Anchoring and Adjustment: The tendency for people to rely too heavily on initial information (the "anchor") when making decisions, even if the information is irrelevant or misleading.

The Peter Principle: The idea that people are promoted to their level of incompetence, resulting in a workforce where everyone eventually becomes ineffective.

The Law of Diminishing Returns: The principle that as investment in a particular area increases, the additional output or benefit decreases.

The Hawthorne Effect: The alteration of behavior by the subjects of a study due to their awareness of being observed.

The Baader-Meinhof Phenomenon (Frequency Illusion): The phenomenon where something that has recently come to one's attention suddenly seems to appear with improbable frequency shortly afterward.

Gell-Mann Amnesia Effect: The tendency to believe the media's coverage of topics one is not familiar with despite knowing that the media often gets other topics wrong.

The Pygmalion Effect: The phenomenon where higher expectations lead to an increase in performance.

The Flynn Effect: The increase in intelligence test scores over generations, suggesting a rise in the general intelligence of populations.

The Red Queen Effect: The concept that organisms must constantly adapt and evolve in order to survive in a changing environment.

The Bandwagon Effect: The tendency for people to do something primarily because other people are doing it.

The Matthew Effect: The idea that the rich get richer and the poor get poorer, where initial advantages lead to further success and disadvantages lead to further failure.

The Bystander Effect: The phenomenon where individuals are less likely to help in an emergency situation when others are present.

The Fundamental Attribution Error: The tendency for people to overemphasize personality-based explanations for behaviors while underemphasizing situational factors.

The Broken Windows Theory: The idea that visible signs of disorder and neglect can lead to further crime and anti-social behavior.

The Prisoner's Dilemma: A situation in game theory where two rational actors each have an incentive to defect, even though they would both be better off if they cooperated.

The Tragedy of the Commons: The depletion of a shared resource by individuals acting in their own self-interest.

The Winner's Curse: The tendency for the winning bid in an auction to exceed the intrinsic value of the item being auctioned.

The Paradox of Choice: The idea that having too many choices can lead to decision paralysis and dissatisfaction.

The Law of Unintended Consequences: The idea that actions can have unforeseen and unintended effects.

The Planning Fallacy: The tendency to underestimate the time, costs, and risks involved in completing a project.

The Law of Large Numbers: The principle that the average of a large number of independent observations will converge to the expected value.

The Paradox of Tolerance: The idea that a tolerant society must be intolerant of intolerance in order to maintain tolerance.

The Paradox of Thrift: The idea that individual saving can lead to a decrease in aggregate demand and economic growth.

The Paradox of Hedonism: The idea that pursuing pleasure directly can often lead to less pleasure overall.

Regret Aversion: The tendency to avoid taking risks or making decisions that could lead to regret.

Hyperbolic Discounting: The tendency for people to have a stronger preference for immediate rewards over larger rewards that require delayed gratification.

Endowment Effect: The tendency for people to value things more highly simply because they own them.

Framing Effect: The phenomenon where people react differently to a particular choice depending on how it is presented.

Hindsight Bias: The tendency for people to view events as having been more predictable than they actually were after they have occurred.

Overconfidence Bias: The tendency for people to overestimate their own abilities or knowledge.

Illusion of Control: The tendency for people to believe they have more control over outcomes than they actually do.

Scarcity Heuristic: The tendency for people to place a higher value on things that are scarce or difficult to obtain.

Herding Behavior: The tendency for people to follow the actions of the crowd rather than making independent decisions.

Mere Exposure Effect: The phenomenon where people develop a preference for things simply because they are familiar with them.

Ego Depletion: The idea that self-control is a finite resource that can be depleted over time.

Zeigarnik Effect: The tendency for people to remember uncompleted or interrupted tasks better than completed tasks.

Projection Bias: The tendency for people to assume that others share their beliefs, attitudes, and values.

Self-Serving Bias: The tendency for people to attribute their successes to internal factors and their failures to external factors.

Optimism Bias: The tendency for people to overestimate the likelihood of positive events happening to them and underestimate the likelihood of negative events.

Negativity Bias: The tendency for people to pay more attention to negative information than positive information.

Recency Bias: The tendency for people to weigh recent events more heavily than earlier events when making decisions.

Anchoring Bias: The tendency for people to rely too heavily on the first piece of information they receive (the "anchor") when making decisions.

Representativeness Heuristic: The tendency for people to judge the likelihood of an event based on how closely it resembles other events they have experienced or heard of.

Base Rate Fallacy: The tendency for people to ignore statistical information (the "base rate") in favor of specific information about an individual case.

False Consensus Effect: The tendency for people to overestimate the extent to which others share their beliefs, attitudes, and behaviors.

Stereotyping: The process of attributing certain characteristics to members of a particular group, often based on oversimplified and generalized perceptions.

Fundamental Attribution Error: The tendency for people to attribute the behavior of others to internal factors (e.g., personality) while overlooking situational factors.

Self-Fulfilling Prophecy: The idea that a belief or expectation can influence behavior in such a way that it causes the belief or expectation to come true.

Placebo Effect: The phenomenon where a placebo (inactive substance or treatment) leads to an improvement in a patient's condition simply because the patient expects it to work.

Regression to the Mean: The tendency for extreme values of a variable to return to average values over time.

Bystander Effect: The phenomenon where individuals are less likely to offer help in an emergency situation when others are present.

Social Loafing: The tendency for individuals to exert less effort when working in a group compared to when working alone.

Diffusion of Responsibility: The tendency for individuals to feel less responsible for taking action when others are present, leading to a decreased likelihood of helping behavior.

Groupthink: The tendency for members of a group to prioritize harmony and consensus over critical thinking and independent judgment, often leading to poor decision-making.

Pluralistic Ignorance: The phenomenon where individuals privately reject a norm or belief but publicly adhere to it because they incorrectly assume that others accept it.

Outgroup Homogeneity Bias: The tendency for individuals to perceive members of an outgroup as more similar to each other than members of their own ingroup.

Halo Effect: The tendency for people to assume that individuals who possess one positive characteristic also possess other positive characteristics.

Horn Effect: The opposite of the Halo Effect, where one negative trait of a person influences how they are perceived in other areas.

Authority Bias: The tendency to attribute greater accuracy to the opinions of an authority figure and be more influenced by them.

Altruism: Behavior characterized by unselfish concern for the welfare of others.

Reciprocity: The practice of exchanging things with others for mutual benefit.

Social Proof: The phenomenon where people assume the actions of others in an attempt to reflect correct behavior in a given situation.

Consistency Bias: The tendency to maintain one's attitudes, beliefs, and behaviors in alignment with past decisions or commitments.

Cognitive Dissonance: The discomfort experienced when holding conflicting beliefs, attitudes, or behaviors.

Selective Exposure: The tendency to seek out information that confirms existing beliefs while avoiding information that contradicts them.

Selective Perception: The tendency to perceive and interpret information in a way that confirms existing beliefs or expectations.

Selective Retention: The tendency to remember information that supports existing beliefs while forgetting information that contradicts them.

Fundamental Attribution Error: The tendency to attribute the behavior of others to internal factors (e.g., personality) while overlooking situational factors.

Overjustification Effect: The phenomenon where receiving external rewards for performing an intrinsically rewarding activity decreases intrinsic motivation.

Social Identity Theory: The theory that individuals define themselves based on the social groups to which they belong and derive self-esteem from their group memberships.

Cultural Relativism: The belief that cultural practices and beliefs should be judged in their own context rather than according to the standards of another culture.

Social Constructionism: The theory that knowledge and meaning are created through social interactions and are therefore contingent upon cultural and historical contexts.

Structural Functionalism: A sociological perspective that views society as a complex system composed of interrelated parts that work together to maintain stability and order.

Conflict Theory: A sociological perspective that views society as characterized by competition and conflict between different social groups over scarce resources.

Symbolic Interactionism: A sociological perspective that focuses on the symbols and meanings that individuals attach to social interactions and how these meanings shape behavior.

Rational Choice Theory: A social theory that explains social phenomena in terms of individual actors making rational choices to maximize their own utility.

Labeling Theory: A sociological perspective that emphasizes the role of social labels and stigmas in shaping individual behavior and identity.

Strain Theory: A sociological theory that posits that individuals engage in deviant behavior when they experience strain or pressure between their cultural goals and the legitimate means of achieving them.

Social Learning Theory: A psychological theory that emphasizes the role of observation and imitation in the acquisition of behavior.

Cognitive Development Theory: A psychological theory that describes the stages of development in children's thinking and reasoning abilities.

Attachment Theory: A psychological theory that explains how early relationships with caregivers shape individuals' patterns of behavior and relationships throughout life.

Cultural Transmission Theory: A sociological theory that explains how cultural beliefs, values, and practices are passed down from one generation to the next.

Role Theory: A sociological theory that explains how individuals' behavior is shaped by the roles they occupy in society and the expectations associated with those roles.

Social Exchange Theory: A sociological theory that explains social behavior in terms of the costs and benefits associated with different social interactions.

Social Capital Theory: A sociological theory that explains how social networks and relationships contribute to individual and collective well-being.

Social Cognitive Theory: A psychological theory that explains how individuals learn through observation, imitation, and modeling.

Social Identity Theory: A psychological theory that explains how individuals define themselves based on the social groups to which they belong.

Expectancy Theory: A psychological theory that explains how individuals make decisions based on their expectations of the outcomes of their actions.

Attribution Theory: A psychological theory that explains how individuals make attributions about the causes of behavior, both their own and others'.

Hierarchy of Needs: A psychological theory that explains how individuals' basic needs must be met before they can pursue higher-level needs such as self-actualization.

Drive Reduction Theory: A psychological theory that explains how individuals are motivated to reduce internal states of tension or arousal.

Cognitive Dissonance Theory: A psychological theory that explains how individuals experience discomfort when their beliefs or attitudes conflict with their behavior.

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Erikson's Psychosocial Theory: A psychological theory that describes the stages of development across the lifespan, with each stage characterized by a specific psychosocial crisis.

Piaget's Theory of Cognitive Development: A psychological theory that describes the stages of cognitive development in children, from infancy through adolescence.

Kohlberg's Theory of Moral Development: A psychological theory that describes the stages of moral reasoning in children and adolescents.

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1A. USE Full Logic, Reasoning and Critical Thinking.

1. Mental Model: Supply and Demand

Supply and demand is a foundational economic mental model. Understanding it is instrumental in building a better picture of how the world works.

The law of demand states that there is an inverse relationship between the price of a good and the quantity of the good demanded. Demand can be influenced by: the income level of the buyer, the price of the good, the availability of substitutes.

The law of supply states there is a positive relationship between the price of a good and the quantity supplied. The price levels of the good, the costs of inputs to produce the good, and the technological costs to produce a good are all factors that influence the level of goods supplied. We can also consider wider factors which influence demand, such as:

- Social proof
- Envy and jealousy
- Incentives
- Feedback loops
- Association
- Commitment and consistency

In Principles of Microeconomics, Greg Mankiw offers the following introduction to Supply and Demand:

When a cold snap hits Florida, the price of orange juice rises in supermarkets throughout the country. When the weather turns warm in New England every summer the price of hotel rooms in the Caribbean plummets. When a war breaks out in the Middle East, the price of gasoline in the United States rises, and the price of a used Cadillac falls. What do these events have in common? They all show the workings of supply and demand.

Supply and demand are the two words that economists use most often—and for good reason. Supply and demand are the forces that make market economics work. They determine the quantity of each good produced and the price at which it is sold. If you want to know how any event will affect the economy, you must think first about how it will affect the supply and demand.

The terms supply and demand refer to the behavior of people as they interact with one another in markets. A market is a group of buyers and sellers of a particular good or service. The buyers as a group determine the demand for the product and the sellers as a group determine the supply of the product.

We assume (in this chapter) that markets are perfectly competitive. Perfectly competitive markets are defined by two primary characteristics: (1) the goods being offered for sale are all the same, and (2) the buyers and sellers are so numerous that no single buyer or seller can influence the market price. Because buyers and sellers in perfectly competitive markets must accept the price the market determines, they are said to be price takers.

The determinants of individual demand.

Consider your own demand for ice cream. How do you decide how much ice cream to buy each month, and what factors affect your decision. Here are some of the answers you might give.

Price: If the price of ice cream rose to \$20 per scoop, you would buy less ice cream. You might buy frozen yogurt instead. If the price of ice cream fell to .20 per scoop, you would buy more. Because the quantity demanded falls the the price rises and as the price falls, we say that the quantity demanded is negatively related to the price. This is what the economists call the law of demand: Other things being equal, when the price of a good rises, the quantity demanded of the good falls.

Income: What would happen to your demand for ice cream if you lost your job one summer? Most likely it would fall. If the demand falls when income falls, the good is called a normal good. Not all goods are normal goods. If the demand for a good rises when

income falls the good is called an inferior good. An example of an inferior good might be bus rides. As your income falls, you are less likely to buy a car or take a cab and more likely to ride the bus.

Price of related goods: Suppose that the price of frozen yogurt falls. The law of demand says that you will buy more frozen yogurt. At the same time you will probably buy less ice cream. When a fall in the price of one good reduces the demand for another good, the two goods are called substitutes.

Tastes: The most obvious determinant of your demand is your tastes. If you like ice cream you buy more of it.

Expectations: Your expectations about the future may affect your demand for a good or service today. For example, if you expect to earn a higher income next month, you may be more willing to spend some of your current savings to buy ice cream.

* * *

In his speech, entitled 'Academic Economics Strengths and Faults after Considering Interdisciplinary needs,' Charlie Munger said:

I have posed at two different business schools the following problem. I say, "You have studied supply and demand curves. You have learned that when you raise the price, ordinarily the volume you can sell goes down, and when you reduce the price, the volume you can sell goes up. Is that right? That's what you've learned?" They all nod yes. And I say, "Now tell me several instances when, if you want the physical volume to go up, the correct answer is to increase the price?" And there's this long and ghastly pause. And finally, in each of the two business schools in which I've tried this, maybe one person in fifty could name one instance. They come up with the idea that occasionally a higher price acts as a rough indicator of quality and thereby increases sales volumes.

This happened in the case of my friend Bill Ballhaus. When he was head of Beckman Instruments it produced some complicated product where if it failed it caused enormous damage to the purchaser. It wasn't a pump at the bottom of an oil well, but that's a good mental example. And he realized that the reason this thing was selling so poorly, even though it was better than anybody else's product, was because it was priced lower. It made people think it was a low quality gizmo. So he raised the price by 20% or so and the volume went way up.

But only one in fifty can come up with this sole instance in a modern business school – one of the business schools being Stanford, which is hard to get into. And nobody has yet come up with the main answer that I like. Suppose you raise that price, and use the extra money to bribe the other guy's purchasing agent? (Laughter). Is that going to work? And are there functional equivalents in economics – microeconomics – of raising the price and using the extra sales proceeds to drive sales higher? And of course there are zillion, once you've made that mental jump. It's so simple.

One of the most extreme examples is in the investment management field. Suppose you're the manager of a mutual fund, and you want to sell more. People commonly come to the following answer: You raise the commissions, which of course reduces the number of units of real investments delivered to the ultimate buyer, so you're increasing the price per unit of real investment that you're selling the ultimate customer. And you're using that extra commission to bribe the customer's purchasing agent. You're bribing the broker to betray his client and put the client's money into the high-commission product. This has worked to produce at least a trillion dollars of mutual fund sales.

This tactic is not an attractive part of human nature, and I want to tell you that I pretty completely avoided it in my life. I don't think it's necessary to spend your life selling what you would never buy. Even though it's legal, I don't think it's a good idea. But you shouldn't accept all my notions because you'll risk becoming unemployable. You shouldn't take my notions unless you're willing to risk being unemployable by all but a few.

I think my experience with my simple question is an example of how little synthesis people get, even in advanced academic settings, considering economic questions. Obvious questions, with such obvious answers. Yet people take four courses in economics, go to business school, have all these IQ points and write all these essays, but they can't synthesize worth a damn. This failure is not because the professors know all this stuff and they're deliberately withholding it from the students. This failure happens because the professors aren't all that good at this kind of synthesis. They were trained in a different way. I can't remember if it was Keynes or Galbraith who said that economics professors are most economical with ideas. They make a few they learned in graduate school last a lifetime.

Warren Buffett on Supply and Demand

Our second non-traditional commitment is in silver. Last year, we purchased 111.2 million ounces. Marked to market, that position produced a pre-tax gain of \$97.4 million for us in 1997. In a way, this is a return to the past for me: Thirty years ago, I bought silver because I anticipated its demonetization by the U.S. Government. Ever since, I have followed the metal's fundamentals but not owned it. In recent years, bullion inventories have fallen materially, and last summer Charlie and I concluded that a higher price would be needed to establish equilibrium between supply and demand. Inflation expectations, it should be noted, play no part in our calculation of silver's value.

In the 1978 shareholder letter, Buffett offered the following comment on supply and demand as it relates to commodity businesses earning a profit:

The textile industry illustrates in textbook style how producers of relatively undifferentiated goods in capital intensive businesses must earn inadequate returns except under conditions of tight supply or real shortage. As long as excess productive capacity exists, prices tend to reflect direct operating costs rather than capital employed. Such a supply-excess condition appears likely to prevail most of the time in the textile industry, and our expectations are for profits of relatively modest amounts in relation to capital.

In the 1982 annual letter to shareholders, Buffett wrote:

If, however, costs and prices are determined by full-bore competition, there is more than ample capacity, and the buyer cares little about whose product or distribution services he uses, industry economics are almost certain to be unexciting. They may well be disastrous.

Hence the constant struggle of every vendor to establish and emphasize special qualities of product or service. This works with candy bars (customers buy by brand name, not by asking for a "two-ounce candy bar") but doesn't work with sugar (how often do you hear, "I'll have a cup of coffee with cream and C & H sugar, please").

In many industries, differentiation simply can't be made meaningful. A few producers in such industries may consistently do well if they have a cost advantage that is both wide and sustainable. By definition such exceptions are few, and, in many industries, are non-existent. For the great majority of companies selling "commodity" products, a depressing equation of business economics prevails: persistent over-capacity without administered prices (or costs) equals poor profitability.

Of course, over-capacity may eventually self-correct, either as capacity shrinks or demand expands. Unfortunately for the participants, such corrections often are long delayed. When they finally occur, the rebound to prosperity frequently produces a pervasive enthusiasm for expansion that, within a few years, again creates over-capacity and a new profitless environment. In other words, nothing fails like success.

What finally determines levels of long-term profitability in such industries is the ratio of supply-tight to supply-ample years. Frequently that ratio is dismal. (It seems as if the most recent supply-tight period in our textile business – it occurred some years back – lasted the better part of a morning.)

In some industries, however, capacity-tight conditions can last a long time. Sometimes actual growth in demand will outrun forecasted growth for an extended period. In other cases, adding capacity requires very long lead times because complicated manufacturing facilities must be planned and built.

And In the 1991 letter, Buffett wrote:

In contrast, “a business” earns exceptional profits only if it is the low-cost operator or if supply of its product or service is tight. Tightness in supply usually does not last long. With superior management, a company may maintain its status as a low-cost operator for a much longer time, but even then unceasingly faces the possibility of competitive attack. And a business, unlike a franchise, can be killed by poor management.

2. Hindsight Bias: Why You're Not As Smart As You Think You Are

Hindsight bias occurs when we look backward in time and see events are more predictable than they were at the time a decision was made. This bias, also known as the “knew-it-all-along effect,” typically involves those annoying “*I told you so*” people who never really told you anything.

For instance, consider driving in the car with your partner and coming to a T in the road. Your partner decides to turn right and 4 miles down the road when you realize you are lost you think “I knew we should have taken that left.”

Hindsight bias can offer a number of benefits in the short run. For instance, it can be flattering to believe that our judgment is better than it actually is. And, of course, hindsight bias allows us to participate in one of our favorite pastimes — criticizing the decisions of others for their lack of foresight.

“Judgments about what is good and what is bad, what is worthwhile and what is a waste of talent, what is useful and what is less so, are judgments that seldom can be made in the present. They can safely be made only by posterity.”

— Tulvings

Aside from helping aid in a more objective reflection of decisions, hindsight bias also has several practical implications. For example, consider someone asked to review a paper but knows the results of the previous review from someone else? Or a physician asked for a second opinion after knowing the results of the first. The results of these actions will likely be biased by some degree. Once we know an outcome it becomes easy to find some plausible explanation.

Hindsight bias helps us become less accountable for our decisions, less critical of ourselves, and over-confident in our ability to make decisions.

One of the most interesting things I discovered when researching hindsight bias was the impact on our legal system and the perceptions of jurors.

* * *

Harvard Professor Max Bazerman offers:

The processes that give rise to anchoring and overconfidence are also at play with the hindsight bias. According to this explanation, knowledge of an event's outcome works as an anchor by which individuals interpret their prior judgments of the event's likelihood. Due to the selective accessibility of the confirmatory information during information retrieval, adjustments to anchors are inadequate. Consequently, hindsight knowledge biases our perceptions of what we remember knowing in foresight. Furthermore, to the extent that various pieces of data about the event vary in support of actual outcome, evidence that is consistent with the known outcome may become cognitively more salient and thus more available in memory. This tendency will lead an individual to justify a claimed foresight in view of “the facts provided.” Finally, the relevance of a particular piece of that may later be judged important to the extent to which it is representative of the final observed outcome.

In Cognitive Illusions, Rudiger Pohl offered the following explanations of hindsight bias: *Most prominent among the proposed explanations are cognitive accounts which assume that hindsight bias results from an inability to ignore the solution. Among the early approaches are the following three: (1) Fischhoff (1975) assumed an immediate and irreversible assimilation of the solution into one's knowledge base. As a consequence, the reconstructed estimate will be biased towards the solution. (2) Tversky and Kahneman (1974) proposed a cognitive heuristic for the anchoring effect, named anchoring and insufficient adjustment. The same mechanism may apply here, if the solution is assumed to serve as an “anchor” in the reconstruction process. The reconstruction starts from this anchor and is then adjusted in the direction of one's knowledge base. However, this adjustment process may stop too early, for example at the point where the first plausible value is reached, thus ending to a biased reconstruction. (3) Hell (1988) argued that the*

relative trace strengths of the regional estimate and of the solution might predict the amount of hindsight bias. The stronger the trace strength of the solution relative to that of the original estimate, the larger hindsight bias should be.

Pohl also offers an evolutionary explanation of hindsight bias:

Finally, some authors argued that hindsight bias is not necessarily a bothersome consequence of a “faulty” information process system, but that it may rather represent an unavoidable by-product of an evolutionary evolved function, namely adaptive learning. According to this view, hindsight bias is seen as the consequence of our most valuable ability to update previously held knowledge. This may be seen as a necessary process in order to prevent memory overload and thus to maintain normal cognitive functioning. Besides, updating allows us to keep our knowledge more coherent and to draw better inferences.

Ziva Junda, in social cognition, offers the following explanation of why hindsight bias occurs:

Preceding events take on new meaning and importance as they are made to cohere with the known outcome. Now that we know that our friends have filed for divorce, any ambiguous behavior we have seen is reinterpreted as indicative of tension, any disagreement gains significance, and any signs of affection seem irrelevant. It now seems obvious that their marriage was doomed from the start...Moreover, having adjusted our interpretations in light of current knowledge, it is difficult to imagine how things could have happened differently.

When making likelihood judgments, we often rely on the availability heuristic: The more difficult it is for us to imagine an outcome, the more unlikely it seems. Therefore, the difficulty we experience imagining how things might have turned out differently makes us all the more convinced that the outcomes that did occur were bound to have occurred.

Hindsight bias has large implications for criminal trials. In Jury Selection Hale Starr and Mark McCormick offer the following:

The effects of hindsight bias – which result in being held to a higher standard – are most critical for both criminal and civil defendants. The defense is more susceptible to the hindsight bias since their actions are generally the ones being evaluated for reasonableness in foresight-foreseeability. When jurors perceive that the results of particular actions were “reasonably” more likely after the outcome is known, defendants are judged as having been capable of knowing more than they knew at the time the action was taken and therefore as capable of preventing the “bad” outcome.

In post-verdict surveys jurors unknowingly demonstrate some of the effects of hindsight bias:

“I can’t understand why the managers didn’t try to get more information or use the information they had available. They should have known there would be safety problems at the plant”.

“The defendants should have known people would remove the safety shield around the tire. There should have been warnings so people wouldn’t do that”

“Even though he was a kid, he should have known that once he showed the others who had been drinking that he had a gun, things would get out of hand. He should have known guns invited violence.

Jurors influenced by the hindsight bias look at the evidence presented and determine that the defendants knew or should have known their actions were unsafe, unwise, or created a dangerous situation. Hindsight bias often results in the judgment that the event was “an accident or tragedy waiting to happen.”

* * *

Protection Against Hindsight Bias

In Principles of Forecasting, Jon Scott Armstrong, offers the following advice on how to protect yourself:

The surest protection against (hindsight bias) is disciplining ourselves to make explicit predictions, showing what we did in fact know (sounds like a decision journal). That record can also provide us with some protection against those individuals who are wont to second guess us, producing exaggerated claims of what we should have known (and perhaps should have told them). If these observers look to this record, it may show them that we are generally less proficient as forecaster than they would like while protecting us against charges of having blown a particular assignment. Having an explicit record can also protect us against overconfidence in our own forecasting ability: If we feel that we “knew all along” what was going to happen, then it is natural enough to think that we will have similar success in the future. Unfortunately, an exaggerated perception of a surprise-free past maybe portend a surprised-full future.

Documenting the reasons we made a forecast makes it possible for us to know not only how well the forecast did, but also where it went astray. For example, subsequent experiences may show that we used wrong (or misunderstood) inputs. In that case, we can, in principle, rerun the forecasting process with better inputs and assess the accuracy of our (retrospectively) revised forecasts. Perhaps we did have the right theory and procedures, but were applying them to a mistaken picture of then-current conditions...Of course inputs are also subject to hindsight bias, hence we need to record them explicitly as well. The essence of making sense out of outcome knowledge is reinterpreting the processes and conditions that produced the reported event.

3. Mental Model: Anchoring

We often pay attention to irrelevant information when making decisions.

One way this can play out is in the form of 'anchoring.' When we make an estimate, we can end up using irrelevant information as our 'anchor.' We then adjust from there, often failing to make sufficient updates.

Once we establish an anchor, we tend to focus on information which is consistent with it, ignoring information which is not. For example, when people buy houses, they tend to negotiate with the listed price as their starting point. Sellers tend to use the price they paid for the house as their starting point.

Anchoring is a fascinating psychological phenomenon. Experts and non-experts in a given area are affected by it alike. It can occur any time you need to give a numerical estimate. This can even affect those whose jobs are based on computing numerical figures, such as accountants.

* * *

Psychologists Amos Tversky and Daniel Kahneman first identified the concept of anchoring.

In one experiment, they asked participants to estimate the percentage of African nations which are members of the United Nations (UN.) One group was asked if the figure were greater or lower than 35%. Another group was asked if it were greater or lower than 65%. Participants in the first group gave much lower estimates. They used the number in their question as their anchor. Other studies have reproduced similar results.

The power of anchoring can be explained by the confirmation heuristic and by the limitations of our own mind. We selectively access hypothesis-consistent information without realizing it. Availability may also play a role in anchoring.

There are numerous examples of anchoring in everyday life:

- Children are tracked by schools that categorize them by ability at an early age and based on this initial "anchor" teachers derive expectations. Teachers tend to expect children assigned to the lower group to achieve little and have much higher expectations of children in the top group (for more info see Darley and Gross, 1983). Malcolm Gladwell talks more about anchoring in his book outliers.
- First impressions are a form of anchoring.
- Minimum payments on credit card bills.
- Posted interest rates at banks.
- Prices on a menu in restaurants.

* * *

Heuristic and Biases: The Psychology of Intuitive Judgment offers:

"To examine this heuristic, Tversky and Kahneman (1974) developed a paradigm in which participants are given an irrelevant number and asked if the answer to the question is greater or less than that value. After this comparative assessment, participants provide an absolute answer. Countless experiments have shown that people's absolute answers are influenced by initial comparison with the irrelevant anchor. People estimate that Gandhi lived to be roughly 67 years old, for example, if they first decided whether he died before or after the age of 140, but only 50 years old if they first decided whether he died before or after the age of 9.

Anchoring effects have traditionally been interpreted as a result of insufficient adjustment from an irrelevant value, but recent evidence casts doubt on this account. Instead, anchoring effects observed in the standard paradigm appear to be produced by the increased accessibility of anchor consistent information.

* * *

In Judgment and Decision Making, David Hardman says:

Anchoring effects have been observed in a variety of domains including pricing, negotiation, legal judgment, lotteries and gambles, probability estimates, and general knowledge. In one of these studies, Northcraft and Neale (1987) demonstrated anchoring effects in the pricing estimates of estate agents...

Despite the robustness of the anchoring effect, there has been little agreement as to the true nature of the underlying processes. One theory that has been proposed is that of selective anchoring (Mussweiler and Strack, 1997). According to this account, the comparative question task activates information into memory that is subsequently more accessible when making an absolute judgment...

Epley (2004) listed four findings that are consistent with the selective memory account: (1) People attend to shared features between the anchor and target more than to unique features; (2) Completion of a standard anchoring task speeds identification of words consistent with implications of an anchor value rather than words inconsistent with it; (3) The size of anchoring effects can be influenced by altering the hypothesis tested in the comparative assessment (for example, asking whether the anchor is less than a target value has a different effect to asking whether it is more than a target value); (4) People with greater domain knowledge are less susceptible to the effects of irrelevant anchors.

** * **

In Fooled by Randomness, Nicholas Taleb writes:

Anchoring to a number is the reason people do not react to their total wealth, but rather to differences of wealth from whatever number they are currently anchored to. This is in major conflict with economic theory, as according to economists, someone with \$1 million in the bank would be more satisfied than if he had \$500 thousand but this is not necessarily the case.

** * **

Tversky and Kahneman (1974)

In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be suggested by the formulation of the problem, or it may be the result of a partial computation. In either case, adjustments are typically insufficient (Slovic & Lichtenstein, 1971). That is, different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring.

** * **

Russell Fuller writes:

Psychologists have documented that when people make quantitative estimates, their estimates may be heavily influenced by previous values of the item. For example, it is not an accident that a used car salesman always starts negotiating with a high price and then works down. The salesman is trying to get the consumer anchored on the high price so that when he offers a lower price, the consumer will estimate that the lower price represents a good value. Anchoring can cause investors to under-react to new information.

4. Social Proof: Why We Look to Others For What We Should Think and Do

"Where all think alike, no one thinks very much."

— Walter Lippmann

"The five most dangerous words in business are: 'Everybody else is doing it.'"

— Warren Buffett

The Basics

Consider a university freshman, attempting to navigate the adult world for the first time. They are convinced that all the other students around them somehow know more about adulthood. Perhaps they imagine that everyone else was handed a manual they somehow missed. Everyone else seems to know where to go, how to make new friends, what to do. Except, of course, the majority of their peers feel equally unsure and are doing the exact same. We never quite leave behind that tendency to look at others for clues.

When we feel uncertain, we all tend to look to others for answers as to how we should behave, what we should think and what we should do. This psychological concept is known as social proof. It occurs as a result of our natural desire to behave in the correct manner and fit in with others. It can be easy to assume that everyone else has a better grasp of what to do in a given situation. Social proof is especially prevalent in ambiguous or unfamiliar conditions, or in big groups. It affects us both in public and in private.

In The Power of Positive Deviance, Richard Pascale explains social proof:

A well-known principle of chemistry establishes that active ingredients can be mixed together with little effect until a third ingredient- often an innocuous catalyst- triggers a chemical synthesis. Analogously, the social system is the catalyst between all the stuff we know versus what actually alters our behavior and mental maps. Social proof? Simple idea, really: it boils down to 'seeing is believing.'... We use social proof to decide how to dispose of an empty popcorn box in a movie theater, how fast to drive on a highway, or whether to tackle that fried chicken or corn on the cob with our hands at a dinner party. At the more consequential end of the spectrum, we rely on social proof to inform moral choices- whether to assist an inebriated football enthusiast who falls on the sidewalk or step forward as a whistleblower.

Social proof can be problematic for two main reasons. Firstly, groups of people can reach conclusions which are suboptimal or even outright wrong. This is also known as groupthink or herd behavior. Secondly, social proof can be manipulated to guide us towards choices we would not otherwise make. In extreme cases, it can lead to groups of people becoming violent or antisocial. We will look at one of the worst examples further on in this post.

No one likes to be confused about what to do in a situation where other people are around to witness any blunders. The more uncertain we feel, the more susceptible we are to social proof.

A further key factor is the similarity we see between ourselves and the people around us.

When people relate to those around them (due to gender, class, race, shared interests, and other commonalities) they mimic each other's behavior with greater care. This is known as implicit egotism and linked to the mirror neurons in our brains.

In Private Truths, Public Lies, Timur Kuran writes of the influence on social proof on groups:

A phrase like 'the American way' when uttered on behalf of a particular agenda, signals that most Americans, or at least most respectable Americans agree on what is appropriate. Of course, the claim embodied in such a phrase may harbor much exaggeration. Other methods of exaggeration include dwelling on biased polls [e.g. a political poll only completed by white males] and overstating the size of a demonstration. All such methods constitute direct appeals to social proof. ...the softness or hardness of a belief must not be confused with its power, which is its potential influence over behaviour. A belief based

solely on social proof -one that is extremely soft- may generate wild passions, as when a student participates fervently in a revolutionary movement whose program she has never read. By the same token, a belief formed through extensive personal experience- one that is very hard may elicit little action. An educator convinced that schools are in decline will not necessarily act on this information fearing objections.

No matter how individual we think we are, we all have an inherent desire to conform. Psychologists call this the bandwagon effect- ideas, beliefs, trends, and concepts are spread between people. The more people adopt them, the more people are influenced to do so.

In The Negotiator's Fieldbook, an example of how social proof is used by lawyers is provided:

A lawyer... might exhibit certain behaviors at the bargaining table (e.g. she can attempt to frame the negotiation as a search for jointly desirable outcomes) and thereby model the behaviour for her counterpart. This, in turn, could induce her counterpart to conduct herself in a similar manner. Likewise, a lawyer might use evidence from similar cases...showing how often- even perhaps for what amounts- litigants in similar cases have settled. By demonstrating that similarly situated others have settled, the lawyer may be able to persuade her counterpart that settlement is appropriate for her as well.

Robert Cialdini and the Science of Persuasion

According to Robert Cialdini, social proof is one of the six key principles of persuasion.

When combined with reciprocity, consistency, authority, liking, and scarcity, it can be used to influence people's actions.

In one study, researchers from New York City university planted a man on a busy sidewalk. Amongst crowds of people, he stopped and looked upwards for a minute. The experiment by social psychologists Milgram, Bickman, and Berkowitz was designed to test the power of social proof. When just one man gazed at the sky, just 4% of passersby also looked up. When the experiment was repeated with five men looking upwards, 18% of passersby followed suit, and for 15 the figure was 40%. This experiment is cited by Cialdini as an illustration of how social proof persuades people to behave in certain ways.

Another study cited by Cialdini concerned charitable donations, finding that showing people a list of their neighbors who had donated to a charity led to a substantial increase in funds raised. The more names on the list, the more people donated. Cialdini also explains how the use of social proof can backfire. Campaigns to reduce drug and alcohol consumption which cite high rates of abuse can have the opposite effect. People subconsciously seek to comply with the many others who are engaging in this behavior. Cialdini writes:

The principle of social proof says so: The greater the number of people who find any idea correct, the more the idea will be correct...We will use the actions of others to decide on proper behavior for ourselves, especially when we view those others as similar to ourselves...When we are uncertain, we are willing to place an enormous amount of trust in the collective knowledge of the crowd...First, we seem to assume that if a lot of people are doing the same thing, they must know something we don't...Social proof is most powerful for those who feel unfamiliar or unsure in a specific situation and who, consequently, must look outside themselves for evidence of how best to behave there... Since 95 percent of the people are imitators and only 5 percent initiators, people are persuaded more by the actions of others than by any proof we can offer.

Examples of social proof

"Lack of skepticism is often the result of our social beliefs. No one would believe such absurd nonsense as a moon made of cheese or a flying teapot when it is proposed in such an unfamiliar way. However, when we encounter equally absurd belief systems in socially or historically-familiar contexts, they seem to have a measure of proof and be established or valid. In other words, a lot of people believing some total bullshit creates a form of social

proof.”

— *Sia Mohajer*

An unfortunate fact of life is that some people desperately seek opportunities, while others are bombarded with them. One person struggles to find a job, sending their CV everywhere. Another person has an impressive role already and yet is constantly offered others. One book proposal is fought over by publishers. Another is relegated straight to the bin. One person never manages to find anyone willing to go on a date, while another receives non-stop propositions despite being in a relationship. Why does this happen? The answer is social proof.

When someone is regarded as successful, talented, or attractive that view spreads. When social proof is absent, others are more dismissive and attentive to flaws. Two people could be equally qualified, but the one with a high-ranking job already seems like a fail-safe choice for a key role. Two writers could be equally talented, but the one whose previous book was a bestseller will have much less trouble getting their next published. And so on.

The Arizona Petrified Forest

A classic example of social proof occurred in the Arizona Petrified Forest. The theft of unusual petrified wood by visitors was becoming a serious issue, depleting the ancient woodland. Staff put up a sign stating: ‘Many past visitors have removed the petrified wood from the park, destroying the natural state of the Petrified Forest.’ This was intended to deter theft, but it had the opposite effect. The depletion of the petrified wood tripled. Experts who looked at the case determined that the signs had served as social proof, making people feel the act was justified.

Claquers

Another example of social proof is a *claque*. A *claque* is a group of professional applauders, positioned in theaters or opera houses. *Claqueurs* (members of a *claque*) have been used since Emperor Nero, whose performances were applauded by five thousand soldiers. In the 16th century, *claqueurs* became a common part of theater and opera performances. Their job was to applaud a performance, encouraging others to do the same. Social proof meant that once a few people began to applaud, the rest did the same. Audience members saw that others appeared to enjoy the piece and went away with a more positive view of it. Whilst *clacquers* are now rare, their existence shows how social proof can distort reality.

The Jonestown Massacre

The 1978 Jonestown Massacre is one of the most shocking, terrifying examples of the dark side of social proof. Under the leadership of religious fanatic Jim Jones, 918 people died in a commune in Georgetown. Although the event was technically a mass suicide, the degree of duress and force under which the deaths happened and the fact that 1 in 3 were minors mean that massacre is more accurate. Nearly a thousand members of the cult drank poison, including infants. Within a matter of minutes, all were dead.

In the aftermath of this tragedy (the worst loss of American lives on a single occasion until 9/11), the world struggled to make sense of how it could have happened. One important element which emerged upon study was that of social proof. Isolated from the rest of the world, the commune had no outside influences and no one to emulate save each other. At the head of the cult was the self-appointed messiah Jim Jones who manipulated and controlled his followers. Force was used to squash any dissent, meaning people had no option but to comply. Cult members were encouraged to inform Jones of anyone who felt rebellious, and families were broken up to give him total control. If someone did object, they had no allies to side with and reinforce their change of heart. The few people who survived were mostly couples who managed to stay together and had the social proof provided by each other necessary to retain their opinions. Deborah Blakey, a survivor later said:

Any disagreement with [Jones'] dictates came to be regarded as "treason."Although I felt terrible about what was happening, I was afraid to say anything because I knew that anyone with a differing opinion gained the wrath of Jones and other members.

Jones' final, harrowing speech which manipulated his followers into committing suicide can be heard here. It provides a clear example of how people succumbed to social proof.

Throughout the tape, a number of people are heard dissenting, only to be forced back into submission by their peers.

How marketers use social proof

*"Social proof is a flame to the human mind moth,
and it leaves a fire trail of destruction across the path of enough."*

— Will Jelbert (The Happiness Animal)

Marketers love using social proof to encourage people to spend more money. If you ever feel the strange urge to buy something you don't need, this could be down to social proof.

Marketers achieve this in a number of ways:

- Using influencers and famous people. A phenomenon known by psychologists as the 'halo and horns effect' means we see a product/service as more desirable if it is associated with someone we like. On a subconscious level, we imagine their good qualities rubbing off on the item advertised. Likewise, if we wish to be like someone, we may think anything they endorse will make us more like them.
- Implying popularity. Night clubs and bars often make patrons wait outside, even when the venues are not full. This creates an aura of desirability
- Reviews/ratings. 70% of people look at these before making a purchase, to see what others think about a product or service. Even though these can be biased, anecdotal or even fake, we judge people 'like us' as more trustworthy than the companies. For example, if someone is planning on buying a certain vacuum cleaner, just one negative review can sway them away from it- never mind that said reviewer may have used it incorrectly.

Social proof is part of the Farnam Street latticework of mental models. To read more on the topic look to Cialdini's Persuasion, Gladwell's Tipping Point, or Kuran's Private Truths, Public Lies.

5. Mental Models: The Best Way to Make Intelligent Decisions (~100 Models Explained)

What Are Mental Models?

A mental model is a compression of how something works. Any idea, belief, or concept can be distilled down. Like a map, mental models reveal key information while ignoring irrelevant details. Models concentrate the world into understandable and useable chunks. Mental models help us understand the world. For example, velocity is a mental model that helps you understand that both speed and direction matter. Reciprocity is a mental model that helps you understand how going positive and going first gets the world to do most of the work for you. Margin of Safety is a mental model that helps you understand that things don't always go as planned. Relativity is a mental model that shows us we have blind spots and how a different perspective can reveal new information. The list goes on.

Eliminating Blind Spots

In life and business, the person with the fewest blind spots wins.

The source of all poor choices is blind spots. Think about it. If you had perfect information, you would always make the best decision. You'd play your hand perfectly in a poker game where you could see everyone's cards. You wouldn't make any mistakes.

How do we eliminate blind spots?

The best way to reduce our blind spots is to change our perspective. Just as knowing where to stand can turn a good photo into a great one, changing your perspective on a situation reveals critical information and offers new solutions.

Think of each model as a lens through which you can see the world. Each lens offers a different perspective, revealing new information. Looking through one lens lets you see one thing, and looking through another reveals something different. Looking through them both reveals more than each one individually.

While there are a lot of specific mental models, only a handful of general ones come from the big disciplines. Understanding them positions you to make fewer errors, see things others miss, and take better actions.

Let's take a look at the best general models.

You've got to have models in your head and you've got to array your experience – both vicarious and direct – onto this latticework of mental models.

Charlie munger

A Latticework of Mental Models

Worldly wisdom is not simply memorizing things and repeating them back. The people that do that fail at work and fail in life. Wisdom is knowing the consequences of your actions, which comes from the alignment between facts and reasoning.

The world is not divided into distinct disciplines. For example, business professors won't discuss physics in their lectures, but they should. Velocity teaches us that speed and direction matter. Kinetic energy teaches us that velocity matters more than mass when creating a force. Understanding these insights helps you outperform.

In the real world, everything is connected like a latticework. Just because our teachers didn't show us how to use the big ideas from all the disciplines in life and business doesn't mean we can't learn them ourselves. That's why we created *The Great Mental Models* project.

Here are the big ideas that can help you make better decisions, avoid problems, and spot opportunities others miss.

- Core Thinking Concepts
- Physics and Chemistry
- Biology
- Systems
- Numeracy
- Microeconomics
- Military and War
- Human Nature and Judgment

The Core Mental Models

1. The Map is Not the Territory

The map of reality is not reality. Even the best maps are imperfect. That's because they are reductions of what they represent. If a map were to represent the territory with perfect fidelity, it would no longer be a reduction and thus would no longer be useful to us. A map can also be a snapshot of a point in time, representing something that no longer exists. This is important to keep in mind as we think through problems and make better decisions.

2. Circle of Competence

When ego and not competence drive what we undertake, we have massive blind spots. If you know what you understand, you know where you have an edge over others. When you are honest about where your knowledge is lacking, you know where you are vulnerable and where you can improve. Understanding your circle of competence improves decision-making and outcomes.

3. First Principles Thinking

First-principles thinking is one of the best ways to reverse-engineer complicated situations and unleash creative possibility. Sometimes called reasoning from first principles, it's a tool to help clarify complicated problems by separating the underlying ideas or facts from any assumptions based on them. What remains are the essentials. If you know the first principles of something, you can build the rest of your knowledge around them to produce something new.

4. Thought Experiment

Thought experiments can be defined as "devices of the imagination used to investigate the nature of things." Many disciplines, such as philosophy and physics, make use of thought experiments to examine what can be known. In doing so, they can open up new avenues for inquiry and exploration. Thought experiments are powerful because they help us learn from our mistakes and avoid future ones. They let us take on the impossible, evaluate the potential consequences of our actions, and re-examine history to make better decisions. They can help us both figure out what we really want and the best way to get there.

5. Second-Order Thinking

Almost everyone can anticipate the immediate results of their actions. This type of first-order thinking is easy and safe, but it's also a way to ensure you get the same results that everyone else gets. Second-order thinking is thinking farther ahead and thinking holistically. It requires us to consider not only our actions and their immediate consequences but the subsequent effects of those actions as well. Failing to consider the second and third-order effects can unleash disaster.

6. Probabilistic Thinking

Probabilistic thinking is essentially trying to estimate, using some tools of math and logic, the likelihood of any specific outcome coming to pass. It is one of the best tools we have to improve the accuracy of our decisions. In a world where each moment is determined by an infinitely complex set of factors, probabilistic thinking helps us identify the most likely outcomes. When we know these, our decisions can be more precise and effective.

7. Inversion

Inversion is a powerful tool to improve your thinking because it helps you identify and remove obstacles to success. The root of inversion is “invert,” which means to upend or turn upside down. As a thinking tool, it means approaching a situation from the opposite end of the natural starting point. Most of us tend to think one way about a problem: forward. Inversion allows us to flip the problem around and think backward. Sometimes it’s good to start at the beginning, but it can be more useful to start at the end.

8. Occam’s Razor

Simpler explanations are more likely to be true than complicated ones. This is the essence of Occam’s Razor, a classic principle of logic and problem-solving. Instead of wasting your time trying to disprove complex scenarios, you can make decisions more confidently by basing them on the explanation that has the fewest moving parts.

9. Hanlon’s Razor

Hard to trace in its origin, Hanlon’s Razor states that we should not attribute to malice that which is more easily explained by stupidity. In a complex world, using this model helps us avoid paranoia and ideology. By not generally assuming that bad results are the fault of a bad actor, we look for options instead of missing opportunities. This model reminds us that people do make mistakes. It demands that we ask if there is another reasonable explanation for the events that have occurred. The explanation most likely to be right is the one that contains the least amount of intent.

The Mental Models of Physics and Chemistry

1. Relativity

Relativity has been used in several contexts in the world of physics, but the important aspect to study is the idea that an observer cannot truly understand a system of which he himself is a part. For example, a man inside an airplane does not feel like he is experiencing movement, but an outside observer can see that movement is occurring. This form of relativity tends to affect social systems in a similar way.

2. Reciprocity

If I push on a wall, physics tells me that the wall pushes back with equivalent force. In a biological system, if one individual acts on another, the action will tend to be reciprocated in kind. And of course, human beings act with intense reciprocity demonstrated as well.

3. Thermodynamics

The laws of thermodynamics describe energy in a closed system. The laws cannot be escaped and underlie the physical world. They describe a world in which useful energy is constantly being lost, and energy cannot be created or destroyed. Applying their lessons to the social world can be a profitable enterprise.

4. Inertia

An object in motion with a certain vector wants to continue moving in that direction unless acted upon. This is a fundamental physical principle of motion; however, individuals, systems, and organizations display the same effect. It allows them to minimize the use of energy, but can cause them to be destroyed or eroded.

5. Friction and Viscosity

Both friction and viscosity describe the difficulty of movement. Friction is a force that opposes the movement of objects that are in contact with each other, and viscosity measures how hard it is for one fluid to slide over another. Higher viscosity leads to higher resistance. These concepts teach us a lot about how our environment can impede our movement.

6. Velocity

Velocity is not equivalent to speed; the two are sometimes confused. Velocity is speed plus vector: how fast something gets somewhere. An object that moves two steps forward and then two steps back has moved at a certain speed but shows no velocity. The addition of the vector, that critical distinction, is what we should consider in practical life.

7. Leverage

Most of the engineering marvels of the world were accomplished with applied leverage. As famously stated by Archimedes, "Give me a lever long enough and I shall move the world." With a small amount of input force, we can make a great output force through leverage. Understanding where we can apply this model to the human world can be a source of great success.

8. Activation Energy

A fire is not much more than a combination of carbon and oxygen, but the forests and coal mines of the world are not combusting at will because such a chemical reaction requires the input of a critical level of "activation energy" to get a reaction started. Two combustible elements alone are not enough.

9. Catalysts

A catalyst either kick-starts or maintains a chemical reaction but isn't itself a reactant. The reaction may slow or stop without the addition of catalysts. Social systems, of course, take on many similar traits, and we can view catalysts in a similar light.

10. Alloying

When we combine various elements, we create new substances. This is no great surprise, but what can be surprising in the alloying process is that $2+2$ can equal not 4 but 6 – the alloy can be far stronger than the simple addition of the underlying elements would lead us to believe. This process leads us to engineer great physical objects, but we understand many intangibles in the same way; a combination of the right elements in social systems or even individuals can create a $2+2=6$ effect similar to alloying.

The Mental Models of Biology

1. Evolution Part One: Natural Selection and Extinction

Evolution by natural selection was once called “the greatest idea anyone ever had.” In the 19th century, Charles Darwin and Alfred Russel Wallace simultaneously realized that species evolve through random mutation and differential survival rates. If we call human intervention in animal breeding an example of “artificial selection,” we can call Mother Nature deciding the success or failure of a particular mutation “natural selection.” Those best suited for survival tend to be preserved. But of course, conditions change.

2. Evolution Part Two: Adaptation and The Red Queen Effect

Species tend to adapt to their surroundings in order to survive, given the combination of their genetics and their environment – an always-unavoidable combination. However, adaptations made in an individual’s lifetime are not passed down genetically, as was once thought: *Populations* of species adapt through the process of evolution by natural selection, as the most-fit examples of the species replicate at an above-average rate. The evolution-by-natural-selection model leads to something of an arms race among species competing for limited resources. When one species evolves an advantageous adaptation, a competing species must respond in kind or fail as a species. Standing still can mean falling behind. This arms race is called the Red Queen Effect for the character in *Alice in Wonderland* who said, “Now, here, you see, it takes all the running you can do, to keep in the same place.”

3. Ecosystems

An ecosystem describes any group of organisms coexisting with the natural world. Most ecosystems show diverse forms of life taking on different approaches to survival, with such pressures leading to varying behavior. Social systems can be seen in the same light as the physical ecosystems and many of the same conclusions can be made.

4. Niches

Most organisms find a niche: a method of competing and behaving for survival. Usually, a species will select a niche for which it is best adapted. The danger arises when multiple species begin competing for the same niche, which can cause an extinction – there can be only so many species doing the same thing before limited resources give out.

5. Self-Preservation

Without a strong self-preservation instinct in an organism’s DNA, it would tend to disappear over time, thus eliminating that DNA. While cooperation is another important model, the self-preservation instinct is strong in all organisms and can cause violent, erratic, and/or destructive behavior for those around them.

6. Replication

A fundamental building block of diverse biological life is high-fidelity replication. The fundamental unit of replication seems to be the DNA molecule, which provides a blueprint for the offspring to be built from physical building blocks. There are a variety of replication methods, but most can be lumped into sexual and asexual.

7. Cooperation

Competition tends to describe most biological systems, but cooperation at various levels is just as important a dynamic. In fact, the cooperation of a bacterium and a simple cell probably created the first complex cell and all of the life we see around us. Without cooperation, no group survives, and the cooperation of groups gives rise to even more complex versions of organization. Cooperation and competition tend to coexist at multiple levels.

The Prisoner's Dilemma is a famous application of game theory in which two prisoners are both better off cooperating with each other, but if one of them cheats, the other is better off cheating. Thus the dilemma. This model shows up in economic life, in war, and in many other areas of practical human life. Though the prisoner's dilemma theoretically leads to a poor result, in the real world, cooperation is nearly always possible and must be explored.

8. Hierarchical Organization

Most complex biological organisms have an innate feel for how they should organize. While not all of them end up in hierarchical structures, many do, especially in the animal kingdom. Human beings like to think they are outside of this, but they feel the hierarchical instinct as strongly as any other organism. This includes the Stanford Prison Experiment and Milgram Experiments, which demonstrated what humans learned practically many years before: the human bias towards being influenced by authority. In a dominance hierarchy such as ours, we tend to look to the leader for guidance on behavior, especially in situations of stress or uncertainty. Thus, authority figures have a responsibility to act well, whether they like it or not.

9. Incentives

All creatures respond to incentives to keep themselves alive. This is the basic insight of biology. Constant incentives will tend to cause a biological entity to have constant behavior to an extent. Humans are included and are particularly great examples of the incentive-driven nature of biology; however, humans are complicated in that their incentives can be hidden or intangible. The rule of life is to repeat what works and has been rewarded.

10. Tendency to Minimize Energy Output (Mental and physical)

In a physical world governed by thermodynamics and competition for limited energy and resources, any biological organism that was wasteful with energy would be at a severe disadvantage for survival. Thus, we see in most instances that behavior is governed by a tendency to minimize energy usage when at all possible.

The Mental Models of Systems Thinking

1. Feedback Loops

All complex systems are subject to positive and negative feedback loops whereby A causes B, which in turn influences A (and C), and so on – with higher-order effects frequently resulting from the continual movement of the loop. In a homeostatic system, a change in A is often brought back into line by an opposite change in B to maintain the balance of the system, as with the temperature of the human body or the behavior of an organizational culture. Automatic feedback loops maintain a “static” environment unless and until an outside force changes the loop. A “runaway feedback loop” describes a situation in which the output of a reaction becomes its own catalyst (auto-catalysis).

2. Equilibrium

Homeostasis is the process through which systems self-regulate to maintain an equilibrium state that enables them to function in a changing environment. Most of the time, they over or undershoot it by a little and must keep adjusting. Like a pilot flying a plane, the system is off course more often than on course. Everything within a homeostatic system contributes to keeping it within a range of equilibrium, so it is important to understand the limits of the range.

3. Bottlenecks

A bottleneck describes the place at which a flow (of a tangible or intangible) is stopped, thus constraining it from continuous movement. As with a clogged artery or a blocked drain, a bottleneck in the production of any good or service can be small but have a disproportionate impact if it is in the critical path. However, bottlenecks can also be a source of inspiration as they force us to reconsider if there are alternate pathways to success.

4. Scale

One of the most important principles of systems is that they are sensitive to scale. Properties (or behaviors) tend to change when you scale them up or down. In studying complex systems, we must always be roughly quantifying – in orders of magnitude, at least – the scale at which we are observing, analyzing, or predicting the system.

5. Margin of Safety

Similarly, engineers have also developed the habit of adding a margin for error into all calculations. In an unknown world, driving a 9,500-pound bus over a bridge built to hold precisely 9,600 pounds is rarely seen as intelligent. Thus, on the whole, few modern bridges ever fail. In practical life outside of physical engineering, we can often profitably give ourselves margins as robust as the bridge system.

6. Churn

Insurance companies and subscription services are well aware of the concept of churn – every year, a certain number of customers are lost and must be replaced. Standing still is the equivalent of losing, as seen in the model called the “Red Queen Effect.” Churn is present in many business and human systems: A constant figure is periodically lost and must be replaced before any new figures are added over the top.

7. Algorithms

While hard to precisely define, an algorithm is generally an automated set of rules or a “blueprint” leading a series of steps or actions resulting in a desired outcome, and often stated in the form of a series of “If → Then” statements. Algorithms are best known for their use in modern computing, but are a feature of biological life as well. For example, human DNA contains an algorithm for building a human being.

8. Critical mass

A system becomes critical when it is about to jump discretely from one phase to another. The marginal utility of the last unit before the phase change is wildly higher than any unit before it. A frequently cited example is water turning from a liquid to a vapor when heated to a specific temperature. “Critical mass” refers to the mass needed to have the critical event occur, most commonly in a nuclear system.

9. Emergence

Higher-level behavior tends to emerge from the interaction of lower-order components. The result is frequently not linear – not a matter of simple addition – but rather non-linear, or exponential. An important resulting property of emergent behavior is that it cannot be predicted from simply studying the component parts.

10. Irreducibility

We find that in most systems there are irreducible quantitative properties, such as complexity, minimums, time, and length. Below the irreducible level, the desired result simply does not occur. One cannot get several women pregnant to reduce the amount of time needed to have one child, and one cannot reduce a successfully built automobile to a single part. These results are, to a defined point, irreducible.

11. Law of Diminishing Returns

Related to scale, most important real-world results are subject to an eventual decrease of incremental value. A good example would be a poor family: Give them enough money to thrive, and they are no longer poor. But after a certain point, additional money will not improve their lot; there is a clear diminishing return of additional dollars at some roughly quantifiable point. Often, the law of diminishing returns veers into negative territory – i.e., receiving too much money could destroy the poor family.

The Mental Models of Numeracy

1. Distributions

The normal distribution is a statistical process that leads to the well-known graphical representation of a bell curve, with a meaningful central “average” and increasingly rare standard deviations from that average when correctly sampled. (The so-called “central limit” theorem.) Well-known examples include human height and weight, but it’s just as important to note that many common processes, especially in non-tangible systems like social systems, do not follow this pattern. Normal distributions can be contrasted with power law, or exponential, distributions.

2. Compounding

It’s been said that Einstein called compounding a wonder of the world. He probably didn’t, but it is a wonder. Compounding is the process by which we add interest to a fixed sum, which then earns interest on the previous sum *and* the newly added interest, and then earns interest on that amount, and so on *ad infinitum*. It is an *exponential* effect, rather than a linear, or additive, effect. Money is not the only thing that compounds; ideas and relationships do as well. In tangible realms, compounding is always subject to physical limits and diminishing returns; intangibles can compound more freely. Compounding also leads to the time value of money, which underlies all of modern finance.

3. Sampling

When we want to get information about a population (meaning a set of alike people, things, or events), we usually need to look at a sample (meaning a part of the population). It is usually not possible or even desirable to consider the entire population, so we aim for a sample that represents the whole. As a rule of thumb, more measurements mean more accurate results, all else being equal. Small sample sizes can produce skewed results.

4. Randomness

Though the human brain has trouble comprehending it, much of the world is composed of random, non-sequential, non-ordered events. We are “fooled” by random effects when we attribute causality to things that are actually outside of our control. If we don’t course-correct for this fooled-by-randomness effect – our faulty sense of pattern-seeking – we will tend to see things as being more predictable than they are and act accordingly.

5. Regression to the Mean

In a normally distributed system, long deviations from the average will tend to return to that average with an increasing number of observations: the so-called Law of Large Numbers. We are often fooled by regression to the mean, as with a sick patient improving spontaneously around the same time they begin taking an herbal remedy, or a poorly performing sports team going on a winning streak. We must be careful not to confuse statistically likely events with causal ones.

6. Multiplying by Zero

Any reasonably educated person knows that any number multiplied by zero, no matter how large the number, is still zero. This is true in human systems as well as mathematical ones. In some systems, a failure in one area can negate great effort in all other areas. As simple multiplication would show, fixing the “zero” often has a much greater effect than does trying to enlarge the other areas.

7. Equivalence

The introduction of algebra allowed us to demonstrate mathematically and abstractly that two seemingly different things could be the same. By manipulating symbols, we can demonstrate equivalence or inequivalence, the use of which led humanity to untold engineering and technical abilities. Knowing at least the basics of algebra can allow us to understand a variety of important results.

8. Surface Area

The surface area of a three dimensional object is the amount of space on the outside of it. Thus, the more surface area you have, the more contact you have with your environment. Sometimes a high surface area is desirable: Our lungs and intestines have a huge surface area to increase the absorption of oxygen and nutrients. Other times we want to reduce our exposure, such as limiting our internet exposure to reduce the attack surface.

9. Global and Local Maxima

The maxima and minima of a mathematical function are the largest and smallest values over its domain. Although there is one maximum value, the global maximum, there can be smaller peaks of value in a given range, the local maxima. Global and local maxima help us identify peaks, and if there is still potential to go higher or lower. It also reminds us that sometimes we have to go down to go back up.

The Mental Models of Microeconomics

1. Opportunity Costs

Doing one thing means not being able to do another. We live in a world of trade-offs, and the concept of opportunity cost rules all. Most aptly summarized as “there is no such thing as a free lunch.”

2. Creative Destruction

Coined by economist Joseph Schumpeter, the term “creative destruction” describes the capitalistic process at work in a functioning free-market system. Motivated by personal incentives (including but not limited to financial profit), entrepreneurs will push to best one another in a never-ending game of creative one-upmanship, in the process destroying old ideas and replacing them with newer technology. Beware getting left behind.

3. Comparative Advantage

The Scottish economist David Ricardo had an unusual and non-intuitive insight: Two individuals, firms, or countries could benefit from trading with one another even if one of them was better at everything. Comparative advantage is best seen as an applied opportunity cost: If it has the opportunity to trade, an entity gives up free gains in productivity by not focusing on what it does best.

4. Specialization (Pin Factory)

Another Scottish economist, Adam Smith, highlighted the advantages gained in a free-market system by specialization. Rather than having a group of workers each producing an entire item from start to finish, Smith explained that it's usually far more productive to have each of them specialize in one aspect of production. He also cautioned, however, that each worker might not enjoy such a life; this is a trade-off of the specialization model.

5. Seizing the Middle

In chess, the winning strategy is usually to seize control of the middle of the board, so as to maximize the potential moves that can be made and control the movement of the maximal number of pieces. The same strategy works profitably in business, as can be demonstrated by John D. Rockefeller's control of the refinery business in the early days of the oil trade and Microsoft's control of the operating system in the early days of the software trade.

6. Trademarks, Patents, and Copyrights

These three concepts, along with other related ones, protect the creative work produced by enterprising individuals, thus creating additional incentives for creativity and promoting the creative-destruction model of capitalism. Without these protections, information and creative workers have no defense against their work being freely distributed.

7. Double-Entry Bookkeeping

One of the marvels of modern capitalism has been the bookkeeping system introduced in Genoa in the 14th century. The double-entry system requires that every entry, such as income, also be entered into another corresponding account. Correct double-entry bookkeeping acts as a check on potential accounting errors and allows for accurate records and thus, more accurate behavior by the owner of a firm.

8. Utility (Marginal, Diminishing, Increasing)

The usefulness of additional units of any good tends to vary with scale. Marginal utility allows us to understand the value of one additional unit, and in most practical areas of life, that utility diminishes at some point. On the other hand, in some cases, additional units are subject to a “critical point” where the utility function jumps discretely up or down. As an example, giving water to a thirsty man has diminishing marginal utility with each additional unit, and can eventually kill him with enough units.

9. Bribery

Often ignored in mainstream economics, the concept of bribery is central to human systems: Given the chance, it is often easier to pay a certain agent to look the other way than to follow the rules. The enforcer of the rules is then neutralized. This principal/agent problem can be seen as a form of arbitrage.

10. Arbitrage

Given two markets selling an identical good, an arbitrage exists if the good can profitably be bought in one market and sold at a profit in the other. This model is simple on its face, but can present itself in disguised forms: The only gas station in a 50-mile radius is also an arbitrage as it can buy gasoline and sell it at the desired profit (temporarily) without interference. Nearly all arbitrage situations eventually disappear as they are discovered and exploited.

11. Supply and Demand

The basic equation of biological and economic life is one of limited supply of necessary goods and competition for those goods. Just as biological entities compete for limited usable energy, so too do economic entities compete for limited customer wealth and limited demand for their products. The point at which supply and demand for a given good are equal is called an equilibrium; however, in practical life, equilibrium points tend to be dynamic and changing, never static.

12. Scarcity

Game theory describes situations of conflict, limited resources, and competition. Given a certain situation and a limited amount of resources and time, what decisions are competitors likely to make, and which should they make? One important note is that traditional game theory may describe humans as more rational than they really are. Game theory is theory, after all.

13. Mr. Market

Mr. Market was introduced by the investor Benjamin Graham in his seminal book *The Intelligent Investor* to represent the vicissitudes of the financial markets. As Graham explains, the markets are a bit like a moody neighbor, sometimes waking up happy and sometimes waking up sad – your job as an investor is to take advantage of him in his bad moods and sell to him in his good moods. This attitude is contrasted to an efficient-market hypothesis in which Mr. Market always wakes up in the middle of the bed, never feeling overly strong in either direction.

The Mental Models of Military and War

1. Seeing the Front

One of the most valuable military tactics is the habit of “personally seeing the front” before making decisions – not always relying on advisors, maps, and reports, all of which can be either faulty or biased. The Map/Territory model illustrates the problem with not seeing the front, as does the incentive model. Leaders of any organization can generally benefit from seeing the front, as not only does it provide firsthand information, but it also tends to improve the quality of secondhand information.

2. Asymmetric Warfare

The asymmetry model leads to an application in warfare whereby one side seemingly “plays by different rules” than the other side due to circumstance. Generally, this model is applied by an insurgency with limited resources. Unable to out-muscle their opponents, asymmetric fighters use other tactics, as with terrorism creating fear that’s disproportionate to their actual destructive ability.

3. Two-Front War

The Second World War was a good example of a two-front war. Once Russia and Germany became enemies, Germany was forced to split its troops and send them to separate fronts, weakening their impact on either front. In practical life, opening a two-front war can often be a useful tactic, as can solving a two-front war or avoiding one, as in the example of an organization tamping down internal discord to focus on its competitors.

4. Counterinsurgency

Though asymmetric insurgent warfare can be extremely effective, over time competitors have also developed counterinsurgency strategies. Recently and famously, General David Petraeus of the United States led the development of counterinsurgency plans that involved no additional force but substantial additional gains. Tit-for-tat warfare or competition will often lead to a feedback loop that demands insurgency and counterinsurgency.

5. Mutually Assured Destruction

Somewhat paradoxically, the stronger two opponents become, the less likely they may be to destroy one another. This process of mutually assured destruction occurs not just in warfare, as with the development of global nuclear warheads, but also in business, as with the avoidance of destructive price wars between competitors. However, in a fat-tailed world, it is also possible that mutually assured destruction scenarios simply make destruction more severe in the event of a mistake (pushing destruction into the “tails” of the distribution).

The Mental Models of Human Nature and Judgment

1. Trust

Fundamentally, the modern world operates on trust. Familial trust is generally a given (otherwise we'd have a hell of a time surviving), but we also choose to trust chefs, clerks, drivers, factory workers, executives, and many others. A trusting system is one that tends to work most efficiently; the rewards of trust are extremely high.

2. Bias from Incentives

Highly responsive to incentives, humans have perhaps the most varied and hardest to understand set of incentives in the animal kingdom. This causes us to distort our thinking when it is in our own interest to do so. A wonderful example is a salesman truly believing that his product will improve the lives of its users. It's not merely convenient that he sells the product; the fact of his selling the product causes a very real bias in his own thinking.

3. Pavlovian Association

Ivan Pavlov very effectively demonstrated that animals can respond not just to direct incentives but also to associated objects; remember the famous dogs salivating at the ring of a bell. Human beings are much the same and can feel positive and negative emotion towards intangible objects, with the emotion coming from past associations rather than direct effects.

4. Tendency to Feel Envy & Jealousy

Humans have a tendency to feel envious of those receiving more than they are, and a desire "get what is theirs" in due course. The tendency towards envy is strong enough to drive otherwise irrational behavior, but is as old as humanity itself. Any system ignorant of envy effects will tend to self-immolate over time.

5. Tendency to Distort Due to Liking/Loving or Disliking/Hating

Based on past association, stereotyping, ideology, genetic influence, or direct experience, humans have a tendency to distort their thinking in favor of people or things that they like and against people or things they dislike. This tendency leads to overrating the things we like and underrating or broadly categorizing things we dislike, often missing crucial nuances in the process.

6. Denial

Anyone who has been alive long enough realizes that, as the saying goes, "denial is not just a river in Africa." This is powerfully demonstrated in situations like war or drug abuse, where denial has powerful destructive effects but allows for behavioral inertia. Denying reality can be a coping mechanism, a survival mechanism, or a purposeful tactic.

7. Availability Heuristic

One of the most useful findings of modern psychology is what Daniel Kahneman calls the Availability Bias or Heuristic: We tend to most easily recall what is salient, important, frequent, and recent. The brain has its own energy-saving and inertial tendencies that we have little control over – the availability heuristic is likely one of them. Having a truly comprehensive memory would be debilitating. Some sub-examples of the availability heuristic include the Anchoring and Sunk Cost Tendencies.

8. Representativeness Heuristic

The three major psychological findings that fall under Representativeness, also defined by Kahneman and his partner Tversky, are:

a. Failure to Account for Base Rates

An unconscious failure to look at past odds in determining current or future behavior.

b. Tendency to Stereotype

The tendency to broadly generalize and categorize rather than look for specific nuance. Like availability, this is generally a necessary trait for energy-saving in the brain.

c. Failure to See False Conjunctions

Most famously demonstrated by the Linda Test, the same two psychologists showed that students chose more vividly described individuals as more likely to fit into a predefined category than individuals with broader, more inclusive, but less vivid descriptions, even if the vivid example was a mere subset of the more inclusive set. These specific examples are seen as more representative of the category than those with the broader but vaguer descriptions, in violation of logic and probability.

9. Social Proof (Safety in Numbers)

Human beings are one of many social species, along with bees, ants, and chimps, among many more. We have a DNA-level instinct to seek safety in numbers and will look for social guidance of our behavior. This instinct creates a cohesive sense of cooperation and culture which would not otherwise be possible but also leads us to do foolish things if our group is doing them as well.

10. Narrative Instinct

Human beings have been appropriately called “the storytelling animal” because of our instinct to construct and seek meaning in narrative. It’s likely that long before we developed the ability to write or to create objects, we were telling stories and thinking in stories. Nearly all social organizations, from religious institutions to corporations to nation-states, run on constructions of the narrative instinct.

11. Curiosity Instinct

We like to call other species curious, but we are the most curious of all, an instinct which led us out of the savanna and led us to learn a great deal about the world around us, using that information to create the world in our collective minds. The curiosity instinct leads to unique human behavior and forms of organization like the scientific enterprise. Even before there were direct incentives to innovate, humans innovated out of curiosity.

12. Language Instinct

The psychologist Steven Pinker calls our DNA-level instinct to learn grammatically constructed language the Language Instinct. The idea that grammatical language is not a simple cultural artifact was first popularized by the linguist Noam Chomsky. As we saw with the narrative instinct, we use these instincts to create shared stories, as well as to gossip, solve problems, and fight, among other things. Grammatically ordered language theoretically carries infinite varying meaning.

13. First-Conclusion Bias

As Charlie Munger famously pointed out, the mind works a bit like a sperm and egg: the first idea gets in and then the mind shuts. Like many other tendencies, this is probably an energy-saving device. Our tendency to settle on first conclusions leads us to accept many erroneous results and cease asking questions; it can be countered with some simple and useful mental routines.

14. Tendency to Overgeneralize from Small Samples

It's important for human beings to generalize; we need not see every instance to understand the general rule, and this works to our advantage. With generalizing, however, comes a subset of errors when we forget about the Law of Large Numbers and act as if it does not exist. We take a small number of instances and create a general category, even if we have no statistically sound basis for the conclusion.

15. Relative Satisfaction/Misery Tendencies

The envy tendency is probably the most obvious manifestation of the relative satisfaction tendency, but nearly all studies of human happiness show that it is related to the state of the person relative to either their past or their peers, not absolute. These relative tendencies cause us great misery or happiness in a very wide variety of objectively different situations and make us poor predictors of our own behavior and feelings.

16. Commitment & Consistency Bias

As psychologists have frequently and famously demonstrated, humans are subject to a bias towards keeping their prior commitments and staying consistent with our prior selves when possible. This trait is necessary for social cohesion: people who often change their conclusions and habits are often distrusted. Yet our bias towards staying consistent can become, as one wag put it, a "hobgoblin of foolish minds" – when it is combined with the first-conclusion bias, we end up landing on poor answers and standing pat in the face of great evidence.

17. Hindsight Bias

Once we know the outcome, it's nearly impossible to turn back the clock mentally. Our narrative instinct leads us to reason that we knew it all along (whatever "it" is), when in fact we are often simply reasoning post-hoc with information not available to us before the event. The hindsight bias explains why it's wise to keep a journal of important decisions for an unaltered record and to re-examine our beliefs when we convince ourselves that we knew it all along.

18. Sensitivity to Fairness

Justice runs deep in our veins. In another illustration of our relative sense of well-being, we are careful arbiters of what is fair. Violations of fairness can be considered grounds for reciprocal action, or at least distrust. Yet fairness itself seems to be a moving target. What is seen as fair and just in one time and place may not be in another. Consider that slavery has been seen as perfectly natural and perfectly unnatural in alternating phases of human existence.

19. Tendency to Overestimate Consistency of Behavior (Fundamental Attribution Error)

We tend to over-ascribe the behavior of others to their innate traits rather than to situational factors, leading us to overestimate how consistent that behavior will be in the future. In such a situation, predicting behavior seems not very difficult. Of course, in practice this assumption is consistently demonstrated to be wrong, and we are consequently surprised when others do not act in accordance with the “innate” traits we’ve endowed them with.

20. Influence of Stress (Including Breaking Points)

Stress causes both mental and physiological responses and tends to amplify the other biases. Almost all human mental biases become worse in the face of stress as the body goes into a fight-or-flight response, relying purely on instinct without the emergency brake of Daniel Kahneman’s “System 2” type of reasoning. Stress causes hasty decisions, immediacy, and a fallback to habit, thus giving rise to the elite soldiers’ motto: “In the thick of battle, you will not rise to the level of your expectations, but fall to the level of your training.”

21. Survivorship Bias

A major problem with historiography – our interpretation of the past – is that history is famously written by the victors. We do not see what Nassim Taleb calls the “silent grave” – the lottery ticket holders who did not win. Thus, we over-attribute success to things done by the successful agent rather than to randomness or luck, and we often learn false lessons by exclusively studying victors without seeing all of the accompanying losers who acted in the same way but were not lucky enough to succeed.

22. Tendency to Want to Do Something (Fight/Flight, Intervention, Demonstration of Value, etc.)

We might term this Boredom Syndrome: Most humans have the tendency to need to act, even when their actions are not needed. We also tend to offer solutions even when we do not have knowledge to solve the problem.

23. Falsification / Confirmation Bias

What a man wishes, he also believes. Similarly, what we believe is what we choose to see. This is commonly referred to as the confirmation bias. It is a deeply ingrained mental habit, both energy-conserving and comfortable, to look for confirmations of long-held wisdom rather than violations. Yet the scientific process – including hypothesis generation, blind testing when needed, and objective statistical rigor – is designed to root out precisely the opposite, which is why it works so well when followed.

The modern scientific enterprise operates under the principle of falsification: A method is termed scientific if it can be stated in such a way that a certain defined result would cause it to be proved false. Pseudo-knowledge and pseudo-science operate and propagate by being unfalsifiable – as with astrology, we are unable to prove them either correct or incorrect because the conditions under which they would be shown false are never stated.

6. The Murder of Kitty Genovese and The Bystander Effect

Catherine “Kitty” Genovese, a New York City woman who was stabbed to death near her home in the Kew Gardens section of Queens, New York on March 13, 1964. Genovese was buried in a family grave at Lakeview Cemetery in New Canaan, Connecticut.

The circumstances of her murder and the supposed lack of reaction of numerous neighbors were reported by a newspaper article published two weeks later; the common portrayal of neighbors being fully aware but completely nonresponsive has later been criticized as inaccurate. Nonetheless, it prompted an investigation into the social psychological phenomenon that has become known as the bystander effect (seldom: “Genovese syndrome”) and especially diffusion of responsibility.

7. Taleb: The Risk Externalities of Too Big to Fail

Too Big to Fail” is a dilemma that has plagued economists, policy makers and the public at large. In Nassim Taleb’s latest paper (with co-author Charles S. Tapiero) he takes a look. Abstract

This paper examines the risk externalities stemming from the size of institutions. Assuming (conservatively) that a firm risk exposure is limited to its capital while its external (and random) losses are unbounded we establish a condition for a firm to be too big to fail. In particular, expected risk externalities’ losses conditions for positive first and second derivatives with respect to the firm capital are derived. Examples and analytical results are obtained based on firms’ random effects on their external losses (their risk externalities) and policy implications are drawn that assess both the effects of “too big to fail firms” and their regulation.

The **conclusion** is worth reading even if you don’t read the paper — a small tease. However, the non-transparent bonuses that CEOs of large banks apply to themselves while not a factor in banks failure is a violation of the trust signaled by the incentives that banks have created to maintain the payments they distribute to themselves. For these reasons, too big too fail banks may entail too large too bear risk externalities. The result we have obtained indicate that this is a fact when banks internal risks have an extreme probability distribution (as this is often the case in VaR studies) and when external risks are an unbounded Pareto distribution.

8. Gresham's Law: Why Bad Drives Out Good As Time Passes

Whenever coins containing precious metals have been used along with base metal coins of the same denomination, both legally accepted as tender, the bad coins have driven the good coins out of circulation.

Gresham's Law is named after Sir Thomas Gresham (1519-1579), an English financier in the time of the Tudors.

However, the original principle had been stated at least forty years before by Nicolaus Copernicus and has been credited to Christian and Islamic scholars even before that. In some parts of the world (mostly Central and Eastern Europe), the law is still known as the Copernicus Law.

The idea may practically date back as far as the Athenian playwright Aristophanes. In his play The Frogs, Aristophanes compares the degradation of great politicians to the introduction of bad coinage.

*I'll tell you what I think about the way
This city treats her soundest men today:
By coincidence more sad than funny,
It's very like the way we treat our money.
The noble silver drachma, which of old
We were so proud of, and the one of gold
Coins that rang so true
Throughout the world have ceased to circulate.
Instead the purses of Athenian shoppers
Are full of phoney silver-plated coppers.
Just so, when men are needed by the nation,
The best have withdrawn from circulation.*

The coinage problem is mostly obsolete in the modern age, but the practical problems are as large as ever.

The outcome described by Aristophanes is common in competing human groups or organizations: When bad behavior has taken root, and that bad behavior has a "survival advantage" against good behavior, it becomes difficult, and occasionally impossible, to drive out the bad behavior; a process akin to natural selection.

In fact, one might call Gresham's Law something of a special case of natural selection itself.

Forms of human behavior survive because they have a competitive edge against other behaviors. Self-interested groups naturally tend towards what works, so bad drives out good (in a moral sense) if it causes superior practical effects. This is one large reason why forms of regulation and policing are needed in human systems, to prevent the Law from working its magic.

In an illustration of this tendency, Charlie Munger applied Gresham's Law to 1980s savings and loan banking practices in his 1984 Letter to Wesco Shareholders:

Although interest rates have subsided from the 1981-82 peak, the low and slowly changing interest rates of former years are plainly gone with the wind, as are the former government-decreed limits on interest rate competition for savings accounts and the favoritism for savings and loan associations over banks. But an agency of the U.S. Government (...) continues to insure savings accounts in the savings and loan industry, just as it did before. The result may well be bolder and bolder conduct by many savings and loan associations. A sort of Gresham's Law ("bad loan practice drives out good") may take effect for fully competitive but deposit-insured institutions, through increased copying by cautious institutions of whatever apparent-high-yield loan and investment strategies seem to allow competitors to bid away their savings accounts and yet report substantial

earnings. If so, if "bold conduct drives out conservative conduct," there eventually could be widespread insolvencies caused by bold credit extensions come to grief.

This can be common in some business fields. Take two drug salespeople – one willing to bribe doctors to make sales, and one not willing to do so. If the industry functions such that fraudulent business practices are *not punished*, and the bribery goes uncovered by the buyer's organization, then bribery obviously gains a sustainable competitive advantage over non-bribery. Clearly, the deceptive practice will take hold, as salespeople unburdened by morals are promoted and compensated better than the high-rollers. It's a clear form of Gresham's Law.

Take also sub-prime mortgage lending practices in the lead up to the 2008 financial crisis. If two banks are competing for borrowers and one lets their standards slide to zero (or less), which is likely to prevail? Even if the practice is a "long-term loser," it can still take hold in systems where short-term incentives provide encouragement to the actual decision-makers.

Canadian Prime Minister Mackenzie King once described the origins of Gresham's Law and its effects in a similar fashion, dubbing it the Law of Competing Standards.

In the reign of Queen Elizabeth, an official named Gresham observed that where different metals were in circulation as coinage and some were better than others of the same nominal value, the coins made of the inferior metal tended to drive the better out of circulation. The better coins were either hoarded or melted down and sold as bullion, were used in the fine arts, or were absorbed in the foreign exchanges. In other words, what Gresham discovered was that cheaper money tends to drive out dearer; that when people begin to discriminate between two coinages, they will invariably pay out the inferior and hoard the better, thus removing the better from circulation. This phenomenon once generally observed came to be described as a "Law," and was identified with Gresham's name, since it was Gresham who was first successful in drawing public attention to it. Amongst money-changers, Gresham's Law of the precious metals is better known than the Ten Commandments.

Something analogous to Gresham's Law will be found to obtain in the case of competing standards in Industry. Assuming there is indifference in the matter of choice between competing commodities or services, but that in the case of such commodities or services the labor standards involved vary, the inferior standard, if brought in this manner into competition with a higher standard, will drive it out, or drag the higher down to its level. This is effected by the opportunity of under-selling which comes, where in such cases human well-being is sacrificed to material ends. The superior standard, not being recognized or demanded, is unable to hold its own, and in time disappears. This Law is just as real and relentless in its operation in Industry as Gresham's Law of the precious metals is with respect to money and the mechanism of exchange. Indeed, a more accurate exposition would describe both as manifestations of one and the same law, which I propose to call the Law of Competing Standards. I see no reason why economists should not recognize the existence of such a law, and incorporate it immediately in economic science as being quite as significant as the Law of Supply and Demand, the Law of Diminishing Returns, or any other Law accorded a place in its nomenclature.

The Law of Competing Standards is doubtless a part of the general Law of Competition, under which the cheaper of two commodities gains in competition a preference over the dearer. What Gresham discovered was an important sequence of the Law of Competition as applied to coinage; namely, the disappearance, in the course of time, of the superior metals. Observance of a like sequence in the case of standards in Industry is highly desirable. As respects labor standards, I believe that recognition of the operation of the Law of Competing Standards over ever-widening areas would do more than aught else to clear up the most baffling problems with which Industry is confronted, and to point the way to a solution of many situations which hitherto have seemed incapable of solution.

Perhaps the most important application of Gresham's Law is to avoid becoming part of systems where good behavior cannot win. Certain industries and activities lack the "policing" necessary to keep systems free from bad behavior. While it's admirable to be the "cleanest shirt" in a pile of dirty laundry, certain areas of human life do not allow the clean shirts to win.

On the flip side, you'll occasionally find situations where the good money drives out bad, and the cleanest shirts end up being worn the *most*. Those are the areas to aim your focus.

9. Lessons of the Past

The tendency to relate contemporary events to earlier events as a guide to understanding is a powerful one. The difficulty, of course, is in being certain that two situations are truly comparable. Because they are similar in some respects does not assure us that they are similar in all respects.

When we try to understand contemporary events, we often relate them to ones from the past. We do this within the context of our own lives and within the context of human history as a whole. We try to learn from our own mistakes and those of our ancestors.

The issue is that it can be hard to be sure if what is happening now and what happened before are truly comparable. They may be similar in some respects, but we cannot know if they are similar in every meaningful way.

The way we set policy is often flawed. The underrated historian Ernest May argues that we attempt to avoid the mistakes of previous generations by pursuing policies that would have made sense in the past but do not today. May wrote that lawmakers make analogies with history. However, they tend to seize upon the first which comes to mind, without considering differences. They reject disconfirming evidence. In his book, Lessons From the Past, he traces the impact of historical analogy on US foreign policy.

He found that because of reasoning by analogy, US policymakers tend to be one generation behind, determined to avoid the mistakes of the previous generation. They pursue the policies that would have been most appropriate in the historical situation but are not necessarily well adapted to the current one.

Policymakers in the 1930s, for instance, viewed the international situation as analogous to that before World War I. Consequently, they followed a policy of isolation that would have been appropriate for preventing American involvement in the first World War but failed to prevent the second. Communist aggression after World War II was seen as analogous to Nazi aggression, leading to a policy of containment that could have prevented World War II.

The Vietnam analogy had been used repeatedly over many years to argue against an activist US foreign policy. For example, some used the Vietnam analogy to argue against US participation in the Gulf War—a flawed analogy because the operating terrain over which battles were fought was completely different in Kuwait/Iraq and much more in our favor there as compared with Vietnam.

May argues that policymakers often perceive problems in terms of analogies with the past, but that they ordinarily use history badly: When resorting to an analogy, they tend to seize upon the first that comes to mind. They do not research more widely. Nor do they pause to analyze the case, test its fitness, or even ask in what ways it might be misleading.

10. Can one person successfully play different roles that require different, and often competing, perspectives?

No, according to research by Max Bazerman, author of the best book on decision making I've ever read: *Judgment in Managerial Decision Making*.

Contrary to F. Scott Fitzgerald's famous quote, "the test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function," evidence suggests that even the most intelligent find it difficult to sustain opposing beliefs without the two influencing each other.

Why?

One reason is a bias from incentives. Another is bounded awareness. The auditor who desperately wants to retain a client's business may have trouble adopting the perspective of a dispassionate referee when it comes time to prepare a formal evaluation of the client's accounting practices.

* * * * *

In many situations, professionals are called upon to play dual roles that require different perspectives. For example, attorneys embroiled in pretrial negotiations may exaggerate their chances of winning in court to extract concessions from the other side. But when it comes time to advise the client on whether to accept a settlement offer, the client needs objective advice.

Professors, likewise, have to evaluate the performance of graduate students and provide them with both encouragement and criticism. But public criticism is less helpful when faculty serve as their students' advocates in the job market. And, although auditors have a legal responsibility to judge the accuracy of their clients' financial accounting, the way to win a client's business is not by stressing one's legal obligation to independence, but by emphasizing the helpfulness and accommodation one can provide.

Are these dual roles psychologically feasible?; that is, can one person successfully play different roles that require different, and often competing, perspectives? No.

Abstract

This paper explores the psychology of conflict of interest by investigating how conflicting interests affect both public statements and private judgments. The results suggest that judgments are easily influenced by affiliation with interested partisans, and that this influence extends to judgments made with clear incentives for objectivity. The consistency we observe between public and private judgments indicates that participants believed their biased assessments. Our results suggest that the psychology of conflict of interest is at odds with the way economists and policy makers routinely think about the problem. We conclude by exploring implications of this finding for professional conduct and public policy.

11. Youngme Moon: On Business Competition and Escaping the Competitive Herd

There are many ways companies compete with one another. Unfortunately, a lot of those ways seem like nothing more than an expensive route to commoditization.

Companies are relentless in their pursuit of finding their weaknesses. They hire consultants, create branding maps, and solicit customer feedback. In our hyper-competitive world, this feedback tells us what we're missing—our weaknesses.

Companies, like people, fall into the habit of thinking the way to be better is to become more like everyone else.

- Jane's company just introduced a new line of green worms? We need green worms too preferably caffeine enhanced green worms.
- Bob decided to offer a new service? We need a new service too!
- When you ask your customers what they want they respond with what you're missing.
- When consultants compare your products to others they tell you what the competition offers that you don't.

"A funny thing happens when you begin to capture competitive differences on paper", says Harvard Professor Youngme Moon in her book Different: Escaping the Competitive Herd, "there is a natural inclination for folks in the competitive set to focus on eliminating differences rather than accentuating them."

Eliminating Differences

Our brains have been wired since birth to eliminate our differences.

We've all received school report cards. If you're like most people, at some point or another, you discovered you were below the class average in something. We all knew our parents would pick up on that weakness right away.

I cringed before coming home if I was even a hair below average in anything. After a mother saw that report card, it didn't matter how awesome you were in physics and math. The only thing that mattered was the fact that you were below average in art.

If your mother was like my mother, you wouldn't hear the end of it until you were once again average in art.

As adults, the only thing that has changed is who gives the report card.

Managers across the country hand out performance reviews that highlight your strengths and weaknesses. Of course, your boss wants you to address those weaknesses. He wants you to be more like everyone else. And since keeping your job is a pretty big incentive, you eagerly put your head down and do what you've done your whole life: rather than accentuate the differences you address your weaknesses and, in the process, become more average and indistinguishable from everyone else.

In the process, you move increasingly towards becoming a commodity.

Competition

It's like we're back in school all over; competitors and customers are telling us what we don't have—where we're below average. Only now this isn't grade school. The stakes are higher. It's winner take all and our competitive spirits take over. Except, increasingly, there is no winner.

Consumers can't tell company Y from Company X. Shelves in grocery stores are full of products that are all essentially the same. Companies think that the way to improve their laundry detergent is simply to add a new, previously unknown, fragrance. Being more of the same is, according to Moon, making brand loyalty harder to find.

Of course, if consumers pay close attention, these products have minute differences. But most of these differences are essentially meaningless.

Competing by eliminating our differences seems like nothing more than an expensive route to commoditization.

- When one airline introduced frequent flier miles the rest soon followed and the industry offerings were, once again, almost indistinguishable.
- When the Westin started offering the Heavenly Bed as a way to differentiate itself from the competition, almost immediately most other hotels at the same price point upgraded their mattresses too. The only problem was that room rates didn't increase to make up for the new investment. When everyone can offer essentially the same bed it becomes hard to differentiate yourself and raise prices in the process.

Ultimately, all of the advantages flow to the customers (and the mattress companies). According to Moon, "The more generous the baseline value proposition becomes within the category, the easier it becomes for consumers to become indifferent and the more expensive it becomes for businesses to compete." Investing in differentiation without the ability to increase prices or market share only reduces returns.

In the race to become more like everyone else, companies often don't think through the whole problem.

They "don't do the second step of the analysis which is to determine how much is going stay home and how much is just going to flow through to the customer," says longtime investor Charlie Munger.

I've never seen a single projection incorporating that second step in my life. And I see them all the time. Rather, they always read: This capital outlay will save you so much money that it will pay for itself in three years. So you keep buying things that will pay for themselves in three years. And after 20 years of doing it, somehow you've earned a return of only about 4% per annum.

If this sounds vaguely familiar it should. It's a variation of the prisoners' dilemma; the best choice for all companies is not the best choice for each individual company.

I'm not saying that all competition based on product augmentation (either through new sub-categories or new features) is a flawed strategy. Under the right circumstances, some of these investments can, and will, pan out. I am saying that if your business is pursuing one of these strategies as a means of differentiating yourself from competition, you need to critically think through this strategy.

12. The Colonel Blotto Game: How Underdogs Can Win

If you've ever wondered why underdogs win or how to improve your odds of winning when you're the underdog, this article on The Colonel Blotto Game is for you.

There is a rich tradition of celebrating wins by the weak—while forgetting those who lost—including the biblical Story of David vs. Goliath. It is notable, that “David shunned a traditional battle using a helmet and sword and chose instead to fight unconventionally with stones and a slingshot,” says Michael Mauboussin.

Luckily, David was around before Keynes said: “It is *better to fail conventionally* than to succeed unconventionally.” Turns out, if you're an underdog, David was onto something.

Despite the fact it is not as well known as the Prisoners' Dilemma, the Colonel Blotto Game can teach us a lot about strategic behavior and competition.

Underdogs can change the odds of winning simply by changing the basis of competition.

So what exactly is the Colonel Blotto Game and what can we learn from it?

In the Colonel Blotto game, two players concurrently allocate resources across n battlefields. The player with the greatest resources in each battlefield wins that battle and the player with the most overall wins is the victor.

An extremely simple version of this game would consist of two players, A and B, allocating 100 soldiers to three battlefields. Each player's goal is to create favorable mismatches versus his or her opponent.

According to Mauboussin, “The Colonel Blotto game is useful because by varying the game's two main parameters, giving one player more resources or changing the number of battlefields, you can gain insight into the likely winners of competitive encounters.”

To illustrate this point, Malcolm Gladwell tells the story of Vivek Ranadivé:

When Vivek Ranadivé decided to coach his daughter Anjali's basketball team, he settled on two principles. The first was that he would never raise his voice. This was National Junior Basketball—the Little League of basketball. The team was made up mostly of twelve-year-olds, and twelve-year-olds, he knew from experience, did not respond well to shouting. He would conduct business on the basketball court, he decided, the same way he conducted business at his software firm. He would speak calmly and softly, and convince the girls of the wisdom of his approach with appeals to reason and common sense.

The second principle was more important. Ranadivé was puzzled by the way Americans played basketball. He is from Mumbai. He grew up with cricket and soccer. He would never forget the first time he saw a basketball game. He thought it was mindless. Team A would score and then immediately retreat to its own end of the court. Team B would inbound the ball and dribble it into Team A's end, where Team A was patiently waiting. Then the process would reverse itself. A basketball court was ninety-four feet long. But most of the time a team defended only about twenty-four feet of that, conceding the other seventy feet.

Occasionally, teams would play a full-court press—that is, they would contest their opponent's attempt to advance the ball up the court. But they would do it for only a few minutes at a time. It was as if there were a kind of conspiracy in the basketball world about the way the game ought to be played, and Ranadivé thought that that conspiracy had the effect of widening the gap between good teams and weak teams. Good teams, after all, had players who were tall and could dribble and shoot well; they could crisply execute their carefully prepared plays in their opponent's end. Why, then, did weak teams play in a way that made it easy for good teams to do the very things that made them so good?

Basically, the more dimensions the game has the less certain the outcome becomes and the more likely underdogs are to win.

In other words, adding battlefields increases the number of interactions (dimensions) and improves the chances of an upset. When the basketball team cited by Malcolm Gladwell above started a full court press, it increased the number of dimensions and, in the process, substituted effort for skill.

The political scientist Ivan Arreguín-Toft recently looked at every war fought in the past two hundred years between strong and weak combatants in his book How the Weak Win Wars. The Goliaths, he found, won in 71.5 percent of the cases. That is a remarkable fact. Arreguín-Toft was analyzing conflicts in which one side was at least ten times as powerful—in terms of armed might and population—as its opponent, and even in those lopsided contests, the underdog won almost a third of the time.

In the Biblical story of David and Goliath, David initially put on a coat of mail and a brass helmet and girded himself with a sword: he prepared to wage a conventional battle of swords against Goliath. But then he stopped. “I cannot walk in these, for I am unused to it,” he said (in Robert Alter’s translation), and picked up those five smooth stones.

Arreguín-Toft wondered, what happened when the underdogs likewise acknowledged their weakness and chose an unconventional strategy? He went back and re-analyzed his data. In those cases, David’s winning percentage went from 28.5 to 63.6. When underdogs choose not to play by Goliath’s rules, they win, Arreguín-Toft concluded, “even when everything we think we know about power says they shouldn’t.”

Arreguín-Toft discovered another interesting point: *over the past two centuries the weaker players have been winning at a higher and higher rate*. For instance, strong actors prevailed in 88 percent of the conflicts from 1800 to 1849, but the rate dropped very close to 50% from 1950 to 1999.

After reviewing and dismissing a number of possible explanations for these findings, Arreguín-Toft suggests that an analysis of strategic interaction best explains the results. Specifically, when the strong and weak actors go toe-to-toe (effectively, a low n), the weak actor loses roughly 80 percent of the time because “there is nothing to mediate or deflect a strong player’s power advantage.”

In contrast, when the weak actors choose to compete on a different strategic basis (effectively increasing the size of n), they lose less than 40 percent of the time “because the weak refuse to engage where the strong actor has a power advantage.” Weak actors have been winning more conflicts over the years because they see and imitate the successful strategies of other actors and have come to the realization that refusing to fight on the strong actor’s terms improves their chances of victory. This might explain what’s happening in the Gulf War.

In the Gulf War, the number of battlefields (dimensions) is high. Even though substantially outnumbered, the Taliban, have increased the odds of “winning,” by changing the base of competition, as they did previously against the superpower Russians. It also explains why the strategy employed by Ranadivé’s basketball team, while not guaranteed to win, certainly increased the odds.

Mauboussin provides another great example:

A more concrete example comes from Division I college football. Texas Tech has adopted a strategy that has allowed it to win over 70 percent of its games in recent years despite playing a highly competitive schedule. The team’s success is particularly remarkable since few of the players were highly recruited or considered “first-rate material” by the professional scouts. Based on personnel alone, the team was weaker than many of its opponents.

Knowing that employing a traditional game plan would put his weaker team at a marked disadvantage, the coach offset the talent gap by introducing more complexity into the team’s offense via a large number of formations. These formations change the geometry of the game, forcing opponents to change their defensive strategies. It also creates new matchups (i.e., increasing n , the number of battlefields) that the stronger teams have

difficulty winning. For example, defensive linemen have to drop back to cover receivers. The team's coach explained that "defensive linemen really aren't much good at covering receivers. They aren't built to run around that much. And when they do, you have a bunch of people on the other team doing things they don't have much experience doing." This approach is considered unusual in the generally conservative game of college football. While it's easy to recall all the examples of underdogs who found winning strategies by increasing the number of competition dimensions, it's not easy to recall all of those who, employing similar dimension enhancing strategies, have failed. Another interesting point is why teams who are likely to lose use conventional strategies, which only increase the odds of failure?

According to Mauboussin:

What the analysis also reveals, however, is that nearly 80 percent of the losers in asymmetric conflicts never switch strategies. Part of the reason players don't switch is that there is a cost: when personnel training and equipment are geared toward one strategy, it's often costly to shift to another. New strategies are also stymied by leaders or organizational traditions. This type of inertia appears to be a consequential impediment to organizations embracing the strategic actions implied by the Colonel Blotto game.

Teams have an incentive to maintain a conventional strategy, even when it increases their odds of losing. Malcolm Gladwell explores:

The consistent failure of underdogs in professional sports to even try something new suggests, to me, that there is something fundamentally wrong with the incentive structure of the leagues. I think, for example, that the idea of ranking draft picks in reverse order of finish — as much as it sounds "fair" — does untold damage to the game. You simply cannot have a system that rewards anyone, ever, for losing. Economists worry about this all the time, when they talk about "moral hazard." Moral hazard is the idea that if you insure someone against risk, you will make risky behavior more likely. So if you always bail out the banks when they take absurd risks and do stupid things, they are going to keep on taking absurd risks and doing stupid things. Bailouts create moral hazard. Moral hazard is also why your health insurance has a co-pay. If your insurer paid for everything, the theory goes, it would encourage you to go to the doctor when you really don't need to. No economist in his right mind would ever endorse the football and basketball drafts the way they are structured now. They are a moral hazard in spades. If you give me a lottery pick for being an atrocious GM, where's my incentive not to be an atrocious GM?

Key takeaways:

- Underdogs improve their chances of winning by changing the basis for competition and, if possible, creating more dimensions.
- We often fail to switch strategies because of a combination of biases, including social proof, status quo, commitment and consistency, and confirmation.

13. Giffen Goods: Raising prices and increasing consumption

Other things being equal when the price of a good rises, the quantity demanded should fall. Economics refer to this as the law of demand. Because there are many counter-examples to this law it's more of a quick rule of thumb.

Giffen goods are ones which people consume more of as the price rises, thus violating the law of demand. The name comes from Sir Robert Giffen, who first proposed this paradox from his observations of the purchasing habits of the Victorian era poor.

Alfred Marshall, explains it like this:

a rise in the price of bread makes so large a drain on the resources of the poorer labouring families and raises so much the marginal utility of money to them, that they are forced to curtail their consumption of meat and the more expensive farinaceous foods: and, bread being still the cheapest food which they can get and will take, they consume more, and not less of it.

But this exceptions to the "law of demand" can be more broader than food or even inferior goods. Often a price can act as a quality indicator. More mischevious people could raise prices and use part of the profits to bribe the purchasing agent (like Visa). Amazon does this. Brian Zen does this. Mutual Funds do this. Bribing the purchasing agent is actually fairly common once you open your mind to it.

In his speech "Academic Economics Strengths and Faults after Considering Interdisciplinary needs," Charlie Munger explained:

One of the most extreme examples is in the investment management field. Suppose you're the manager of a mutual fund, and you want to sell more. People commonly come to the following answer: You raise the commissions, which of course reduces the number of units of real investments delivered to the ultimate buyer, so you're increasing the price per unit of real investment that you're selling the ultimate customer. And you're using that extra commission to bribe the customer's purchasing agent. You're bribing the broker to betray his client and put the client's money into the high-commission product. This has worked to produce at least a trillion dollars of mutual fund sales.

* * *

A real world example of what Munger was talking about:

Sanjay Bakshi offers a great real-world example of how Brian Zen, from Zenway bribes the purchasing agent.

(Brian) wants me to recommend to you, as my student, his online investment course which has helped "people with limited means to become millionaires and multi-millionaires."

Dr. Zen will charge you \$800 to sign up. He promises to pay me \$400, if you do.

You will, I hope, recall the connection between Dr. Zen's offer and Mr. Charlie Munger's example of "bribing the purchasing agent"...How, then, does one go about selling a high-priced product derived out of something so cheap? That's simple. One uses, the reward super-response tendency and the associated incentive-caused bias (whose bread I eat, his song I sing) which it produces— Mr. Munger's terms – by pricing the product high and offering a very significant part of the sales proceeds to people like me having access to "captive audience" like you.

There is nothing illegal about Dr. Zen designing his business model in this manner. After all, seeking profits is the essence of capitalism, isn't it? But I doubt it very much – if the fathers of value investing – Mr. Graham and Mr. Buffett – would approve of the marketing strategies used by Dr. Zen, for promoting products created out of their knowledge, which they generously shared with the world, without any profit motive involved.

When Wal-Mart pushes its suppliers to lower their prices, and then passes on these low prices to its customers, and yet is able to earn a respectable return on capital, it's an example of a positive-sum game which benefits civilization as a whole. Wal-Mart does not make money off its customers – it makes money with them. But when someone pushes a

high-priced product using as ammunition, mouth-watering commissions offered to people who are in a position to influence others, it largely becomes, at least in my view, a zero-sum game. You're not making money with your clients anymore- you're making money off them. And, this aspect of capitalism is not very good for civilization.

14. Predicting the Improbable

One natural human bias is that we tend to draw strong conclusions based on few observations. This bias, misconceptions of chance, shows itself in many ways including the gambler and hot hand fallacies. Such biases may induce public opinion and the media to call for dramatic swings in policies or regulation in response to highly improbable events. These biases are made even worse by our natural tendency to “do something.”

An event like an earthquake happens, making it more available in our mind.

We think the event is more probable than evidence would support so we run out and buy earthquake insurance. Over many years as the earthquake fades from our mind (making it less available) we believe, paradoxically, that the risk is lower (based on recent evidence) so we cancel our policy. ...

Some events are hard to predict. This becomes even more complicated when you consider not only predicting the event but the timing of the event as well. This article below points out that experts, like the rest of us, base their predictions on inference from observing the past and are just as prone to biases as the rest of us.

Why do people over infer from recent events?

There are two plausible but apparently contradicting intuitions about how people over-infer from observing recent events.

The gambler's fallacy claims that people expect rapid reversion to the mean.

For example, upon observing three outcomes of red in roulette, gamblers tend to think that black is now due and tend to bet more on black (Croson and Sundali 2005).

The hot hand fallacy claims that upon observing an unusual streak of events, people tend to predict that the streak will continue. (See Misconceptions of Chance)

The hot hand fallacy term originates from basketball where players who scored several times in a row are believed to have a “hot hand”, i.e. are more likely to score at their next attempt.

Recent behavioural theory has proposed a foundation to reconcile the apparent contradiction between the two types of over-inference. The intuition behind the theory can be explained with reference to the example of roulette play.

A person believing in the law of small numbers thinks that small samples should look like the parent distribution, i.e. that the sample should be representative of the parent distribution. Thus, the person believes that out of, say 6, spins 3 should be red and 3 should be black (ignoring green). If observed outcomes in the small sample differ from the 50:50 ratio, immediate reversal is expected. Thus, somebody observing 2 times red in 6 consecutive spins believes that black is “due” on the 3rd spin to restore the 50:50 ratio.

Now suppose such person is uncertain about the fairness of the roulette wheel. Upon observing an improbable event (6 times red in 6 spins, say), the person starts to doubt about the fairness of the roulette wheel because a long streak does not correspond to what he believes a random sequence should look like. The person then revises his model of the data generating process and starts to believe the event on streak is more likely. The upshot of the theory is that the same person may at first (when the streak is short) believe in reversion of the trend (the gambler's fallacy) and later – when the streak is long – in continuation of the trend (the hot hand fallacy).

15. Suppressing Volatility: Making the World Less Predictable and More Dangerous

Nassim Taleb's article, The Black Swan of Cario, ([PDF](#)) on suppressing volatility is worth a read.

It's the ultimate example of iatrogenics by the fragilista.

Here are my notes.

- Complex systems that have artificially suppressed volatility tend to become extremely fragile, while at the same time exhibiting not visible risks.
- Seeking to restrict variability seems to be good policy (who does not prefer stability to chaos?), so it is with very good intentions that policymakers unwittingly increase the risk of major blowups.
- Because policymakers believed it was better to do something than to do nothing, they felt obligated to heal the economy rather than wait and see if it healed on its own.
- Those who seek to prevent volatility on the grounds that any and all bumps in the road must be avoided paradoxically increase the probability that a tail risk will cause a major explosion. Consider as a thought experiment a man placed in artificially sterilized environment for a decade and then invited to take a ride on a crowded subway; he would be expected to die quickly.
- But although these controls might work in some rare situations, in the long-term effect of any such system is an eventual and extremely costly blowup whose cleanup costs can far exceed the benefits accrued.
- ... Government interventions are laden with unintended—and unforeseen—consequences, particularly in complex systems, so humans must work with nature by tolerating systems that absorb human imperfections rather than seek to change them.
- Although it is morally satisfying, the film (inside job) naively overlooks the fact that humans have always been dishonest and regulators have always been behind the curve.
- Humans must try to resist the illusion of control: just as foreign policy should be intelligence-proof (it should minimize its reliance on the competence of information-gathering organizations and the predictions of “experts” in what are inherently unpredictable domains), the economy should be regulator-proof, given that some regulations simply make the system itself more fragile.
- The “turkey problem” occurs when a naive analysis of stability is derived from the absence of past variations.
- Imagine someone who keep adding sand to a sand pile without any visible consequence, until suddenly the entire pile crumbles. It would be foolish to blame the collapse on the last grain of sand rather than the structure of the pile, but that is what people do consistently, and that is the policy error.
- As with a crumbling sand pile, it would be foolish to attribute the collapse of a fragile bridge to the last truck that crossed it, and even more foolish to try to predict in advance which truck might bring it down.
- Obama's mistake illustrates the illusion of local causal chains—that is, confusing catalysts for causes and assuming that one can know which catalyst will produce which effect.
- Governments are wasting billions of dollars on attempting to predict events that are produced by interdependent systems and are therefore not statistically understandable at the individual level.

- Most explanations being offered for the current turmoil in the Middle East follow the “catalysts as causes” confusion. The riots in Tunisia and Egypt were initially attributed to rising commodity prices, not to stifling and unpopular dictatorships.
- Again, the focus is wrong even if the logic is comforting. It is the system and its fragility, not events, that must be studied—what physicists call “percolation theory,” in which the properties of the terrain are studied rather than those of a single element of the terrain.
- Humans fear randomness—a healthy ancestral trait inherited from a different environment. Whereas in the past, which was a more linear world, this trait enhanced, fitness and increased changes of survival, it can have the reverse effect in today’s complex world, making volatility take the shape of nasty Black Swans hiding behind deceptive periods of “great moderation.”
- But alongside the “catalysts as causes” confusion sit two mental biases: the illusion of control and the action bias (the illusion that doing something is always better than doing nothing.) This leads to the desire to impose man-made solutions. Greenspan’s actions were harmful, but it would have been hard to justify inaction in a democracy where the incentive is to always promise a better outcome than the other guy, regardless of the actual delayed cost.
- As Seneca wrote in De clementia, “repeated punishment, while it crushes the hatred of a few, stirs the hatred of all ... just as trees that have been trimmed throw out again countless branches.”
- The Romans were wise enough to know that only a free man under Roman law could be trusted to engage in a contract; by extension, only a free people can be trusted to abide by a treaty.
- As Jean-Jacques Rousseau put it, “A little bit of agitation gives motivation to the soul, and what really makes the species prosper is not peace so much as freedom.” With freedom comes some unpredictable fluctuation. This is one of life’s packages: there is no freedom without noise—and no stability without volatility.

16. Reductionism: Understanding the Parts, Misunderstanding the Whole

In 1637 René Descartes changed the course of science forever with the publication of Discourse on the Method of Rightly Conducting One's Reason and of Seeking Truth in the Sciences. That work lays the foundation to modern science by putting forth two enduring ideas about reductionism:

1. As a way of knowing ("divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution") and;
2. To "conduct my thoughts in such order that, beginning with those objects that are simplest and most readily understood, I might ascend little by little, and, as it were, step by step, to the knowledge of the more complex."

In the article below, Robert Dorit argues the days of blind faith in the power of reductionist deconstruction are over and a new approach is taking shape. This new, interactionist perspective on living systems, emphasis on the interplay between parts (along with advances in technology to allow for modeling).

Dorit offers, "Whole new subfields in the life sciences, as well as productive interactions among existing disciplines, have emerged. Systems biologists, complexity theorists and newly minted biologists now attend as carefully to the ways in which parts come together as they do to the parts themselves." He goes on to say we are beginning to understand that modularity and redundancy are inherent features of all levels of biological organization (something Nassim Taleb has long argued). These features, he argues, are both simultaneously resilient and capable of evolving.

The "Humpty-Dumpty Problem" is one whereby we trick ourselves into believing that we understand a whole through the dissection, disassembly, and deconstruction of its parts. In doing this, we remove each individual piece from context and ignore the relationships it has with other pieces to which it is intricately connected. This is not to say that we have absolutely no understanding of a complete entity. However, to claim *full* understanding of something by breaking it into fragments and trying to put it back together again would be fallacious.

The core of Dorit's argument is not with reductionism itself but rather with the notion that *it represents the only viable strategy for understanding the living world.*

If anything, living systems consistently violate all of the criteria for reducibility. The number of elements that compose any living system—an ecosystem, an organism, an organ or a cell—is enormous. In living systems, the specific identities of these component parts matter. Unlike chemistry, for instance, in which an electron in a lithium atom is identical to an electron in a gold atom, all proteins in a cell are not equivalent or interchangeable. Each protein is the result of its own evolutionary trajectory. We understand and exploit their similarities, but their differences matter to us just as much. Perhaps most importantly, the relations between the components of living systems are complex, context-dependent and weak. In mechanical machines, the conversation taking place between the parts involves clear and unambiguous interactions. These interactions result in simple causes and effects: They are instructions barked down a simple chain of command.

Think of an escalator. Its mechanical parts and the mechanisms that are composed of those parts work together toward a collective goal. That is, to ensure that the escalator is in a constant state of upward or downward movement to transport people from point A to point B. Unlike living organisms in all their glorious complexity, there's no room for deviation or multiple outcomes in an escalator (not counting defects and malfunctions).

Dorit goes on to contrast machines with living, breathing things:

In living systems, by contrast, virtually every interesting bit of biological machinery is embedded in a very large web of weak interactions. And this network of interactions gives rise to a discussion among the parts that is less like a chain of command and more like a

complex court intrigue: ambiguous whispers against a noisy and distracting background. As a result, the same interaction between a regulatory protein and a segment of DNA can lead to different (and sometimes opposite) outcomes depending on which other proteins are present in the vicinity. The firing of a neuron can act to amplify the signal coming from other neurons or act instead to suppress it, based solely on the network in which the neuron is embedded. The disappearance of a single species can stabilize an ecosystem or send it spinning into chaos, depending on (you guessed it) the network of interactions that surrounds that species. This extensive and subtle connectivity, which gives meaning to the behavior of the underlying components, turns out to be a consistent feature of living systems.

...

The promise of reductionism rested on the belief that an intelligent dissection of complex phenomena would not only yield progress, but would eventually reduce any problem to its component parts. Complexity, we naively hoped, was simply a by-product of incomplete understanding, an illusion that would fall away once the parts were fully understood. But this is the dirty little secret of contemporary biology: Despite our reductionist successes, the central conceptual problems of biology have not yielded to study.

He clarifies this idea by providing examples where, despite the fact that the human race is in a perpetual state of exploring the uncharted and demystifying unknowns, our understanding of overarching themes that hold individual parts together falls short:

We have revealed the elegant workings of neurons in exquisite detail, but the material understanding of consciousness remains elusive. We have sequenced human genomes in their entirety, but the process that leads from a genome to an organism is still poorly understood. We have captured the intricacies of photosynthesis, and yet the consequences of rising carbon-dioxide levels for the future of the rainforests remain frustratingly hazy. We are, in short, the king's horses and the king's men: We stare at the pieces, knowing what Humpty should look like, but unable to put him together again.

17. An Introduction to the Mental Model of Redundancy (with examples)

"The reliability that matters is not the simple reliability of one component of a system, but the final reliability of the total control system."

— Garrett Hardin

We learn from Engineering that critical systems often require back up systems to guarantee a certain level of performance and minimize downtime. These systems are resilient to adverse conditions and if one fails there is spare capacity or a backup system. A simple example where you want to factor in a large margin of safety is a bridge. David Dodd, a longtime colleague of Benjamin Graham, observed *"You build a bridge that 30,000-pound trucks can go across and then you drive 10,000-pound trucks across it. That is the way I like to go across bridges."*

Looking at failure, we can see many insights into redundancy.

There are many cases of failures where the presence of redundant systems would have averted catastrophe. On the other hand, there are cases of failure where the presence of redundancy caused failure.

How can redundancy cause failure?

First, in certain cases, the added benefits of redundancy are outweighed by the risks of added complexity. Since adding redundancy increases the complexity of a system, efforts to increase reliability and safety through redundant systems may backfire and inadvertently make systems more susceptible to failure. An example of how adding complexity to a system can increase the odds of failure can be found in the near-meltdown of the Femi reactor in 1996. This incident was caused by an emergency safety device which broke off and blocked a pipe stopping the flow of coolants into the reactor core. Luckily this was before the plant was active.

Second, redundancy with people can lead to social diffusion where people always assume it was someone else who had the responsibility.

Third, redundancy can lead to increasingly risky behavior.

* * *

In Reliability Engineering for Electronic Design, Norman Fuqua gives a great introduction to the concept of redundancy.

Websters defines redundancy as needless repetition. In reliability engineering, however, redundancy is defined as the existence of more than one means for accomplishing a given task. Thus all of these means must fail before there is a system failure.

Under certain circumstance during system design, it may become necessary to consider the use of redundancy to reduce the probability of system failure—to enhance systems reliability—by providing more than one functional path or operating element in areas that are critically important to system success. The use of redundancy is not a panacea to solve all reliability problems, nor is it a substitute for good initial design. By its very nature, redundancy implies increased complexity, increased weight and space, increased power consumption, and usually a more complicated system ...

In Seeking Wisdom, Peter Bevelin mentioned some interesting quotes from Buffett and Munger that speak to the concept of redundancy/resilience from the perspective of business:

Charlie Munger

Of course you prefer a business that will prosper even if it is not managed well. We are not looking for mismanagement; we like the capacity to withstand it if we stumble into it.... We try and operate so that it wouldn't be too awful for us if something really extreme happened – like interest rates at 1% or interest rates at 20%... We try to arrange [our affairs] so that no matter what happens, we'll never have to "go back to go."

Warren Buffett uses the concept of margin of safety for investing and insurance:
We insist on a margin of safety in our purchase price. If we calculate the value of a common stock to be only slightly higher than its price, we're not interested in buying. We believe this margin-of-safety principle, so strongly emphasized by Ben Graham, to be the cornerstone of investment success.

David Dodd, on the same topic, writes:

You don't try to buy something for \$80 million that you think is worth \$83,400,000.

Buffett on Insurance:

If we can't tolerate a possible consequence, remote though it may be, we steer clear of planting its seeds.

The pitfalls of this business mandate an operating principle that too often is ignored: Though certain long-tail lines may prove profitable at combined ratios of 110 or 115, insurers will invariably find it unprofitable to price using those ratios as targets. Instead, prices must provide a healthy margin of safety against the societal trends that are forever springing expensive surprises on the insurance industry.

Confucius comments:

The superior man, when resting in safety, does not forget that danger may come. When in a state of security he does not forget the possibility of ruin. When all is orderly, he does not forget that disorder may come. Thus his person is not endangered, and his States and all their clans are preserved.

Warren Buffett talked about redundancy from a business perspective at the 2009 shareholder meeting:

Question: You've talked a lot about opportunity-costs. Can you discuss more important decisions over the past year?

Buffett: When both prices are moving and in certain cases intrinsic business value moving at a pace that's far greater than we've seen – it's tougher, more interesting and more challenging and can be more profitable. But, it's a different task than when things were moving at more leisurely pace. We faced that problem in September and October. We want to always keep a lot of money around. We have so many extra levels of safety we follow at Berkshire.

We got a call on Goldman on a Wednesday – that couldn't have been done the previous Wednesday or the next Wednesday. We were faced with opportunity-cost – and we sold something that under normal circumstances we wouldn't.

Jonathan Bendor, writing in Parallel Systems: Redundancy in Government, provides an example of how redundancy can reduce the risk of failure on cars.

Suppose an automobile had dual breaking (sic) circuits: each circuit can stop the car, and the circuits operate independently so that if one malfunctions it does not impair the other. If the probability of either one failing is 1/10, the probability of both failing simultaneously is $(1/10)^2$, or 1/100. Add a third independent circuit and the probability of the catastrophic failure of no brakes at all drops to $(1/10)^3$, or 1/1,000.

Airplane Design provides an insightful example. From the code of federal regulations:

The airplane systems and associated components, considered separately and in relation to other systems, must be designed so that the occurrence of any failure condition which would prevent the continued safe flight and landing of the airplane is extremely improbable, and the occurrence of any other failure conditions which would reduce the capacity of the airplane or the ability of the crew to cope with adverse operating conditions is improbable.

* * *

Ways redundancy can fail

In The Problem of Redundancy Problem: Why More Nuclear Security Forces May Produce Less Nuclear Security, Scott Sagan writes:

The first problem with redundancy is that adding extra components can inadvertently create a catastrophic common-mode error (a fault that causes all the components to fail). In complex systems, independence in theory (or in design) is not necessarily independence in fact. As long as there is some possibility of unplanned interactions between the components leading to common-mode errors, however, there will be inherent limits to the effectiveness of redundancy as a solution to reliability problems. The counterproductive effects of redundancy when extra components present even a small chance of producing a catastrophic common-mode error can be dramatic.

This danger is perhaps most easily understood through a simple example from the commercial aircraft industry. Aircraft manufacturers have to determine how many engines to use on jumbo jets. Cost is clearly an important factor entering their calculations. Yet so is safety, since each additional engine on an aircraft both increases the likelihood that the redundant engine will keep the plane in the air if all others fail in flight and increases the probability that a single engine will cause an accident, by blowing up or starting a fire that destroys all the other engines and the aircraft itself.

In (the image below) I assume that 40% of the time that each engine fails, it does so in a way (such as starting a catastrophic fire) that causes all the other engines to fail as well. Aircraft manufacturers make similar calculations in order to estimate how many engines would maximize safety. Boeing, for example, used such an analysis to determine that, given the reliability of modern jet engines, putting two engines on the Boeing 777, rather than three or more engines as exist on many other long-range aircraft, would result in lower risks of serious accidents.

In more complex systems or organizations, however, it is often difficult to know when to stop adding redundant safety devices because of the inherent problem of predicting the probabilities of exceedingly rare events.

...

The second way in which redundancy can backfire is when diffusion of responsibility leads to “social shirking.”

This common phenomenon—in which individuals or groups reduce their reliability in the belief that others will take up the slack—is rarely examined in the technical literature on safety and reliability because of a “translation problem” that exists when transferring redundancy theory from purely mechanical systems to complex organizations. In mechanical engineering, the redundant units are usually inanimate objects, unaware of each other’s existence. In organizations, however, we are usually analyzing redundant individuals, groups, or agencies, backup systems that are aware of one another.

...

The third basic way in which redundancy can be counterproductive is when the addition of extra components encourages individuals or organizations to increase production in dangerous ways. In most settings, individuals and organizations face both production pressures and pressure to be safe and secure. If improvements in safety and security, however, lead individuals to engage in inherently risky behavior—driving faster, flying higher, producing more nuclear energy, etc.—then expected increases in system reliability could be reduced or even eliminated. Research demonstrates, for example, that laws requiring “baby-proof” safety caps on aspirin bottles have led to an increase in child poisoning because parents leave the bottles outside the medicine cabinet.

* * *

Another example of people over-confident in redundant systems can be found in the Challenger Disaster:

A dramatic case in point is the January 1986 space shuttle Challenger explosion. A strong consensus about the basic technical cause of the accident emerged soon afterward with the publication of the Rogers Commission report: the unprecedented cold temperature at the Kennedy Space Center at the time of launch caused the failure of two critical O-rings

on a joint in the shuttle's solid rocket booster, producing a plume of hot propellant gases that penetrated the shuttle's external fuel tank and ignited its mixture of liquid hydrogen and oxygen. In contrast to the technical consensus, a full understanding of why NASA officials and Morton Thiokol engineers decided to launch the shuttle that day, despite the dangerously cold weather, has been elusive.

The Challenger launch decision can be understood as a set of individuals overcompensating for improvements in space shuttle safety that had been produced through the use of redundant O-rings. This overcompensation interpretation differs significantly from both the traditional arguments that "production pressures" forced officials to break safety rules and consciously accept an increased risk of an accident to permit the launch to take place and Diane Vaughan's more recent argument, which focuses instead on how complex rules and engineering culture in NASA created "the normalization of deviance" in which risky operations were accepted unless it could be proven that they were extremely unsafe. The production pressures explanation—that high-ranking officials deliberately stretched the shuttle flight safety rules because of political pressure to have a successful launch that month—was an underlying theme of the Rogers Commission report and is still a widely held view today.⁽³⁵⁾ The problem with the simple production pressure explanation is that Thiokol engineers and NASA officials were perfectly aware that the resilience of an O-ring could be reduced by cold temperature and that the potential effects of the cold weather on shuttle safety were raised and analyzed, following the existing NASA safety rules, on the night of the Challenger launch decision.

Vaughan's argument focuses on a deeper organizational pathology: "the normalization of deviance." Engineers and high-ranking officials had developed elaborate procedures for determining "acceptable risk" in all aspects of shuttle operations. These organizational procedures included detailed decision-making rules among launch officials and the development of specific criteria by which to judge what kinds of technical evidence could be used as an input to the decision. The Thiokol engineers who warned of the O-ring failure on the night before the launch lacked proper engineering data to support their views and, upon consideration of the existing evidence, key managers, therefore, unanimously voted to go ahead with the launch.

Production pressures were not the culprits, Vaughan insists. Well-meaning individuals were seeking to keep the risks of an accident to a minimum, and were just following the rules (p. 386). The problem with Vaughan's argument, however, is that she does not adequately explain why the engineers and managers followed the rules that night. Why did they not demand more time to gather data, or protest the vote in favor of a launch, or more vigorously call for a postponement until that afternoon when the weather was expected to improve?

The answer is that the Challenger accident appears to be a tragic example of overcompensation. There were two O-rings present in the critical rocket booster joint: the primary O-ring and the secondary O-ring were listed as redundant safety components because they were designed so that the secondary O-ring would seal even if the first leaked because of "burn through" by hot gasses during a shuttle launch. One of the Marshall space center officials summarized the resulting belief: "We had faith in the tests. The data said that the primary would always push into the joint and seal . . . And if we didn't have a primary seal in the worst case scenario, we had faith in the secondary" (p. 105).

This assumption was critical on the night of January 27, 1986 for all four senior Thiokol managers reversed their initial support for postponing the launch when a Marshall Space Center official reminded them of the backup secondary O-ring. "We were spending all of our time figuring out the probability of the primary seating," one of the Thiokol managers later noted: "[t]he engineers, Boisjoly and Thompson, had expressed some question about how long it would take that [primary] O-ring to move, [had] accepted that as a possibility,

not a probability, but it was possible. So, if their concern was a valid concern, what would happen? And the answer was, the secondary O-ring would seat”(p. 320). In short, the Challenger decision makers failed to consider the possibility that the cold temperature would reduce the resilience of both O-rings in the booster joint since that low probability event had not been witnessed in the numerous tests that had been conducted. That is, however, exactly what happened on the night of unprecedented cold temperatures. Like many automobile drivers, these decision makers falsely believed that redundant safety devices allowed them to operate in more dangerous conditions without increasing the risk of a catastrophe.

18. 3 Things Everyone Should Know About the Availability Heuristic

There are 3 things you should know about the availability heuristic:

1. We often misjudge the frequency and magnitude of events that have happened recently.
2. This happens, in part, because of the limitations on memory.
3. We remember things better when they come in a vivid narrative.

There are two biases emanating from the availability heuristic (a.k.a. the availability bias):
Ease of recall and retrievability.

Because of the availability bias, our perceptions of risk may be in error and we might worry about the wrong risks. This can have disastrous impacts.

Ease of recall suggests that if something is more easily recalled in memory it must occur with a higher probability.

The availability heuristic distorts our understanding of real risks.

“The attention which we lend to an experience is proportional to its vivid or interesting character; and it is a notorious fact that what interests us most vividly at the time is, other things equal, what we remember best.”

— William James

When we make decisions we tend to be swayed by what we remember. What we remember is influenced by many things including beliefs, expectations, emotions, and feelings as well as things like frequency of exposure. Media coverage (e.g., Internet, radio, television) makes a big difference. When rare events occur they become very visible to us as they receive heavy coverage by the media. This means we are more likely to recall it, especially in the immediate aftermath of the event. However, recalling an event and estimating its real probability are two different things. If you're in a car accident, for example, you are likely to rate the odds of getting into another car accident much higher than base rates would indicate.

Retrievability suggests that we are biased in assessments of frequency in part because of our memory structure limitations and our search mechanisms. It's the way we remember that matters.

The retrievability and ease of recall biases indicate that the availability bias can substantially and unconsciously influence our judgment. We too easily assume that our recollections are representative and true and discount events that are outside of our immediate memory.

In Thinking Fast and Slow, Kahneman writes:

People tend to assess the relative importance of issues by the ease with which they are retrieved from memory—and this is largely determined by the extent of coverage in the media.

Nobel Prize winning Social Scientist and Father of Artificial Intelligence, Herbert Simon, wrote in Models of My life:

I soon learned that one wins awards mainly for winning awards: an example of what Bob Merton calls the Matthew Effect. It is akin also to the phenomenon known in politics as “availability,” or name recognition. Once one becomes sufficiently well known, one's name surfaces automatically as soon as an award committee assembles.

* * *

According to Harvard professor Max Bazerman

Many life decisions are affected by the vividness of information. Although most people recognize that AIDS is a devastating disease, many individuals ignore clear data about how to avoid contracting AIDS. In the fall of 1991, however, sexual behavior in Dallas was

dramatically affected by one vivid piece of data that may or may not have been true. In a chilling interview, a Dallas woman calling herself C.J. claimed she had AIDS and was trying to spread the disease out of revenge against the man who had infected her. After this vivid interview made the local news, attendance at Dallas AIDS seminary increased dramatically. Although C.J.'s possible actions were a legitimate cause for concern, it is clear that most of the health risks related to AIDS are not a result of one woman's actions. There are many more important reasons to be concerned about AIDS. However, C.J.'s vivid report had a more substantial effect on many people's behavior than the mountains of data available. The Availability Heuristic describes the inferences we make about even commonness based on the ease with which we can remember instances of that event... While this example of vividness may seem fairly benign, it is not difficult to see how the availability bias could lead managers to make potentially destructive workplace decisions. The following came from the experience of one of our MBA students: As a purchasing agent, he had to select one of several possible suppliers. He chose the firm with whose name was the most familiar to him. He later found out that the salience of the name resulted from recent adverse publicity concerning the firm's extortion of funds from client companies!

Managers conducting performance appraisals often fall victim to the availability heuristic. Working from memory, vivid instances of an employee's behavior (either positive or negative) will be most easily recalled from memory, will appear more numerous than commonplace incidents, and will therefore be weighted more heavily in the performance appraisals. The recency of events is also a factor: Managers give more weight to performance during the three months prior to the evaluation than to the previous nine months of the evaluation period because it is more available in memory.

* * *

There are numerous implications for availability bias for investors.

A study by Karlsson, Loewenstein, and Ariely (2008) showed that people are more likely to purchase insurance to protect themselves after a natural disaster they have just experienced than they are to purchase insurance on this type of disaster before it happens.

Bazerman adds:

This pattern may be sensible for some types of risks. After all, the experience of surviving a hurricane may offer solid evidence that your property is more vulnerable to hurricanes than you had thought or that climate change is increasing your vulnerability to hurricanes.

Robyn M. Dawes, in his book Everyday Irrationality, says:

What is a little less obvious is that people can make judgments of the ease with which instances can come to mind without actually recalling specific instances. We know, for example, whether we can recall the presidents of the United States—or rather how well we can recall their names; moreover, we know at which periods of history we are better at recalling them than at which other periods. We can make judgments without actually listing in our minds the names of the specific presidents.

This recall of ease of creating instances is not limited to actual experience, but extends to hypothetical experience as well. For example, subjects are asked to consider how many subcommittees of two people can be formed from a committee of eight, and either the same or other subjects are asked to estimate how many subcommittees of six can be formed from a committee of eight people. It is much easier to think about pairs of people than to think about sets of six people, with the result that the estimate of pairs tends to be much higher than the estimate of subsets of six. In point of logic, however, the number of subsets of two is identical that of six; the formation of a particular subset of two people automatically involves the formation of a particular subset consisting of the remaining six. Because these unique subsets are paired together, there are the same number of each.

This availability to the imagination also creates a particularly striking irrationality, which can be termed with the conjunction fallacy or compound probability fallacy. Often combinations of events or entities are easier to think about than their components, because the combination might make sense whereas the individual component does not. A classic example is that of a hypothetical woman named Linda who is said to have been a social activist majoring in philosophy as a college undergraduate. What is the probability that at age thirty she is a bank teller? Subjects judge the probability as very unlikely. But when asked whether she might be a bank teller active in a feminist movement, subjects judge this combination to be more likely than for her to be a bank teller.

* * *

Retrievability (based on memory structures)

We are better at retrieving words from memory using the word's initial letter than a random position like 3 (Tversky & Kahneman, 1973).

In 1984 Tversky and Kahneman demonstrated the retrievability bias again when they asked participants in their study to estimate the frequency of seven-letter words that had the letter "n" in the sixth position. Their participants estimated such words to be less common than seven letter words ending in the more memorable "ing". This response is incorrect. All seven letter words ending with "ing" also have an "n" in the sixth position. However, it's easy to recall seven letter words ending with ing. As we demonstrated with Dawes above, this is another example of the conjunction fallacy.

Retail locations are chosen based on search as well, which explains why gas stations and retail stores are often "clumped" together. Consumers learn the location of a product and organize their mind accordingly. While you may not remember the name of all three gas stations on the same corner, your mind tells you that is where to go to find gas. Each station, assuming all else equal, then has a 1/3 shot at your business which is much better than gas stations you don't visit because their location doesn't resonate with your minds search. In order to maximize traffic stores must find locations that consumers associate with a product.

* * *

Exposure Effect

People tend to develop a preference for things because they are familiar with them. This is called the exposure effect. According to Titchener (1910) the exposure effect leads people to experience a "glow or warmth, a sense of ownership, a feeling of intimacy."

The exposure effect applies only to things that are perceived as neutral to positive. If you are repeatedly exposed to something perceived as a negative stimuli it may in fact amplify negative feelings. For example, when someone is playing loud music you tend to have a lot of patience at first. However, as time goes on you get increasingly aggravated as your exposure to the stimuli increases.

The more we are exposed to something the easier it is to recall in our minds. The exposure effect influences us in many ways. Think about brands, stocks, songs, companies, and even the old saying "the devil you know."

* * *

The Von Restorff Effect

"One of these things doesn't belong," can accurately summarize the Von Restorff Effect (also known as the isolation effect and novelty effect). In our minds, things that stand out are more likely to be remembered and recalled because we give increased attention to distinctive items in a set.

For example, if I asked you to remember the following sequence of characters

"RTASDT9RTGS" I suspect the most common character remembered would be the "9" because it stands out and thus your mind gives it more attention.

The Von Restorff Effect leads us to Vivid evidence.

* * *

Vivid Evidence

According to William James in the Principles of Psychology:

An impression may be so exciting emotionally as to almost leave a scar upon the cerebral tissues; and thus originates a pathological delusion. For example "A woman attacked by robbers takes all the men whom she sees, even her own son, for brigands bent on killing her. Another woman sees her child run over by a horse; no amount of reasoning, not even the sight of the living child, will persuade her that he is not killed.

M. Taine wrote:

If we compare different sensations, images, or ideas, we find that their aptitudes for revival are not equal. A large number of them are obliterated, and never reappear throughout life; for instance, I drove through Paris a day or two ago, and though I saw plainly some sixty or eighty new faces, I cannot now recall any one of them; some extraordinary circumstance, a fit of delirium, or the excitement of hashish would be necessary to give me a chance at revival. On the other hand, there are sensations with a force of revival which nothing destroys or decreases. Though, as a rule, time weakens and impairs our strongest sensations, these reappear entire and intense, without having lost a particle of their detail, or any degree of their force. M. Breirre de Boismont, having suffered when a child from a disease of the scalp, asserts that 'after fifty-five years have elapsed he can still feel his hair pulled out under the treatment of the 'skull-cap.'—For my own part, after thirty years, I remember feature for feature the appearance of the theater to which I was taken for the first time. From the third row of boxes, the body of the theater appeared to me an immense well, red and flaming, swarming with heads; below, on the right, on a narrow floor, two men and a woman entered, went out, and re-entered, made gestures, and seemed to me like lively dwarfs: to my great surprise one of these dwarfs fell on his knees, kissed the lady's hand, then hid behind a screen: the other, who was coming in, seemed angry, and raised his arm. I was then seven, I could understand nothing of what was going on; but the well of crimson velvet was so crowded, and bright, that after a quarter of an hour i was, as it were, intoxicated, and fell asleep.

Every one of us may find similar recollections in his memory, and may distinguish them in a common character. The primitive impression has been accompanied by an extraordinary degree of attention, either as being horrible or delightful, or as being new, surprising, and out of proportion to the ordinary run of life; this it is we express by saying that we have been strongly impressed; that we were absorbed, that we could not think of anything else; that our other sensations were effaced; that we were pursued all the next day by the resulting image; that it beset us, that we could not drive it away; that all distractions were feeble beside it. It is by force of this disproportion that impressions of childhood are so persistent; the mind being quite fresh, ordinary objects and events are surprising...

Whatever may be the kind of attention, voluntary or involuntary, it always acts alike; the image of an object or event is capable of revival, and of complete revival, in proportion to the degree of attention with which we have considered the object or event. We put this rule into practice at every moment in ordinary life.

An example from Freeman Dyson:

A striking example of availability bias is the fact that sharks save the lives of swimmers. Careful analysis of deaths in the ocean near San Diego shows that on average, the death of each swimmer killed by a shark saves the lives of ten others. Every time a swimmer is killed, the number of deaths by drowning goes down for a few years and then returns to the normal level. The effect occurs because reports of death by shark attack are remembered more vividly than reports of drownings.

Availability Bias is a Mental Model in the Farnam Street Mental Model Index

19. Intervention Bias: When to Step in and When To Leave Things Alone

When we want to improve a situation, our first instinct is often to change something. Try something new. Make adjustments. Anything other than what we're already doing. But this approach is frequently misguided. Sometimes doing nothing at all or removing inputs is the better approach.

Nassim Taleb, author of many books—The Black Swan, Fooled By Randomness, and The Bed of Procrustes—also wrote a book on fragility called Antifragile (antifragile defined).

One of the core ideas of Antifragile is around our tendency to intervene in situations *regardless* of whether that benefit is a net positive. There is a term for this, *iatrogenics*. Why do we do this? I can think of three good reasons: 1) we struggle to think in systems, 2) we believe that systems would benefit from our intervention and guidance, and 3) we believe that we know how to fix things to make them better.

The first reason is that we are unable to think in terms of second, third, and nth order consequences. More importantly, we are unaware that we need to. The second reason is that we see systems operating and see a flaw in the system that we could do better. Usually, it's minor. This combines with the third reason, which is we think we are the very person that needs to fix the system.

Here's Taleb expanding on this idea:

There is a mental defect psychologists call illusion of control that lead to a default to action rather than inaction, even when the benefits of inaction might be greater than those of action. So the intervention bias" (do something seems better than doing nothing, which is fine except that there are cases in which it gets us in trouble). The illusion of control was meant to show how "irrational" (according to some norm of behavior) we humans can be by giving ourselves the illusion to manage the uncontrollable around us: for instance gamblers cannot resist the pressure to do something in order to improve the outcome, such as throw the die with violence when they need a high number, or throw it softly in order to get a low one. Traders cannot resist wearing the same "lucky" shirt (often unwashed) to improve their day and feel they need to find similar way to take control of their destiny. This mental bias leads to all manner of patently "irrational" actions such as belief in paranormal, alternative medicine and many such actions often put under the umbrella magical thinking. Now the irony is that while this bias was devised to expose patently nonscientific fields, it largely affects many things you learn in college, particularly in social science. Many matters we deem scientific are just the fruit of that very illusion of control masquerading as science with, of course, actions to "improve" mankind.

Why is the scientific illusion of control worse than that of the pedestrian version? Because, tout simplement, these gamblers superstitions are benign, not much worse than doing nothing—they may be even beneficial in hidden ways, and in the right environment. But a doctor tinkering with your system or an army playing with a complex system with opaque causal links, say by invading Iraq, giving chemicals to kids and threatening their brain balance, or intervening in the environment, is far worse than nothing.

This variant of the illusion of control leads to the denigration of acts of omission (not doing something, letting things run their own course, leaving nature or the human body alone) as compared to doing something (such as operating on a patient or prescribing medication). This, we will see is the reason medicine used, until recent history, to kill more patients than it saved (and did not even get close to realizing it), and economists of the sophisticated equation-carrying variety, I will hope to convince you, have been particularly harmful to the economic health of societies—central bankers, and finance ministers, by tinkering with economic life, have caused massive instability.

20. The Tragedy Of The Commons

What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others. — Aristotle

The rules pay you to do the wrong thing. — Garrett Hardin

The Tragedy of the Commons is a parable that illustrates why common resources get used more than is desirable from the standpoint of society as a whole.

Garrett Hardin, introduces us to the The Tragedy of the Commons:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Greg Mankiw, in his Microeconomics text says:

Consider life in a small medieval town. Of the many economic activities that take place in the town, one of the most important is raising sheep. Many of the town's families own flocks of sheep and support themselves by selling the sheep's wool, which is used to make clothing.

As our story begins, the sheep spend much of their time grazing on the land surrounding the town, called the Town Commons. No family owns the land. Instead the town residents own the land collectively, and all the residents are allowed to graze their sheep on it.

Collective ownership works well because land is plentiful. As long as everyone can get all the good grazing land they want, the Town Common is not a rival good and allowing residents' sheep to graze for free causes no problems. Everyone in the town is happy.

As the years pass, the population of the town grows and so does the number of sheep grazing on the Town Commons. With a growing number of sheep and a fixed amount of land, the land starts to lose its ability to replenish itself. Eventually, the land is grazed so heavily that it becomes barren. With no grass left on the Town Common, raising sheep is impossible, and the town's once prosperous wool industry disappears and, tragically, many families lose their source of livelihood.

What causes the tragedy? Why do the shepherds allow the sheep population to grow so large that it destroys the Town Common? The reason is that social and private incentives differ. Avoiding the destruction of the grazing land depends on the collective action of the shepherds. If the shepherds acted together, they could reduce the sheep population to a

size that the Town Common could support. Yet no single family has an incentive to reduce the size of its own flock because each flock represents only a small part of the problem. In essence, the Tragedy of the Commons arises because of an externality. When one family's flock grazes on the common land, it reduces the quality of the land available for other families. Because people neglect this negative externality when deciding how many sheep to own, the result is an excessive number of sheep.

If the tragedy had been foreseen, the town could have solved the problem in various ways. It could have regulated the number of sheep in each family's flock, internalized the externality by taxing sheep, or auctioned off a limited number of sheep grazing permits. That is, the medieval town could have dealt with the problem of overgrazing in the way that modern society deals with the problem of pollution.

In the case of land, however, there is a simpler solution. The town can divide up the land among town families. Each family can enclose its allotment of land with a fence and then protect it from excessive grazing. In this way, the land becomes a private good rather than a common resource. This outcome in fact occurred during the enclosure movement in England in the 17th century.

The Tragedy of the Commons is a story with a general lesson: when one person uses a common resource, he diminishes other people's enjoyment of it. Because of this negative externality, common resources tend to be used excessively. The government can solve the problem by reducing use of the common resource through regulation or taxes.

Alternatively, the government can sometimes turn the common resource into a private good.

This lesson has been known for thousands of years. The ancient Greek philosopher Aristotle pointed out the problem with common resources: 'What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others.'

21. Alignment: The Key to Success Nobody Ever Taught You

I spend a lot of time thinking about this simple idea: The person who aligns themselves with the general principles of the world goes further and faster than the person who doesn't.

What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.

— Joseph Tussman

The way to align yourself with the world is to take simple ideas seriously.

Consider compounding.

We know that spending less than we make, investing the difference in index funds, and waiting for a long time creates financial independence. Yet how many people follow this principle? Not many. Most of us know what works but fail to align ourselves with it.

Compounding applies to relationships too. Not just with your partner, but with your colleagues, friends, and even your customers. For relationships to compound, they must be win-win. But how many people take a consistent win-win approach? Not many. Again, we know what works, but fail to align ourselves with it.

Outcome over Ego

Here's the trick to seeing things differently: put your energy into *being* right, not *feeling* right. While that sounds simple, it's far from easy.

If you want to be right, you have to change your mind. When the evidence indicates the approach isn't working, change the approach. This is easy with something like math, where the answers are black and white, but harder with more subjective things.

Often the hardest things to change our minds about are the things that require us to understand that just because we can't see the results immediately doesn't mean they are not moving us closer or further from the outcome we want. For instance, eating a full pizza once won't make you unhealthy, but repeating that choice daily for years certainly will.

Feeling right, on the other hand, often requires you to believe you are an exception. You know the path to financial independence, but that takes too long. It's boring. Instead, you'd rather try the latest incarnation of a get-rich-quicker scheme that promises the outcome sooner. When it inevitably fails to produce the desired results, rather than tell yourself you made a mistake you chalk it up to the world not working as it should. It's as if that little voice in your head says, "You're not wrong; the world is."

Most of us would rather bargain with how the world works than accept how it does work, cooperate with it, and move forward. This happens in a lot of areas of life. Consider the general concept of health.

A lot of people think they don't have to take care of their health. They get too little sleep. They drink too much. They eat incredible amounts of processed food. They get little to no exercise. While they know health is important, at some level they think they are the exception. Acceptance is knowing you must care for your health because it is the foundation for everything else. Without health, everything else multiplies by zero.

We are tempted to believe we're the exception because it's the easy path.

Aligning with the world often requires you to pre-pay now for a result later. A little bit of pain today for gain tomorrow. And we don't like the sounds of that.

However, if you can align yourself with the world despite what those around you do, you'll quickly discover that it tends to do most of the work for you. It just won't take the first step for you. You have to take that one for yourself.

22. Kantian Fairness Tendency: The World Isn't Fair

The Kantian Fairness Tendency refers to the pursuit of perfect fairness which causes a lot of terrible problems. Stop expecting the world to be fair and adjust your behavior accordingly.

To learn about this mental model we turn to Charlie Munger, who mentioned it twice.

First in this UCCB talk entitled Academic Economics — Strengths and Weaknesses, after Considering Interdisciplinary Needs where he said:

It is not always recognized that, to function best, morality should sometimes appear unfair, like most worldly outcomes. The craving for perfect fairness causes a lot of terrible problems in system function. Some systems should be made deliberately unfair to individuals because they'll be fairer on average for all of us. I frequently cite the example of having your career over, in the Navy, if your ship goes aground, even if it wasn't your fault. I say the lack of justice for the one guy that wasn't at fault is way more than made up by a greater justice for everybody when every captain of a ship always sweats blood to make sure the ship doesn't go aground. Tolerating a little unfairness to some to get a greater fairness for all is a model I recommend to all of you. But again, I wouldn't put it in your assigned college work if you want to be graded well, particularly in a modern law school wherein there is usually an over-love of fairness-seeking process.

The second time was in his essay entitled: The Psychology of Human Misjudgment:

Kant was famous for his "categorical imperative," a sort of a "golden rule" that required humans to follow those behavior patterns that, if followed by all others, would make the surrounding human system work best for everybody. And it is not too much to say that modern acculturated man displays, and expects from others, a lot of fairness as thus defined by Kant.

In a small community having a one-way bridge or tunnel for autos, it is the norm in the United States to see a lot of reciprocal courtesy, despite the absence of signs or signals. And many freeway drivers, including myself, will often let other drivers come in front of them, in lane changes or the like, because that is the courtesy they desire when roles are reversed. Moreover, there is, in modern human culture, a lot of courteous lining up by strangers so that all are served on a "firstcome-first-served" basis.

Also, strangers often voluntarily share equally in unexpected, unearned good and bad fortune. And, as an obverse consequence of such "fair-sharing" conduct, much reactive hostility occurs when fairsharing is expected yet not provided. It is interesting how the world's slavery was pretty well abolished during the last three centuries after being tolerated for a great many previous centuries during which it coexisted with the world's major religions. My guess is that Kantian Fairness Tendency was a major contributor to this result.

* * *

Professor Sanjay Bakshi makes a connection between the Kantian Fairness Tendency and the "law of the higher good" in reference to Machiavelli's famous book The Prince.

Bakshi said this to his students:

Machiavelli's "The Prince" is a great book and should be made compulsory reading for all MBA students.

To many people, The Prince is an evil book. But Joseph L. Badaracco, who teaches a hugely popular course titled "The Moral Leader" at the Harvard Business School uses this book to teach ethics. And he teaches ethics by telling students to follow Machiavelli's advice in The Prince.

In an interview, Badaracco has said that four different takes on The Prince usually emerge in classroom discussions of The Prince at HBS:

Version 1 : "This book is a mess. It was written by a guy who hoped to get to the center of things, was there briefly, offended some of the wrong Medicis, was exiled, was tortured,

and wanted to get back in.” It’s “a scholar’s dream because you can find anything you want in it and play intellectual games. But just put it aside.”

Version 2 : “Now wait a minute. There’s some good common sense in there. Machiavelli is basically saying that if you want to make an omelet you have to break some eggs... To do some right things, you may have to not do some other right things.”

Version 3 : Other students believe the book is still around because it’s so evil. Why is it evil? “If you look closely at *The Prince*,” he said, “it’s quite interesting what isn’t in the book. Nothing about religion. Nothing about the Church. Nothing about God. There’s nothing about spirituality. Almost nothing about the law. Almost nothing about traditions. You’re out there on your own doing what works for you in terms of naked ambition.”

Version 4 : “A fourth Prince that other students uncover is the most interesting one, in Badaracco’s mind. Students find that the book reveals a kind of worldview, he says, and it’s not an evil worldview. This version goes: “If you’re going to make progress in the world you’ve got to have a clear sense, a realistic sense, an unsentimental sense, of how things really work: the mixed motives that compel some people and the high motives that compel some others. And the low motives that unfortunately captivate other people.” Students who claim the fourth Prince, Badaracco said, believe that if they’re going to make a difference, it’s got to be in this world, “and not in some ideal world that you would really like to live in.”

One of my favourite mental models comes from *The Prince*. I call this model, the “law of the higher good”. Before I read *The Prince*, I read an excellent book called, “*The Contrarian Guide to Leadership*” by Steven Sample. In this book, which was recommended by Mr. Munger, Sample’s thoughts on the law of the higher good from *The Prince* resonated very well with what Mr. Munger has been advocating for years.

I reproduce here an excerpt from Sample’s book which deals with the law of the higher good:

“Let me clarify the most fundamental misunderstanding. Machiavelli was not an immoral or even an amoral man; as mentioned earlier, he had a strong set of moral principles. But he was driven by the notion of a higher good: an orderly state in which citizens can move about at will, conduct business, safeguard their families and possessions, and be free of foreign intervention or domination. Anything which could harm this higher good, Machiavelli argued, must be opposed vigorously and ruthlessly. Failure to do so out of either weakness or kindness was condemned by Machiavelli as being contrary to the interests of the state, just as it would be contrary to the interests of a patient for his surgeon to refuse to perform a needed operation out of fear that doing so would inflict pain on the patient.”

The law of the higher good is a terribly useful model for leaders because it forces them to think about things from a totally different perspective.

Here’s a hypothetical situation to ponder about:

You are in charge of running a retail store and one of your cashiers, an elderly woman, is caught committing a minor embezzlement. Fearing that she might be dismissed, she approaches you to plead forgiveness. She tells you that this is the first time she embezzled money from the company and promises that she’ll never do it again. She tells you about her sad situation, namely that her husband is very ill and that she was going to use the money to buy medicines for him. She becomes extremely emotional and your heart is melting. What do you do?

Something similar to the above situation was described by Mr. Munger in a talk given by him. He used two models to produce his answer. The first model was probability. Mr. Munger implores you to reduce the problem to the mathematics of Fermat/Pascal by asking the question: How likely is it that the old woman’s statement, “I’ve never done it before, I’ll never do it again” is true?

Note that this question has nothing whatsoever to do with the circumstances in this particular instance of embezzlement. Rather, Munger is relying on his knowledge of the

theory of probability. He asks: "If you found 10 embezzlements in a year, how many of them are likely to be first offences?"

The possible actions are: (1) She is lying and you fire her (good outcome – because it cures the problem and sends the right signals); (2) She is telling the truth and you fire her (bad outcome for her but good outcome for system integrity); (3) She is lying and you pardon her (bad outcome for system integrity); and (4) She is telling the truth and you pardon her (bad outcome for system integrity because it will send the wrong signal that its ok to embezzle once).

Weighed with probabilities, and after considering signalling effects of your actions on other people's incentives and its effect on system integrity, its clear that the woman should be fired.

Looked this way, this is not a legal problem or an ethical problem. Its an arithmetical problem with a simple solution. This extreme reductionism of practical problems to a fundamental discipline (in this case mathematics), is, of course, the hallmark of the Munger way of thinking and living.

So, from a leader's perspective, it's more important to have the right systems with the right incentives in place, rather than trying to be fair to one person – even if that person is the leader or someone close to the leader.

The logic is that leaders must look at such situations from their civilization's point of view rather than the viewpoint of an individual. If we create systems which encourage embezzlements, or tolerate such systems, we'll ruin our civilization. If we don't punish the woman, the idea that its ok to do minor embezzlement once in a while, will spread because of incentive effects, and social proof (everyone's doing it so its ok). And we cannot let that idea spread because that will ruin our civilization. Its that simple.

23. Definition of a Black Swan

A black swan is a rare unexpected event. Black swans can be positive or negative. There are ways to account for this problem including an understanding of The Lucretius Problem, factoring in a Margin of Safety, and having skin in the game.

In The Black Swan: The Impact of the Highly Improbable, Nassim Taleb offers a definition of a black swan.

Taleb writes:

an event with the following three attributes. First, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact.... Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.

Black swans are the inevitable byproduct of complex adaptive systems. Think about the world as a collection of interactions between components that are generally predictable but not always.

Knowing the behaviors of the individual part can allow you to extrapolate the behavior of the group most of the time. However, it won't allow you to predict the behavior of each interaction. Occasionally these interactions will produce something unexpected and result in non-linear and non-predictable behavior.

One of the biggest mistakes that people make with black swans comes with a big impact. A lot of people think that when outcomes occur outside of *their* expectations that the result is a black swan. This reasoning causes the belief that the outcome could not have been foreseen, because *they* didn't foresee it. While this reasoning loop relaxes our brain and allows us to avoid feedback, it also ensures that we are not learning how the world really works. We become close-minded.

Just because something is outside of *our* expectations does not make it a black swan.

24. Daniel Kahneman: Some Thoughts on Thinking

While Daniel Kahneman's book, Thinking Fast, Thinking Slow, gets all the attention, he's also written a few articles that might catch your interest on thinking better.

Optimistic Bias:

In terms of its consequences for decisions, the optimistic bias may well be the most significant cognitive bias. Because optimistic bias is both a blessing and a risk, you should be both happy and wary if you are temperamentally optimistic.

Competition Neglect

Colin Camerer, who coined the concept of competition neglect, illustrated it with a quote from a chairman of Disney Studios. Asked why so many big-budget movies are released on the same holidays, he said, "Hubris. Hubris. If you only think about your own business, you think, 'I've got a good story department, I've got a good marketing department' ... and you don't think that everybody else is thinking the same way." The competition isn't part of the decision. In other words, a difficult question has been replaced by an easier one. This is a kind of dodge we all make, without even noticing. We use fast, intuitive thinking — System 1 thinking — whenever possible, and switch over to more deliberate and effortful System 2 thinking only when we truly recognize that the problem at hand isn't an easy one.

The question that studio executives needed to answer is this: Considering what others will do, how many people will see our film? The question they did consider is simpler and refers to knowledge that is most easily available to them: Do we have a good film and a good organization to market it?

Appreciation of uncertainty

As Nassim Taleb, the author of "The Black Swan," has argued, inadequate appreciation of the uncertainty of the environment inevitably leads economic agents to take risks they should avoid. However, optimism is highly valued; people and companies reward the providers of misleading information more than they reward truth tellers. An unbiased appreciation of uncertainty is a cornerstone of rationality — but it isn't what organizations want. Extreme uncertainty is paralyzing under dangerous circumstances, and the admission that one is merely guessing is especially unacceptable when the stakes are high. Acting on pretended knowledge is often the preferred approach.

Theory-induced blindness

Bernoulli invented psychophysics to explain this aversion to risk. His idea was straightforward: People's choices are based not on dollar values but on the psychological values of outcomes, their utilities. The psychological value of a gamble is therefore not the weighted average of its possible dollar outcomes; it is the average of the utilities of these outcomes, each weighted by its probability.

...That Bernoulli's theory prevailed for so long is even more remarkable when you see that, in fact, it is seriously flawed. The errors are found not in what it asserts explicitly, but what it tacitly assumes.

The mystery is how a conception that is vulnerable to such obvious counterexamples survived for so long. I can explain it only by a weakness of the scholarly mind that I have often observed in myself. I call it theory-induced blindness: Once you have accepted a theory, it is extraordinarily difficult to notice its flaws. As the psychologist Daniel Gilbert has observed, disbelieving is hard work.

Reference points and loss aversion

The economists Devin Pope and Maurice Schweitzer, at the University of Pennsylvania, suggest that golf provides the perfect example of a reference point: par. For a professional golfer, a birdie (one stroke under par) is a gain, and a bogey (one stroke over par) is a loss. Failing to make par is a loss, but missing a birdie putt is a forgone gain, not a loss.

Pope and Schweitzer analyzed more than 2.5 million putts to test their prediction that players would try harder when putting for par than when putting for a birdie.

They were right. Whether the putt was easy or hard, at every distance from the hole, players were more successful when putting for par than for a birdie.

...If you are set to look for it, the asymmetric intensity of the motives to avoid losses and to achieve gains shows up almost everywhere. It is an ever-present feature of negotiations, especially of renegotiations of an existing contract, the typical situation in labor negotiations, and in international discussions of trade or arms limitations. Loss aversion creates an asymmetry that makes agreements difficult to reach.

Negotiations over a shrinking pie are especially difficult because they require an allocation of losses. People tend to be much more easygoing when they bargain over an expanding pie.

In the world of territorial animals, the principle of loss aversion explains the success of defenders. A biologist observed that “when a territory holder is challenged by a rival, the owner almost always wins the contest — usually within a matter of seconds.”

25. Mental Model: Feedback Loops

Feedback loops are created when reactions affect themselves and can be positive or negative.

Consider a thermostat regulating room temperature. This is an example of a negative feedback loop. As the temperature rises, the thermostat turns off the furnace allowing the room to rest at a predetermined temperature. When the temperature falls below that predetermined temperature the furnace reignites to return the room to its equilibrium state. Other examples include body temperature and financial markets.

Referring to the credit problems in 2008/2009, Vice Chairman of Berkshire Hathaway, Charlie Munger explained:

By the fourth quarter, the credit crisis, coupled with tumbling home and stock prices, had produced a paralyzing fear that engulfed the country. A free-fall in business activity ensued, accelerating at a pace that I have never before witnessed. The U.S. — and much of the world — became trapped in a vicious negative-feedback cycle. Fear led to business contraction, and that in turn led to even greater fear.

* * *

In The Education of a Speculator, Victor Niederhoffer says:

One of the common features that all life possesses is a mechanism for maintaining orderly conditions. This tendency is called homeostasis. In system theory, it is called negative feedback ... A Common homeostatic behavior in humans is temperature regulation. If the temperature rises above the 98.6 F optimum for normal human activity, sensors on the skin detect it and signal the brain that a rise has occurred. The brain relays the information to the effectors that increase blood flow to the skin. This induces perspiration. The loss in heat, caused by evaporation, lowers the body temperature. When the body cools below a certain point, a comparable mechanism is set off, this time reducing blood flow and causing shivering. This activity generates heat through physical activity thus raising the body temperature.

In Universal Principles of Design, William Lidwell, Jill Butler, and Kritina Holden write:

Every action creates an equal and opposite reaction. When reactions loop back to affect themselves, a feedback loop is created. All real-world systems are composed of many such interacting feedback loops — animals, machines, businesses, and ecosystems, to name a few. There are two types of feedback loops: positive and negative. Positive feedback amplifies system output, resulting in growth or decline. Negative feedback dampers output, stabilizes the system around an equilibrium point.

Positive feedback loops are effective for creating change, but generally result in negative consequences if not moderated by negative feedback loops. For example, in response to head and neck injuries in football in the late 1950s, designers created plastic football helmets with internal padding to replace leather helmets. The helmets provided more protection, but induced players to take increasingly greater risks when tackling. More head and neck injuries occurred (after the introduction of plastic helmets) than before. By concentrating on the problem in isolation (e.g., not considering changes in player behavior) designers inadvertently created a positive feedback loop in which players used their head and neck in increasingly risky ways. This resulted in more injuries which resulted in additional redesigns that made the helmet shells harder and more padded and so on. Negative feedback loops are effective for resisting change. For example, the Segway Human Transporter uses negative feedback loops to maintain equilibrium. As a rider leans forward or backward, the Segway accelerates or decelerates to keep the system in equilibrium. To achieve this smoothly, the Segway makes hundreds of adjustments every second. Given the high adjustment rate, the oscillations around the point of equilibrium are so small as to not be detectable. However, if fewer adjustments were made per second, the oscillations would increase in size and the ride would become increasingly jerky.

A key lesson of feedback loops is that things are connected—changing one variable in a system will affect other variables in that system and other systems. This is important because it means that designers must not only consider particular elements of a design, but also their relation to the design as a whole and to the greater environment.

From Graph Algebra by Courtney Brown:

Feedback loops are typically used to accomplish regulation and control. A feedback loop is like an input, but its origin is from within the system itself, not from outside the system. In many systems, the output reenters the system as another input. This is exactly what happens with a microphone and speakers when the sound from the speakers feed back into the microphone, often causing a loud squeal.

Sanjay Bakshi, a visiting professor at MDI wrote an email to one of his students on positive feedback:

In my view, its not correct to always view positive feedback loops in business as destructive, though they well might be. For example a run on a bank can bring it down on its knees in a very short time period and it can spread (systemic risk) to other banks. Similarly stock market bubbles can be thought of positive feedback loops – high prices feed optimism which feeds high prices – it does not last for ever, but it can last for a long long time.

I think you're on the right track when you visualize a positive feedback loop as a mechanism which is nested inside a negative feedback loop. To illustrate, why do bear markets follow bull markets? Because over the long run, markets operate inside a negative feedback loop with built-in corrective mechanisms. When prices run too far away from underlying values, there are forces that pull them back. For example, when stocks become too cheap in relation to the replacement cost of the underlying assets, there is no incentive to create new capacity and industry consolidation is likely to take place wherein the strong players in an industry, instead of creating new capacity, buy out competitors. Conversely, when stock prices rise so high that they become much more than the replacement cost of the underlying assets, strong incentives are created by those high prices, to create fresh capacity. So shortages follow gluts follow shortages.... – hence a negative feedback loop.

But what caused the speculative bubble in the first place? Why do people suddenly become euphoric about an industry or a sector and invest in it in unison? That part of the answer is better explained by positive feedback loops.

Its also important to view positive feedback loops as means of explaining some of the extreme business successes. I gave two examples in class of the dominant newspaper, and Wal-Mart. But one can think of others. For example, in some industries, the first mover has a big advantage. He goes and captures a very large part of the market and obtains scale economics. And once he's done that, it becomes very difficult to dislodge him.

In 2005 Michael Mauboussin, Chief Investment Strategist at Legg Mason Capital Management offered¹:

The last idea has to do with systems that exhibit super-linear behavior vs. those that exhibit sub-linear behavior. In the super-linear systems, when you add more, you create more: there's a positive feedback loop. One of the most direct uses of this in markets is network effects—the value of a good or service increases as more people use that good or service. The prototypical example would be eBay. They started out with their basic auction business which has very clear network effects. Then they moved into PayPal which is a payment business. It also derived benefits from network effects. Last week they announced the acquisition of Skype. Once again it's a network effects business.

Sub-linear systems are concerned with maximizing efficiency per unit in industries that are relatively mature. Using capital to innovate may not be the best path for these types of companies: they should work on efficiency instead.

In 2002, Mauboussin offered an example of ants and positive feedback:

The power of this collective effect has not been lost on nature. This is where Johnson's stories about ants come in. How do the ants do it? Foraging ants depart the nest with one job in mind, to find and retrieve food. They also have the ability to leave and follow chemical trails. At first, they disperse randomly. When the ants that find food come back to the nest, they leave a chemical trail that their sisters can follow. Studies show that this process allows ants to consistently find the shortest path to the food.

Once researchers understood this collective ability, they decided to play a trick on the ants. In a controlled setting, the scientists placed two food sources at identical path lengths from the nest. As it turned out, the ants ended up using just one of the paths, although which one they chose was random. Why? Because they follow chemical trails, a couple more ants going down one path will attract other ants, triggering a positive feedback loop. So instead of finding an optimal solution, the ants have one crowded path and an equidistant, empty path. Amazingly, though, nature anticipated this problem as well. As it turns out, ants periodically break from the main path and begin a random search process again. The ants are programmed to strike a balance between exploiting a known food source and exploring for the next food source. The ants are hard-wired to seek diversity.

In Earth in the Balance, Al Gore writes:

When I was flying over the Amazon rain forest in small plane I was struck by what happened immediately after a thunderstorm moved across an area of the forest: as soon as the rain stopped, clouds of moisture began to rise from the trees to form new rain clouds that moved west, driven by the wind, where they provided the water for new rain falling out of new thunderstorms. Any interruption of this natural process can have a magnificent impact. When large areas of rain forest are burned, the amount of rainfall recycled to adjacent areas is sharply reduced, depriving those areas of the rain they need to maintain their healthy condition. If the deforested area is large enough, the amount of rainfall removed from adjacent areas will be enough to cause a reinforcing drought cycle, which slowly kills more trees, thus further reducing rainfall recycling and accelerating the death of the forest in turn.

From Thomas Goetz in Wired:

...So feedback loops work. Why? Why does putting our own data in front of us somehow compel us to act? In part, it's that feedback taps into something core to the human experience, even to our biological origins. Like any organism, humans are self-regulating creatures, with a multitude of systems working to achieve homeostasis. Evolution itself, after all, is a feedback loop, albeit one so elongated as to be imperceptible by an individual. Feedback loops are how we learn, whether we call it trial and error or course correction. In so many areas of life, we succeed when we have some sense of where we stand and some evaluation of our progress. Indeed, we tend to crave this sort of information; it's something we viscerally want to know, good or bad. As Stanford's Bandura put it, "People are proactive, aspiring organisms." Feedback taps into those aspirations.

* * *

Richard Koch:

In the absence of feedback loops, the natural distribution of phenomena would be 50/50—inputs of a given frequency would lead to commensurate results. It is only because of positive and negative feedback loops that causes do not have equal results. Yet it also seems to be true that powerful positive feedback loops only affect a small minority of the inputs.

26. Mental Model: Conjunctive and Disjunctive Events Bias

Welcome to the conjunctive and disjunctive events bias.

Why are we so optimistic in our estimation of a project's cost and schedule? Why are we so surprised when something inevitably goes wrong? Because of the human tendency to underestimate disjunctive events.

According to Daniel Kahneman and his long-time co-author Amos Tversky (1974): "A complex system, such as a nuclear reactor or the human body, will malfunction if any of its essential components fails." They continue, "Even when the likelihood of failure in each component is slight, the probability of an overall failure can be high if many components are involved."

In Seeking Wisdom: From Darwin to Munger, Peter Bevelin writes:

A project is composed of a series of steps where all must be achieved for success. Each individual step has some probability of failure. We often underestimate the large number of things that may happen in the future or all opportunities for failure that may cause a project to go wrong. Humans make mistakes, equipment fails, technologies don't work as planned, unrealistic expectations, biases including sunk cost-syndrome, inexperience, wrong incentives, changing requirements, random events, ignoring early warning signals are reasons for delays, cost overruns and mistakes. Often we focus too much on the specific base project case and ignore what normally happens in similar situations (base rate frequency of outcomes—personal and others). Why should some project be any different from the long-term record of similar ones? George Bernard Shaw said: "We learn from history that man can never learn anything from history."

The more independent steps that are involved in achieving a scenario, the more opportunities for failure and the less likely it is that the scenario will happen. We often underestimate the number of steps, people, and decisions involved.

Add to this that we often forget that the reliability of a system is a function of the whole system. The weakest link sets the upper limit for the whole chain.

* * *

In "Thinking, Fast and Slow", Kahneman offers the following example:

Linda is thirty-one years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with the issues of discrimination and social justice, and also participated in antinuclear demonstrations.

Which alternative is most probable:

Linda is a bank teller.

Linda is a bank teller and is active in the feminist movement.

...About 85% to 95% of undergraduates at several major universities chose the second option, contrary to logic.

The word fallacy is used, in general, when people fail to apply a logical rule that is obviously relevant. Amos and I introduced the idea of a conjunction fallacy, which people commit when they judge a conjunction or two events to be more probable than one of the events in a direct comparison.

...The judgments of probability that our respondents offered, (in the Linda problem), corresponded precisely to the judgments of representativeness (similarity to stereotypes). Representativeness belongs to a cluster of closely related basic assessments that are likely to be generated together. The most representative outcomes combine with the personality description to produce the most coherent stories. The most coherent stories are not necessarily the most probable, but they are plausible, and the notions of coherence, plausibility, and probability are easily confused by the unwary.

* * *

From Max Bazerman's Judgment in Managerial Decision Making:

Which of the following instances appears most likely? Which appears second most likely?
A. Drawing a red marble from a bag containing 50 percent red marbles and 50 percent white marbles.

B. Drawing a red marble seven times in succession, with replacement (i.e., a selected marble is put back into the bag before the next marble is selected), from a bag containing 90 percent red marbles and 10 percent white marbles.

C. Drawing at least one red marble in seven tries, with replacement, from a bag containing 10 percent red marbles and 90 percent white marbles.

The most common ordering of preference is B-A-C. Interestingly, the correct order of likelihood is C (52%), A (50%), and B (48%). This result illustrates a general bias to overestimate the probability of conjunctive events, or events that must occur in conjunction with one another and to underestimate the probability of disjunctive events, or events that occur independently. Thus, when multiple events all need to occur (choice B) we overestimate the true likelihood of this happening, while if only one of many events needs to occur (choice C), we underestimate the true likelihood of this occurring.

The overestimation of conjunctive events offers a powerful explanation for the problems that typically occur with projects that require multistage planning. Individuals, businesses, and governments frequently fall victim to the conjunctive-events bias in terms of timing and budgets. Home remodelling, new product ventures, and public works projects seldom finish on time.

* * *

Astronomy Professor Carl Sagan said in Carl Sagan: A Life in the Cosmos: "The Chernobyl and Challenger disasters remind us that the highly visible technological systems in which enormous national prestige had been invested can nevertheless experience catastrophic failure."

Safety is a function of the total system – that is the interaction of all of the components. If only one component fails (and it need not be a key one), the system may fail. Assume an airplane has 2,000 independent parts or systems. Each part or system is designed to have a working probability of 99%. All the parts need to work together for the airplane to work, however the probability that at least one of the parts fails (causing the plane to malfunction) is 86%.

* * *

From Judgment and Decision Making, by Daniel Kahneman (1974):

Studies of choice among gamblers and of judgments of probability indicate that people tend to overestimate the probability of conjunctive events (Cohen, Chesnick, and Haran, 1972, 24) and to underestimate the probability of disjunctive events. These biases are readily explained as effects of anchoring.

The stated probability of the elementary event (success at any one stage) provides a natural starting point for the estimation of the probabilities of both conjunctive and disjunctive events. Since adjustment from the starting point is typically insufficient, the final estimates remain too close to the probabilities of the elementary events in both cases. Note the overall probability of a conjunctive event is lower than the probability of each elementary event, whereas the overall probability of a disjunctive event is higher than the probability of each elementary event. As a consequence of anchoring, the overall probability will be overestimated in conjunctive problems and underestimated in disjunctive problems.

Biases in the evaluation of compound events are particularly significant in the context of planning. The successful completion of an undertaking, such as the development of a new product or thesis, typically has a conjunctive character: for the undertaking to succeed, each of a series of events must occur. Even when each of these events is very likely, the overall probability of success can be quite low if the number of events is large.

The general tendency to overestimate the probability of conjunctive events leads to unwarranted optimism in the evaluation of the likelihood that a plan will success or that a project will be completed on time. Conversely, disjunctive structures are typically encountered in the evaluation of risks. A complex system, such as a nuclear reactor or the human body, will malfunction if any of its essential components fails. Even when the likelihood of failure in each component is slight, the probability of an overall failure can be high if many components are involved. Because of anchoring, people will tend to underestimate the probabilities of failure in complex systems. Thus, the direction of the anchoring bias can sometimes be inferred from the structure of the event. The chain-like structure of conjunctions leads to over-estimation, the funnel-like structure of disjunctions leads to underestimation.

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Biases in the evaluation of compound events are particularly significant in the context of planning. Any complex undertaking has the character of a conjunctive event: lots of things have to click into place in order for the whole thing to work. Even when the probability of each individual event is very likely, the overall probability can be very low. People in general way overestimate the probability of the conjunctive event, leading to massive time and cost overruns in real projects.

Conversely, disjunctive structures are typically encountered in the evaluation of risks. A complex system, such as a nuclear reactor or a human body, will malfunction if just one key component fails. Even if the probability of failure of any one event is very low, the overall probability of some event going wrong is very high. People always underestimate the probability of complex systems, like the Challenger, going wrong. ([source](#))

28. Mental Model: Prisoners' Dilemma

The prisoners' dilemma is the best known strategy game in social science. The game shows why two entities might not cooperate even when it appears in their best (rational) interest to do so. What is rational for the individual in certain circumstances is not rational for the group — that is, pursuing a strategy that is rational for you leads to a worse outcome.

With applications to economics, politics, and business the game illustrates the conflict, which can sometimes arise, between individual and group rationality.

From Greg Mankiw's Economics textbook:

The prisoners' dilemma is a story about two criminals who have been captured by the police. Let's call them Mr Black and Mr Pink. The police have enough evidence to convict Mr Black and Mr Pink of a relatively minor crime, illegal possession of a handgun, so that each would spend a year in jail. The police also suspect that the two criminals have committed a jewelery robbery together, but they lack hard evidence to convict them of this major crime. The police question Mr Black and Mr Pink in separate rooms, and they offer each of them the following deal:

Right now we can lock you up for 1 year. If you confess to the jewelery robbery and implicate your partner, however, we'll give you immunity and you can go free. Your partner will get 20 years in jail. But if you both confess to the crime, we won't need your testimony and we can avoid the cost of a trial, so you will each get an intermediate sentence of 8 years.

If Mr Black and Mr Pink, heartless criminals that they are, care only about their own sentences, what would you expect them to do? Would they confess or remain silent? Each prisoner has two strategies: confess or remain silent. The sentence each prisoner gets depends on the strategy chosen by his or her partner in crime.

Consider first Mr Black's decision. He reasons as follows:

I don't know what Mr Pink is going to do. If he remains silent, my best strategy is to confess, since then I'll go free rather than spending a year in jail. If he confesses, my best strategy is still to confess, since then I'll spend 8 years in jail rather than 20. So, regardless of what Mr Pink does, I am better off confessing.

In the language of game theory, a strategy is called a dominant strategy if it is the best strategy for a player to follow regardless of the strategies pursued by other players. In this case, confessing is a dominant strategy for Mr Black. He spends less time in jail if he confesses, regardless of whether Mr Pink confesses or remains silent.

Now consider Mr Pink's decision. He faces exactly the same choices as Mr Black, and he reasons in much the same way. Regardless of what Mr Black does, Mr Pink can reduce his time in jail by confessing. In other words, confessing is a dominant strategy for Mr Pink. In the end, both Mr Black and Mr Pink confess, and both spend 8 years in jail. Yet, from their standpoint, this is a terrible outcome. If they had both remained silent, both of them would have been better off, spending only 1 year in jail on the gun charge. By each pursuing his own interests, the two prisoners together reach an outcome that is worse for each of them.

To see how difficult it is to maintain cooperation, imagine that, before the police captured Mr Black and Mr Pink, the two criminals had made a pact not to confess. Clearly, this agreement would make them both better off if they both live up to it, because they would each spend only 1 year in jail. But would the two criminals in fact remain silent, simply because they had agreed to? Once they are being questioned separately, the logic of self-interest takes over and leads them to confess. Cooperation between the two prisoners is difficult to maintain because cooperation is individually irrational.

* * *

Michael J. Mauboussin writes:

The classic two-player example of game theory is the prisoners' dilemma. We can recast the prisoners' dilemma in a business context by considering a simple case of capacity addition. Say two competitors, A and B, are considering adding capacity. If competitor A adds capacity and B doesn't, A gets an outsized payoff. Likewise, if B adds capacity and A doesn't than B gets the large payoff. If neither expands, A and B aren't as well-off as if one alone had added capacity. But if both add capacity, they're worse off of than if they had done nothing.

** * **

Avinash Dixit offers:

Consider two firms, say Coca-Cola and Pepsi, selling similar products. Each must decide on a pricing strategy. They best exploit their joint market power when both charge a high price; each makes a profit of ten million dollars per month. If one sets a competitive low price, it wins a lot of customers away from the rival. Suppose its profit rises to twelve million dollars, and that of the rival falls to seven million. If both set low prices, the profit of each is nine million dollars. Here, the low-price strategy is akin to the prisoner's confession, and the high-price akin to keeping silent. Call the former cheating, and the latter cooperation. Then cheating is each firm's dominant strategy, but the result when both "cheat" is worse for each than that of both cooperating.

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Warren Buffett provides some illumination as to how the Prisoners' Dilemma plays out in business in the 1985 Berkshire Hathaway Annual report.

The domestic textile industry operates in a commodity business, competing in a world market in which substantial excess capacity exists. Much of the trouble we experienced was attributable, both directly and indirectly, to competition from foreign countries whose workers are paid a small fraction of the U.S. minimum wage. But that in no way means that our labor force deserves any blame for our closing. In fact, in comparison with employees of American industry generally, our workers were poorly paid, as has been the case throughout the textile business. In contract negotiations, union leaders and members were sensitive to our disadvantageous cost position and did not push for unrealistic wage increases or unproductive work practices. To the contrary, they tried just as hard as we did to keep us competitive. Even during our liquidation period they performed superbly. (Ironically, we would have been better off financially if our union had behaved unreasonably some years ago; we then would have recognized the impossible future that we faced, promptly closed down, and avoided significant future losses.)

Over the years, we had the option of making large capital expenditures in the textile operation that would have allowed us to somewhat reduce variable costs. Each proposal to do so looked like an immediate winner. Measured by standard return-on-investment tests, in fact, these proposals usually promised greater economic benefits than would have resulted from comparable expenditures in our highly-profitable candy and newspaper businesses.

But the promised benefits from these textile investments were illusory. Many of our competitors, both domestic and foreign, were stepping up to the same kind of expenditures and, once enough companies did so, their reduced costs became the baseline for reduced prices industry-wide. Viewed individually, each company's capital investment decision appeared cost-effective and rational; viewed collectively, the decisions neutralized each other and were irrational (just as happens when each person watching a parade decides he can see a little better if he stands on tiptoes). After each round of investment, all the players had more money in the game and returns remained anemic.

Thus, we faced a miserable choice: huge capital investment would have helped to keep our textile business alive, but would have left us with terrible returns on ever-growing amounts of capital. After the investment, moreover, the foreign competition would still have retained a major, continuing advantage in labor costs. A refusal to invest, however, would

make us increasingly non-competitive, even measured against domestic textile manufacturers. I always thought myself in the position described by Woody Allen in one of his movies: "More than any other time in history, mankind faces a crossroads. One path leads to despair and utter hopelessness, the other to total extinction. Let us pray we have the wisdom to choose correctly."

For an understanding of how the to-invest-or-not-to-invest dilemma plays out in a commodity business, it is instructive to look at Burlington Industries, by far the largest U.S. textile company both 21 years ago and now. In 1964 Burlington had sales of \$1.2 billion against our \$50 million. It had strengths in both distribution and production that we could never hope to match and also, of course, had an earnings record far superior to ours. Its stock sold at 60 at the end of 1964; ours was 13.

Burlington made a decision to stick to the textile business, and in 1985 had sales of about \$2.8 billion. During the 1964-85 period, the company made capital expenditures of about \$3 billion, far more than any other U.S. textile company and more than \$200-per-share on that \$60 stock. A very large part of the expenditures, I am sure, was devoted to cost improvement and expansion. Given Burlington's basic commitment to stay in textiles, I would also surmise that the company's capital decisions were quite rational.

Nevertheless, Burlington has lost sales volume in real dollars and has far lower returns on sales and equity now than 20 years ago. Split 2-for-1 in 1965, the stock now sells at 34 — on an adjusted basis, just a little over its \$60 price in 1964. Meanwhile, the CPI has more than tripled. Therefore, each share commands about one-third the purchasing power it did at the end of 1964. Regular dividends have been paid but they, too, have shrunk significantly in purchasing power.

This devastating outcome for the shareholders indicates what can happen when much brain power and energy are applied to a faulty premise. The situation is suggestive of Samuel Johnson's horse: "A horse that can count to ten is a remarkable horse — not a remarkable mathematician." Likewise, a textile company that allocates capital brilliantly within its industry is a remarkable textile company — but not a remarkable business.

My conclusion from my own experiences and from much observation of other businesses is that a good managerial record (measured by economic returns) is far more a function of what business boat you get into than it is of how effectively you row (though intelligence and effort help considerably, of course, in any business, good or bad). Some years ago I wrote: "When a management with a reputation for brilliance tackles a business with a reputation for poor fundamental economics, it is the reputation of the business that remains intact." Nothing has since changed my point of view on that matter. Should you find yourself in a chronically-leaking boat, energy devoted to changing vessels is likely to be more productive than energy devoted to patching leaks.

** * **

Mauboussin adds:

Our discussion so far has focused on competition. But thoughtful strategic analysis also recognizes the role of co-evolution, or cooperation, in business. Not all business relationships are conflictual. Sometimes companies outside the purview of a firm's competitive set can heavily influence its value creation prospects.

Consider the example of DVD makers (software) and DVD player makers (hardware). These companies do not compete with one another. But the more DVD titles that are available, the more attractive it will be for a consumer to buy a DVD player and vice versa. Another example is the Wintel standard—added features on Microsoft's operating system required more powerful Intel microprocessors, and more powerful microprocessors could support updated operating systems. Complementors make the added value pie bigger. Competitors fight over a fixed pie.

** * **

Mankiw offers another real world example:

Consider an oligopoly with two members, called Iran and Saudi Arabia. Both countries sell crude oil. After prolonged negotiation, the countries agree to keep oil production low in order to keep the world price of oil high. After they agree on production levels, each country must decide whether to cooperate and live up to this agreement or to ignore it and produce at a higher level. The following image shows how the profits of the two countries depend on the strategies they choose.

Suppose you are the leader of Saudi Arabia. You might reason as follows:

I could keep production low as we agreed, or I could raise my production and sell more oil on world markets. If Iran lives up to the agreement and keeps its production low, then my country earns profit of \$60 billion with high production and \$50 billion with low production. In this case, Saudi Arabia is better off with high production. If Iran fails to live up to the agreement and produces at a high level, then my country earns \$40 billion with high production and \$30 billion with low production. Once again, Saudi Arabia is better off with high production. So, regardless of what Iran chooses to do, my country is better off reneging on our agreement and producing at a high level.

Producing at a high level is a dominant strategy for Saudi Arabia. Of course, Iran reasons in exactly the same way, and so both countries produce at a high level. The result is the inferior outcome (from both Iran and Saudi Arabia's standpoint) with low profits in each country.

This example illustrates why oligopolies have trouble maintaining monopoly profits. The monopoly outcome is jointly rational for the oligopoly, but each oligopolist has an incentive to cheat. Just as self-interest drives the prisoners in the prisoners' dilemma to confess, self-interest makes it difficult for the oligopoly to maintain the cooperative outcome with low production, high prices and monopoly prices.

29. Former Canadian Prime Minister Mackenzie King on The Law of Competing Standards

I came across that passage while reading “Industry and Humanity,” by former Canadian Prime Minister Mackenzie King. We’ll add this to our previous knowledge on Gresham’s Law.

In the reign of Queen Elizabeth, an official named Gresham observed that where different metals were in circulation as coinage and some were better than others of the same nominal value, the coins made of the inferior metal tended to drive the better out of circulation. The better coins were either hoarded or melted down and sold as bullion, were used in the fine arts, or were absorbed in the foreign exchanges. In other words, what Gresham discovered was that cheaper money tends to drive out dearer; that when people begin to discriminate between two coinages, they will invariably pay out the inferior and hoard the better, thus removing the better from circulation. This phenomenon once generally observed came to be described as a “Law,” and was identified with Gresham’s name, since it was Gresham who was first successful in drawing public attention to it. Amongst money-changers, Gresham’s Law of the precious metals is better known than the Ten Commandments.

Something analogous to Gresham’s Law will be found to obtain in the case of competing standards in Industry. Assuming there is indifference in the matter of choice between competing commodities or services, but that in the case of such commodities or services the labor standards involved vary, the inferior standard, if brought in this manner into competition with a higher standard, will drive it out, or drag the higher down to its level. This is effected by the opportunity of under-selling which comes, where in such cases human well-being is sacrificed to material ends. The superior standard, not being recognized or demanded, is unable to hold its own, and in time disappears. This Law is just as real and relentless in its operation in Industry as Gresham’s Law of the precious metals is with respect to money and the mechanism of exchange. Indeed, a more accurate exposition would describe both as manifestations of one and the same law, which I propose to call the Law of Competing Standards. I see no reason why economists should not recognize the existence of such a law, and incorporate it immediately in economic science as being quite as significant as the Law of Supply and Demand, the Law of Diminishing Returns, or any other Law accorded a place in its nomenclature.

The Law of Competing Standards is doubtless a part of the general Law of Competition, under which the cheaper of two commodities gains in competition a preference over the dearer. What Gresham discovered was an important sequence of the Law of Competition as applied to coinage; namely, the disappearance, in the course of time, of the superior metals. Observance of a like sequence in the case of standards in Industry is highly desirable. As respects labor standards, I believe that recognition of the operation of the Law of Competing Standards over ever-widening areas would do more than aught else to clear up the most baffling problems with which Industry is confronted, and to point the way to a solution of many situations which hitherto have seemed incapable of solution.

30. Daniel Kahneman and Herbert Simon on Intuition

Why do experts seem to have better intuition than the rest of us when operating within their Circle of Competence?

Are they doing something the rest of us are not? Or is there another explanation that unlocks the keys of intuition.

In *Thinking Fast and Slow*, Nobel laureate Daniel Kahneman writes that “intuition is nothing more and nothing less than recognition.”

When we experience something either *directly* (first hand) or *indirectly* (we’ve read about it or hear it in a podcast) our brains take note and file it away. Later when we encounter a situation that resembles our chunk, our brains leap into a subconscious recognition of a situation. Our intuition about the situation might be correct and it might be wrong but it’s not operating at the level of conscious thought. You can think of intuition as thinking that you know something without really knowing how or why you know it.

When Can We Trust Our Intuition?

While our intuition is often right, it also leads us astray. Without consciously realizing it we place a high confidence in our intuition. And why wouldn’t we? It’s right far more often than it’s wrong. But confidence is a poor proxy for correctness and often means that when you’re wrong, you’re really wrong. Luckily there are situations where our intuition is more likely to be right than others.

Our intuition is more often right if:

1. The environment is unchanging or slow to change. Complex adaptive systems are poor places to develop intuition.
2. We have a large sample size. That is., we get a lot of practice.
3. We receive immediate and accurate feedback.

So all we need is an unchanging environment, lots of practice, and immediate feedback. Simple but not easy. If any of those things are not true, we should rely less on our subconscious gut and more on our rational brain.

The Components of Expertise

This connects with something Herbert Simon, another Nobel laureate, wrote on expertness and intuition:

We have seen that a major component of expertise is the ability to recognize a very large number of specific relevant cues when they are present in any situation, and then to retrieve from memory information about what to do when those particular cues are noticed. Because of this knowledge and recognition capability, experts can respond to new situations very rapidly—and usually with considerable accuracy. Of course, on further thought, the initial reaction may not be the correct one, but it is correct in a substantial number of cases and is rarely irrelevant.

Chess grandmasters, looking at the chessboard, will generally form a hypothesis about the best move within five seconds, and in four out of five cases, this initial hypothesis will be the move they ultimately prefer. Moreover, it can be shown that this ability accounts for a very large proportion of their chess skill. For, if required to play very rapidly, the grandmaster may not maintain a grandmaster level of play but will almost always maintain a master level, even though in rapid play there is time for almost nothing but to react to the first cues that are noticed on the board.

We usually use the word “intuition” – sometimes also “judgment” or even “creativity” – to refer to this ability of experts to respond to situations in their domains of expertise almost instantaneously and relatively accurately.

In his autobiography, *Models of My Life*, Simon further elaborates on the difference between expert decision makers and the rest of us.

The decision maker of experience has at his disposal a checklist of things to watch out for before finally accepting a decision. A large part of the difference between the experienced decision maker and the novice in these situations is not any particular intangible like "judgment" or "intuition." If one could open the lid, so to speak, and see what was in the head of the experienced decision-maker, one would find that he had at his disposal repertoires of possible actions; that he had checklists of things to think about before he acted; and that he had mechanisms in his mind to evoke these, and bring these to his conscious attention when the situations for decisions arose.

31. Why Do People Choke When the Stakes Are High?

Loss Aversion.

In sports, on a game show, or just on the job, what causes people to choke when the stakes are high? A new study by researchers at the California Institute of Technology (Caltech) suggests that when there are high financial incentives to succeed, people can become so afraid of losing their potentially lucrative reward that their performance suffers. It is a somewhat unexpected conclusion. After all, you would think that the more people are paid, the harder they will work, and the better they will do their jobs — until they reach the limits of their skills. That notion tends to hold true when the stakes are low, says Vikram Chib, a postdoctoral scholar at Caltech and lead author on a paper published in the May 10 issue of the journal Neuron. Previous research, however, has shown that if you pay people too much, their performance actually declines.

Some experts have attributed this decline to too much motivation: they think that, faced with the prospect of earning an extra chunk of cash, you might get so excited that you will fail to do the task properly. But now, after looking at brain-scan data of volunteers performing a specific motor task, the Caltech team says that what actually happens is that you become worried about losing your potential prize. The researchers also found that the more someone is afraid of loss, the worse they perform.

32. The Basic Laws of Human Stupidity

Carlo Cipolla, a former Professor of Economics at UC Berkeley, lists the basic laws of human stupidity:

The first basic law of human stupidity asserts without ambiguity that: Always and inevitably everyone underestimates the number of stupid individuals in circulation.

At first, the statement sounds trivial, vague and horribly ungenerous. Closer scrutiny will however reveal its realistic veracity. No matter how high are one's estimates of human stupidity, one is repeatedly and recurrently startled by the fact that:

a) people whom one had once judged rational and intelligent turn out to be unashamedly stupid.

b) day after day, with unceasing monotony, one is harassed in one's activities by stupid individuals who appear suddenly and unexpectedly in the most inconvenient places and at the most improbable moments.

The First Basic Law prevents me from attributing a specific numerical value to the fraction of stupid people within the total population: any numerical estimate would turn out to be an underestimate. Thus in the following pages I will denote the fraction of stupid people within a population by the symbol σ .

33. Batesian Mimicry: Why Copycats Are Successful

One of our first interview guests for The Knowledge Project was the former NFL executive Michael Lombardi. In our interview, we discussed topics ranging from the nature of leadership to decision making in a football context. Mike is one of the wisest thinkers associated with the game.

We heard Mike on an NFL podcast recently, and in a brief clip you can listen to here, Mike makes a fascinating comment on differentiating between a Mimic and the Real Thing:

“There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”

Mike got the idea from my friend and CEO of Glenair, Peter Kaufman. Following Mike’s lead, we chose to dig in a little further.

Turns out there are a *host* of Coral Snake Mimics, all designed to look exactly as fierce as the true bad guys. Besides the Mexican Milk Snake, there is the Scarlet King Snake, the Florida Scarlet Snake, and the California Mountain Kingsnake. (At least.)

For an example, here are the Texas Coral Snake on the left and the Mexican Milk Snake on the right. Pretty damn close!



According to Wikipedia, the Texas Coral Snake's venom is a "powerful neurotoxin, causing neuromuscular dysfunction", and terrifyingly describes its bite as coming from "a pair of hollow, small, fixed fangs in the front of its upper jaw, through which the venom is injected and encouraged via a chewing motion. Due to this method of venom delivery, a coral snake must bite and hold on for a brief time to deliver a significant amount of venom..." The Milk Snake, on the other hand, is described as a pretty ideal pet: "The Mexican Milk Snake adapts well to captive care, and its smaller size and striking colorations can make it an attractive choice for a pet snake. They are normally docile, and not typically apt to bite or expel musk."

So, how is it that these two look alike? It's due to a phenomenon called Batesian Mimicry. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched!

In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.

This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs.

We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffetts. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit.

It seems almost a law of nature that success will be copied, sometimes in a very disgraceful way. (Charlie Munger thinks that the fundamental algorithm of life is "Repeat what works.")

Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry — even in ourselves.

This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself.

The real thing knows a fake. Charlie Munger once commented on this in relation to the field of money management:

"It's very hard to tell the difference between a good money manager and someone who just has the patter down. If you aren't a good money manager yourself, rather than trying to pick one, you're probably better off with a low cost index fund. 'It takes one to know one'."

An insight this good is only possible through continued study across the largest and most relevant fields of study. Peter got this idea by studying biology, a field full of incredible insight but, strangely underappreciated by most "non-biologists". It's not just ideas about predators and prey, but niches, competition, co-evolutionary arms races and a whole host of others which give us massive insight into the human world.

Peter realized that studying across fields like biology and physics is something like buying an index fund: It works because you capture *all* the important companies traded on the public exchange, not just a select few. That means you capture the massive winners, which tend to greatly outweigh the failures.

Studying across *all* of the important fields gives you the same advantage, except it's even better: If an index fund buys a new position, it must sell something to do so; consequently, the "big winners" can only impact your portfolio in a limited way. But if you come to understand a new Great Idea, you don't have to give up the ones you already know! This is a great advantage.

And so it's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

If you liked this post, you'll probably also love:

The Need for Biological Thinking to Solve Complex Problems — How should we think about complexity? Should we use a biological or physics system? The answer, of course, is that it depends. It's important to have both tools available at your disposal.

The Founder Principle: A Wonderful Idea from Biology — In his brilliant *The Song of the Dodo*, David Quammen gives us not only the stories of many brilliant biological naturalists including Mayr, but we also get a deep dive into the core concepts of evolution and extinction, including the Founder Effect.

Biology Enables. Culture Forbids. — From a biological perspective, nothing is unnatural. Whatever is possible is by definition also natural.

34. The Need for Biological Thinking to Solve Complex Problems

“Biological thinking and physics thinking are distinct, and often complementary, approaches to the world, and ones that are appropriate for different kinds of systems.”

How should we think about complexity? Should we use a biological or physics system? The answer, of course, is that it depends. It's important to have both tools available at your disposal.

These are the questions that Samuel Arbesman explores in his fascinating book Overcomplicated: Technology at the Limits of Comprehension.

[B]iological systems are generally more complicated than those in physics. In physics, the components are often identical—think of a system of nothing but gas particles, for example, or a single monolithic material, like a diamond. Beyond that, the types of interactions can often be uniform throughout an entire system, such as satellites orbiting a planet.

Biology is different, and there is something meaningful to be learned from a biological approach to thinking.

In biology, there are a huge number of types of components, such as the diversity of proteins in a cell or the distinct types of tissues within a single creature; when studying, say, the mating behavior of blue whales, marine biologists may have to consider everything from their DNA to the temperature of the oceans. Not only is each component in a biological system distinctive, but it is also a lot harder to disentangle from the whole. For example, you can look at the nucleus of an amoeba and try to understand it on its own, but you generally need the rest of the organism to have a sense of how the nucleus fits into the operation of the amoeba, how it provides the core genetic information involved in the many functions of the entire cell.

Arbesman makes an interesting point here when it comes to how we should look at technology. As the interconnections and complexity of technology increases, it increasingly resembles a biological system rather than a physics one. There is another difference.

[B]iological systems are distinct from many physical systems in that they have a history. Living things evolve over time. While the objects of physics clearly do not emerge from thin air—astrophysicists even talk about the evolution of stars—biological systems are especially subject to evolutionary pressures; in fact, that is one of their defining features. The complicated structures of biology have the forms they do because of these complex historical paths, ones that have been affected by numerous factors over huge amounts of time. And often, because of the complex forms of living things, where any small change can create unexpected effects, the changes that have happened over time have been through tinkering: modifying a system in small ways to adapt to a new environment.

Biological systems are generally hacks that evolved to be good enough for a certain environment. They are far from pretty top-down designed systems. And to accommodate an ever-changing environment, they are rarely the most optimal system on a micro-level, preferring to optimize for survival over any one particular attribute. And it's not the survival of the individual that's optimized, it's the survival of the species.

Technologies can appear robust until they are confronted with some minor disturbance, causing a catastrophe. The same thing can happen to living things. For example, humans can adapt incredibly well to a large array of environments, but a tiny change in a person's genome can cause dwarfism, and two copies of that mutation invariably cause death. We are of a different scale and material from a particle accelerator or a computer network, and yet these systems have profound similarities in their complexity and fragility.

Biological thinking, with a focus on details and diversity, is a necessary tool to deal with complexity.

The way biologists, particularly field biologists, study the massively complex diversity of organisms, taking into account their evolutionary trajectories, is therefore particularly appropriate for understanding our technologies. Field biologists often act as naturalists—collecting, recording, and cataloging what they find around them—but even more than that, when confronted with an enormously complex ecosystem, they don't immediately try to understand it all in its totality. Instead, they recognize that they can study only a tiny part of such a system at a time, even if imperfectly. They'll look at the interactions of a handful of species, for example, rather than examine the complete web of species within a single region. Field biologists are supremely aware of the assumptions they are making, and know they are looking at only a sliver of the complexity around them at any one moment. [...]

When we're dealing with different interacting levels of a system, seemingly minor details can rise to the top and become important to the system as a whole. We need "Field biologists" to catalog and study details and portions of our complex systems, including their failures and bugs. This kind of biological thinking not only leads to new insights, but might also be the primary way forward in a world of increasingly interconnected and incomprehensible technologies.

Waiting and observing isn't enough.

Biologists will often be proactive, and inject the unexpected into a system to see how it reacts. For example, when biologists are trying to grow a specific type of bacteria, such as a variant that might produce a particular chemical, they will resort to a process known as mutagenesis. Mutagenesis is what it sounds like: actively trying to generate mutations, for example by irradiating the organisms or exposing them to toxic chemicals.

When systems are too complex for human understanding, often we need to insert randomness to discover the tolerances and limits of the system. One plus one doesn't always equal two when you're dealing with non-linear systems. For biologists, tinkering is the way to go.

As Stewart Brand noted about legacy systems, "Teasing a new function out of a legacy system is not done by command but by conducting a series of cautious experiments that with luck might converge toward the desired outcome."

When Physics and Biology Meet

This doesn't mean we should abandon the physics approach, searching for underlying regularities in complexity. The two systems complement one another rather than compete. Arbesman recommends asking the following questions:

When attempting to understand a complex system, we must determine the proper resolution, or level of detail, at which to look at it. How fine-grained a level of detail are we focusing on? Do we focus on the individual enzyme molecules in a cell of a large organism, or do we focus on the organs and blood vessels? Do we focus on the binary signals winding their way through circuitry, or do we examine the overall shape and function of a computer program? At a larger scale, do we look at the general properties of a computer network, and ignore the individual machines and decisions that make up this structure?

When we need to abstract away a lot of the details and lean on physics thinking more.

Think about it from an organizational perspective. The new employee at the lowest level is focused on the specific details of their job, whereas the executive is focused on systems, strategy, culture, and flow — how things interact and reinforce one another. The details of the new employee's job are lost on them.

We can't use one system, whether biological or physics, exclusively. That's fragile thinking. Instead, we need to combine both systems.

In Cryptonomicon, a novel by Neal Stephenson, he makes exactly this point talking about the structure of the pantheon of Greek gods:

And yet there is something about the motley asymmetry of this pantheon that makes it more credible. Like the Periodic Table of the Elements or the family tree of the elementary particles, or just about any anatomical structure that you might pull up out of a cadaver, it has enough of a pattern to give our minds something to work on and yet an irregularity that indicates some kind of organic provenance—you have a sun god and a moon goddess, for example, which is all clean and symmetrical, and yet over here is Hera, who has no role whatsoever except to be a literal bitch goddess, and then there is Dionysus who isn't even fully a god—he's half human—but gets to be in the Pantheon anyway and sit on Olympus with the Gods, as if you went to the Supreme Court and found Bozo the Clown planted among the justices.

35. The Founder Principle: A Wonderful Idea from Biology

We've all been taught natural selection; the mechanism by which species evolve through differential reproductive success. Most of us are familiar with the idea that random mutations in DNA cause variances in offspring, some of which survive more frequently than others. However, this is only part of the story.

Sometimes other situations cause massive changes in species populations, and they're often more nuanced and tough to spot.

One such concept comes from one of the most influential biologists in history, Ernst Mayr. He called it The Founder Principle, a mechanism by which new species are created by a splintered population; often with lower genetic diversity and an increased risk of extinction. In the brilliant The Song of the Dodo: Island Biography in an Age of Extinction, David Quammen gives us not only the stories of many brilliant biological naturalists including Mayr, but we also get a deep dive into the core concepts of evolution and extinction, including the founder principle.

Quammen begins by outlining the basic idea:

When a new population is founded in an isolated place, the founders usually constitute a numerically tiny group – a handful of lonely pioneers, or just a pair, or maybe no more than one pregnant female. Descending from such a small number of founders, the new population will carry only a minuscule and to some extent random sample of the gene pool of the base population. The sample will most likely be unrepresentative, encompassing less genetic diversity than the larger pool. This effect shows itself whenever a small sample is taken from a large aggregation of diversity; whether the aggregation consists of genes, colored gum balls, M&M's, the cards of a deck, or any other collection of varied items, a small sample will usually contain less diversity than the whole.

Why does the founder principle happen? It's basically applied probability. Perhaps an example will help illuminate the concept.

Think of yourself playing a game of poker (five card draw) with a friend. The deck of cards is separated into four suits: Diamonds, hearts, clubs and spades, each suit having 13 cards for a total of 52 cards.

Now look at your hand of five cards. Do you have one card from each suit? Maybe. Are all five cards from the same suit? Probably not, but it is possible. Will you get the ace of spades? Maybe, but not likely.

This is a good metaphor for how the founder principle works. The gene pool carried by a small group of founders is unlikely to be precisely representative of the gene pool of the larger group. In some rare cases it will be very unrepresentative, like you getting dealt a straight flush.

It starts to get interesting when this founder population starts to reproduce, and genetic drift causes the new population to diverge significantly from its ancestors. Quammen explains:

Already isolated geographically from its base population, the pioneer population now starts drifting away genetically. Over the course of generations, its gene pool becomes more and more different from the gene pool of the base population – different both as to the array of alleles (that is, the variant forms of a given gene) and as to the commonness of each allele.

The founder population, in some cases, will become so different that it can no longer mate with the original population. This new species may even be a competitor for resources if the two populations are ever reintroduced. (Say, if a land bridge is created between two islands, or humans bring two species back in contact.)

Going back to our card metaphor, let's pretend that you and your friend are playing with four decks of cards — 208 total cards. Say we randomly pulled out forty cards from those decks. If there are absolutely no kings in the forty cards you are playing with, you will

never be able to create a royal flush (ace+king+queen+jack+10 of the same suit). It doesn't matter how the cards are dealt, you can never make a royal flush with no kings. Thus it is with species: If a splintered-off population isn't carrying a specific gene variant (allele), that variant can never be represented in the newly created population, no matter how prolific that gene may have been in the original population. It's gone. And as the rarest variants disappear, the new population becomes increasingly unlike the old one, especially if the new population is small.

Some alleles are common within a population, some are rare. If the population is large, with thousands or millions of parents producing thousands or millions of offspring, the rare alleles as well as the common ones will usually be passed along. Chance operation at high numbers tends to produce stable results, and the proportions of rarity and commonness will hold steady. If the population is small, though, the rare alleles will most likely disappear [...] As it loses its rare alleles by the wayside, a small pioneer population will become increasingly unlike the base population from which it derived.

Some of this genetic loss may be positive (a gene that causes a rare disease may be missing), some may be negative (a gene for a *useful* attribute may be missing) and some may be neutral.

The neutral ones are the most interesting: A neutral gene at one point in time may become a useful gene at another point. It's like playing a round of poker where 8's are suddenly declared "wild," and that card suddenly becomes much more important than it was the hand before. The same goes for animal traits.

Take a mammal population living on an island, having lost all of its ability to swim. That won't mean much if all is well and it is never *required* to swim. But the moment there is a natural disaster such as a fire, having the ability to swim the short distance to the mainland could be the difference between survival or extinction.

That's why the founder principle is so dangerous: The loss of genetic diversity often means losing valuable survival traits. Quammen explains:

Genetic drift compounds the founder-effect problem, stripping a small population of the genetic variation that it needs to continue evolving. Without that variation, the population stiffens toward uniformity. It becomes less capable of adaptive response. There may be no manifest disadvantages in uniformity so long as environmental circumstances remain stable; but when circumstances are disrupted, the population won't be capable of evolutionary adjustment. If the disruption is drastic, the population may go extinct.

This loss of adaptability is one of the two major issues caused by the founder principle, the second being inbreeding depression. A founder population may have no choice but to only breed within its population and a symptom of too much inbreeding is the manifestation of harmful genetic variants among inbred individuals. (One reason humans consider incest a dangerous activity.) This too increases the fragility of species and decreases their ability to evolve.

The founder principle is just one of many amazing ideas in The Song of the Dodo. In fact, we at Farnam Street feel the book is so important that it made our list of books we recommend to improve your general knowledge of the world and it was the first book we picked for our members-only reading group.

If you have already read this book and want more we suggest Quammen's The Reluctant Mr. Darwin or his equally thought provoking Spillover: Animal Infections and the Next Human Pandemic. Another wonderful and readable book on species evolution is The Beak of the Finch, by Jonathan Weiner.

36. What Biology Enables, Culture Forbids

We get a little confused when deciding if a particular human behavior is cultural or biological. Is homosexuality a natural act or unnatural? How about Facebook? Is it unnatural human behavior? Abortion? Non-procreative sex? Slavery? Mixing of races? Many of these are either explicitly or certainly border on being taboo subjects. As in, they may not be discussed in polite company, even when encouraged.

Yet, for those of us seeking to understand reality as it is, to understand deeply the most important buckets of knowledge, taboo is no reason to avoid the hard subjects.

So how should we think about this?

“From a biological perspective, nothing is unnatural. Whatever is possible is by definition also natural.”

— Yuval Harari

Professor Yuval Harari, who has previously taught us why humans dominate the earth and the false natural state of man, has an interesting take, discussed in his book Sapiens: A Brief History of Humankind. The chapter is aptly titled “There is No Justice in History.”

Professor Harari’s well-informed heuristic boils down to: Biology Enables. Culture Forbids. *How can we distinguish what is biologically determined from what people merely try to justify through biological myths? A good rule of thumb is ‘Biology enables, culture forbids.’ Biology is willing to tolerate a very wide spectrum of possibilities. It’s culture that obligates people to realize some possibilities while forbidding others. Biology enables women to have children — some cultures oblige women to realize this possibility. Biology enables men to enjoy sex with one another — some cultures forbid them to realize this possibility. Culture tends to argue that it forbids only that which is unnatural. But from a biological perspective, nothing is unnatural. Whatever is possible is by definition also natural. A truly unnatural behavior, one that goes against the laws of nature, simply cannot exist, so it would need no prohibition.*

[...]

...Evolution has no purpose. Organs have not evolved with a purpose, and the way they are used is in constant flux. There is not a single organ in the human body that only does the job its prototype did when it first appeared hundreds of millions of years ago. Organs evolve to perform a particular function, but once they exist, they can be adapted for other usages as well. Mouths, for example, appeared because the earliest multicellular organisms needed a way to take nutrients into their bodies. We still use our mouths for that purpose, but we also use them to kiss, speak, and, if we are Rambo, to pull the pins out of hand grenades. Are any of these uses unnatural simply because our worm-like ancestors 600 million years ago didn’t do those things with their mouths?

Our biology gives us a very wide playground and a lot of berth. We’re capable of a wide variety of activities and forms of organization, while other species generally fall into far more fixed and predictable hierarchies.

Over the course of history, humans have taken advantage of this wide range in a variety of positive and negative ways by creating and sustaining myths not supported by biological reality.

Take slavery, once a common practice throughout the world and now thankfully considered a scourge (and illegal) on all parts of the planet. Or the caste system, still in place in some in certain areas of the world, although perhaps less strictly than in the past.

Both slavery and the castes were carried out through a series of pseudoscientific rationalizations about the “natural order” of things, stories strong enough to be believed (in part) by all constituents of the hierarchy. This “forbidding” aspect of culture was not supported by biological differences, but that didn’t make the stories any less powerful or believable.

Even the American political system, ostensibly founded on a bedrock of “liberty and equality”, only provided those things to certain small groups. The Founders used cultural myths to rationalize a deeply divided society in which men had dominion over women, European whites had dominion over blacks and the native people, and the historically rich had dominion over the historically poor. Any other order would have been “unnatural”: *The American order consecrated the hierarchy between the rich and poor. Most Americans at that time had little problem with the inequality caused by wealthy parents passing their money and businesses onto their children. In their view, equality meant simply that the same laws applied to rich and poor. It had nothing to do with unemployment benefits, integrated education or health insurance. Liberty, too, carried very different connotations than it does today. In 1776, it did not mean that the disempowered (certainly not blacks or Indians or, God forbid, women) could gain and exercise power. It meant simply that the state could not, except in unusual circumstances, confiscate a citizen’s private property or tell him what to do with it. The American order thereby upheld the hierarchy of wealth, which some thought was mandated by God and others viewed representing the immutable laws of nature. Nature, it was claimed, rewarded merit with wealth while penalizing indolence.*

All the above-mentioned distinctions — between free persons and slaves, between whites and blacks, between rich and poor — are rooted in fictions... Yet it is an iron rule of history that every imagined hierarchy disavows its fictional origins and claims to be natural and inevitable. For instance, many people who have viewed the hierarchy of free persons and slaves as natural and correct have argued that slavery is not a human invention. Hammurabi saw it as ordained by the gods. Aristotle argued that slaves have a ‘slavish nature’ whereas free people have a ‘free nature’. Their status in society is merely a reflection of their innate nature.

This isn’t to argue that there aren’t biological differences between certain groups of people, including men and women. There are. But history has shown our tendency to exaggerate those differences and to create stories around our exaggerations, stories that uphold a certain desired hierarchy. These stories have a way of creating their own reality.

Just as frequently, we commit the opposite sin by restricting certain behavior based on some idea of what’s “natural” or “unnatural”, confusing biology with religious or cultural taboos. (And these myths die hard: It’s hard to fathom, but homosexuality wasn’t even legal in the United Kingdom until 1967.) As Harari rightly points out, anything we can do is perfectly natural in the biological sense. We come well-equipped for a variety of behavior. And this certainly isn’t to argue that all behavior is equally acceptable: We put bumpers on society to reduce murder, rape, slavery, and other vile behavior that is perfectly biologically natural to us, and we should.

But unless we recognize the difference between biology and cultural myth and seek to reduce our unfair taboos wherever possible, we fail in some way to see the world through the eyes of others, and see that our imagined order is not always a fair or just one, a natural or inevitable one. Maybe some of the things we see around us are just a historical accident if we look closely enough.

Even more than that, examining the relationship between biological reality and cultural myth allows us to appreciate our basic storytelling instincts. Human beings are wired for narrative: We’ve been called the Storytelling Animal and for good reason. Our thirst and ready acceptance of narrative is a basic part of our existence; it’s hard-wired into our genetic algorithm.

Much of our narrative superpower can be observed in the structure of human language, which is unique among species in its infinite flexibility and adaptability. It makes us capable of great cooperative accomplishments, but also great evils.

Fortunately, the modern world has done a pretty good job steadily loosening the grip of mythical “natural” realities that only exist in our heads. But a fair inquiry remains: What sustaining myths still exist? Are they for good or for evil? We leave that for you to ponder.

37. The Red Queen Effect: Avoid Running Faster to Stay in the Same Place

Charles Lutwidge Dodgson (1832-1898), better known by his pseudonym Lewis Carroll, was not only an author but a keen observer of human nature. His most famous works are *Alice's Adventures in Wonderland* and its sequel *Through the Looking Glass*, which have become timeless classics.

Bees have to move very fast to stay still.

David Foster Wallace

In *Through the Looking Glass*, Alice, a young girl, gets schooled by the Red Queen in an important life lesson that many of us fail to heed. Alice finds herself running faster and faster but staying in the same place.

Alice never could quite make out, in thinking it over afterwards, how it was that they began: all she remembers is, that they were running hand in hand, and the Queen went so fast that it was all she could do to keep up with her: and still the Queen kept crying 'Faster! Faster!' but Alice felt she could not go faster, though she had not breath left to say so. The most curious part of the thing was, that the trees and the other things round them never changed their places at all: however fast they went, they never seemed to pass anything. 'I wonder if all the things move along with us?' thought poor puzzled Alice. And the Queen seemed to guess her thoughts, for she cried, 'Faster! Don't try to talk!' Eventually, the Queen stops running and props Alice up against a tree, telling her to rest. Alice looked round her in great surprise. 'Why, I do believe we've been under this tree the whole time! Everything's just as it was!'

'Of course it is,' said the Queen, 'what would you have it?'

'Well, in our country,' said Alice, still panting a little, 'you'd generally get to somewhere else — if you ran very fast for a long time, as we've been doing.'

'A slow sort of country!' said the Queen. 'Now, here, you see, it takes all the running you can do, to keep in the same place.'

If you want to get somewhere else, you must run at least twice as fast as that!'

Smarter, Not Harder

The Red Queen Effect means that staying in the same place is falling behind. Surviving another day means we have to co-evolve with the systems we interact with.

If all animals evolved at the same rate, there would be no change in the relative interactions between species. However, not all animals evolve at the same rate. As Darwin observed, some are more “responsive to change” than others.

It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change.

Charles Darwin

Species that are more responsive to change can gain a relative advantage over the ones they compete with and increase the odds of survival. In the short run, these small gains don't make much of a difference, but as generations pass the advantages compound. Everyone from Entrepreneurs and Fortune 500 CEOs to best-selling authors and middle managers are embedded with their own Red Queen. Rather than run harder, wouldn't it be nice to run smarter?

Examples of the Red Queen Effect

In *Deep Simplicity*, John Gribbon describes the red queen principle with frogs.

There are lots of ways in which the frogs, who want to eat flies, and the flies, who want to avoid being eaten, interact. Frogs might evolve longer tongues, for fly-catching purposes; flies might evolve faster flight, to escape. Flies might evolve an unpleasant taste, or even

excrete poisons that damage the frogs, and so on. We'll pick one possibility. If a frog has a particularly sticky tongue, it will find it easier to catch flies. But if flies have particularly slippery bodies, they will find it easier to escape, even if the tongue touches them. Imagine a stable situation in which a certain number of frogs live on a pond and eat a certain proportion of the flies around them each year.

Because of a mutation a frog develops an extra sticky tongue. It will do well, compared with other frogs, and genes for extra sticky tongues will spread through the frog population. At first, a larger proportion of flies gets eaten. But the ones who don't get eaten will be the more slippery ones, so genes for extra slipperiness will spread through the fly population. After a while, there will be the same number of frogs on the pond as before, and the same proportion of flies will be eaten each year. It looks as if nothing has changed – but the frogs have got stickier tongues, and the flies have got more slippery bodies.

Drugs and disease also represent an “arms-race.”

Siddhartha Mukherjee, in his Pulitzer-prize-winning book The Emperor of All Maladies, describes the red queen in the context of drugs and cancer.

In August 2000, Jerry Mayfield, a forty-one-year-old Louisiana policeman diagnosed with CML, began treatment with Gleevec. Mayfield's cancer responded briskly at first. The fraction of leukemic cells in his bone marrow dropped over six months. His blood count normalized and his symptoms improved; he felt rejuvenated—“like a new man [on] a wonderful drug.” But the response was short-lived. In the winter of 2003, Mayfield's CML stopped responding. Moshe Talpaz, the oncologist treating Mayfield in Houston, increased the dose of Gleevec, then increased it again, hoping to outpace the leukemia. But by October of that year, there was no response. Leukemia cells had fully recolonized his bone marrow and blood and invaded his spleen. Mayfield's cancer had become resistant to targeted therapy...

*... Even targeted therapy, then, was a cat-and-mouse game. One could direct endless arrows at the Achilles' heel of cancer, but the disease might simply shift its foot, switching one vulnerability for another. We were locked in a perpetual battle with a volatile combatant. When CML cells kicked Gleevec away, only a different molecular variant would drive them down, and when they outgrew that drug, then we would need the next-generation drug. If the vigilance was dropped, even for a moment, then the weight of the battle would shift. In Lewis Carroll's *Through the Looking-Glass*, the Red Queen tells Alice that the world keeps shifting so quickly under her feet that she has to keep running just to keep her position. This is our predicament with cancer: we are forced to keep running merely to keep still.*

This doesn't only happen in nature, there are many business examples as well.

In describing the capital investment needed to maintain a relative placement in the textile industry, Warren Buffett wrote:

Over the years, we had the option of making large capital expenditures in the textile operation that would have allowed us to somewhat reduce variable costs. Each proposal to do so looked like an immediate winner. Measured by standard return-on-investment tests, in fact, these proposals usually promised greater economic benefits than would have resulted from comparable expenditures in our highly-profitable candy and newspaper businesses.

But the promised benefits from these textile investments were illusory. Many of our competitors, both domestic and foreign, were stepping up to the same kind of expenditures and, once enough companies did so, their reduced costs became the baseline for reduced prices industrywide. Viewed individually, each company's capital investment decision appeared cost-effective and rational; viewed collectively, the decisions neutralized each other and were irrational (just as happens when each person watching a parade decides he can see a little better if he stands on tiptoes). After each round of investment, all the players had more money in the game and returns remained anemic.

In other words, more and more money is needed just to maintain your relative position in the industry and stay in the game. This situation plays out over and over again and brings with it many ripple effects. For example, the company distracted by maintaining a relative position in a poor industry places resources in a position almost assured to get a poor return on capital.

Inflation also causes a Red Queen Effect, here's Buffett Again:

Unfortunately, earnings reported in corporate financial statements are no longer the dominant variable that determines whether there are any real earnings for you, the owner. For only gains in purchasing power represent real earnings on investment. If you (a) forego ten hamburgers to purchase an investment; (b) receive dividends which, after tax, buy two hamburgers; and (c) receive, upon sale of your holdings, after-tax proceeds that will buy eight hamburgers, then (d) you have had no real income from your investment, no matter how much it appreciated in dollars. You may feel richer, but you won't eat richer. High rates of inflation create a tax on capital that makes much corporate investment unwise—at least if measured by the criterion of a positive real investment return to owners. This "hurdle rate" the return on equity that must be achieved by a corporation in order to produce any real return for its individual owners—has increased dramatically in recent years. The average tax-paying investor is now running up a down escalator whose pace has accelerated to the point where his upward progress is nil.

37. Mental Model: Game Theory

From Game Theory, by Morton Davis:

The theory of games is a theory of decision making. It considers how one should make decisions and to a lesser extent, how one does make them. You make a number of decisions every day. Some involve deep thought, while others are almost automatic. Your decisions are linked to your goals—if you know the consequences of each of your options, the solution is easy. Decide where you want to be and choose the path that takes you there. When you enter an elevator with a particular floor in mind (your goal), you push the button (one of your choices) that corresponds to your floor. Building a bridge involves more complex decisions but, to a competent engineer, is no different in principle. The engineer calculates the greatest load the bridge is expected to bear and designs a bridge to withstand it. When chance plays a role, however, decisions are harder to make. ... Game theory was designed as a decision-making tool to be used in more complex situations, situations in which chance and your choice are not the only factors operating. ... (Game theory problems) differ from the problems described earlier—building a bridge and installing telephones—in one essential respect: While decision makers are trying to manipulate their environment, their environment is trying to manipulate them. A store owner who lowers her price to gain a larger share of the market must know that her competitors will react in kind. ... Because everyone's strategy affects the outcome, a player must worry about what everyone else does and knows that everyone else is worrying about him or her.

What is a game? From Game Theory and Strategy:

Game theory is the logical analysis of situations of conflict and cooperation. More specifically, a game is defined to be any situation in which:

- 1. There are at least two players. A player may be an individual, but it may also be a more general entity like a company, a nation, or even a biological species.*
- 2. Each player has a number of possible strategies, courses of action which he or she may choose to follow.*
- 3. The strategies chosen by each player determine the outcome of the game.*
- 4. Associated to each possible outcome of the game is a collection of numerical payoffs, one to each player. These payoffs represent the value of the outcome to the different players.*

...Game theory is the study of how players should rationally play games. Each player would like the game to end in an outcome which gives him as large a payoff as possible.

From Greg Mankiw's Economics textbook:

Game theory is the study of how people behave in strategic situations. By 'strategic' we mean a situation in which each person, when deciding what actions to take, must consider how others might respond to that action. Because the number of firms in an oligopolistic market is small, each firm must act strategically. Each firm knows that its profit depends not only on how much it produces but also on how much the other firms produce. In making its production decision, each firm in an oligopoly should consider how its decision might affect the production decisions of all other firms.

Game theory is not necessary for understanding competitive or monopoly markets. In a competitive market, each firm is so small compared to the market that strategic interactions with other firms are not important. In a monopolized market, strategic interactions are absent because the market has only one firm. But, as we will see, game theory is quite useful for understanding the behavior of oligopolies.

A particularly important 'game' is called the prisoners' dilemma.

Markets with only a few sellers

Because an oligopolistic market has only a small group of sellers, a key feature of oligopoly is the tension between cooperation and self-interest. The oligopolists are best off when they cooperate and act like a monopolist – producing a small quantity of output and charging a price above marginal cost. Yet because each oligopolist cares only about its own profit, there are powerful incentives at work that hinder a group of firms from maintaining the cooperative outcome.

Avinash Dixit and Barry Nalebuff, in their book “Thinking Strategically” offer:

Everyone’s best choice depends on what others are going to do, whether it’s going to war or maneuvering in a traffic jam.

These situations, in which people’s choices depend on the behavior or the choices of other people, are the ones that usually don’t permit any simple summation. Rather we have to look at the system of interaction.

Michael J. Mauboussin relates game theory to firm interaction

How a firm interacts with other firms plays an important role in shaping sustainable value creation. Here we not only consider how many companies interact with their competitors, but how companies can co-evolve.

Game Theory is one of the best tools to understand interaction. Game Theory forces managers to put themselves in the shoes of other players rather than viewing games solely from their own perspective.

The classic two-player example of game theory is the prisoners’ dilemma.

38. The Principle of Incomplete Knowledge

“All models are wrong, but some are useful”

— George Box

If you think of the complicated world we live in you quickly realize that we need to sort the inessential from the essential and then reduce complexity into something simpler. In the same way the map is not the territory, knowledge is only but a subset of what it represents. In why knowledge is incomplete, the authors elaborate on these ideas:

This principle can be deduced from a lot of other, more specific principles: Heisenberg's uncertainty principle, implying that the information a control system can get is necessarily incomplete; the relativistic principle of the finiteness of the speed of light, implying that the moment information arrives, it is already obsolete to some extent; the principle of bounded rationality, stating that a decision-maker in a real-world situation will never have all information necessary for making an optimal decision; the principle of the partiality of self-reference, a generalization of Gödel's incompleteness theorem, implying that a system cannot represent itself completely, and hence cannot have complete knowledge of how its own actions may feed back into the perturbations. As a more general argument, one might note that models must be simpler than the phenomena they are supposed to model. Otherwise, variation and selection processes would take as much time in the model as in the real world, and no anticipation would be possible, precluding any control. Finally, models are constructed by blind variation processes, and, hence, cannot be expected to reach any form of complete representation of an infinitely complex environment.

39. Insensitivity To Base Rates: An Introduction

In statistics, a base rate refers to the percentage of a population (e.g. grasshoppers, people who live in New York, newborn babies) which have a characteristic. Given a random individual and no additional information, the base rate tells us the likelihood of them exhibiting that characteristic. For instance, around 10% of people are left-handed. If you selected a random person and had no information related to their handedness, you could safely guess there to be a 1 in 10 chance of them being left-handed.

When we make estimations, we often fail to consider the influence of base rates. This is a common psychological bias and is related to the representativeness heuristic.

From Smart Choices: A Practical Guide to Making Better Decisions:

Donald Jones is either a librarian or a salesman. His personality can best be described as retiring. What are the odds that he is a librarian?

When we use this little problem in seminars, the typical response goes something like this: "Oh, it's pretty clear that he's a librarian. It's much more likely that a librarian will be retiring; salesmen usually have outgoing personalities. The odds that he's a librarian must be at least 90 percent." Sounds good, but it's totally wrong.

The trouble with this logic is that it neglects to consider that there are far more salesmen than male librarians. In fact, in the United States, salesmen outnumber male librarians 100 to 1. Before you even considered the fact that Donald Jones is "retiring," therefore, you should have assigned only a 1 percent chance that Jones is a librarian. That is the base rate.

Now, consider the characteristic "retiring." Suppose half of all male librarians are retiring, whereas only 5 percent of salesmen are. That works out to 10 retiring salesmen for every retiring librarian — making the odds that Jones is a librarian closer to 10 percent than to 90 percent. Ignoring the base rate can lead you wildly astray.

* * *

Charlie Munger, instructs us how to think about base rates with an example of an employee who got caught for stealing, claiming she's never done it before and will never do it again:

You find an isolated example of a little old lady in the See's Candy Company, one of our subsidiaries, getting into the till. And what does she say? "I never did it before, I'll never do it again. This is going to ruin my life. Please help me." And you know her children and her friends, and she'd been around 30 years and standing behind the candy counter with swollen ankles. When you're an old lady it isn't that glorious a life. And you're rich and powerful and there she is: "I never did it before, I'll never do it again." Well how likely is it that she never did it before? If you're going to catch 10 embezzlements a year, what are the chances that any one of them — applying what Tversky and Kahneman called base rate information — will be somebody who only did it this once? And the people who have done it before and are going to do it again, what are they all going to say? Well in the history of the See's Candy Company they always say, "I never did it before, and I'm never going to do it again." And we cashier them. It would be evil not to, because terrible behavior spreads (Greshams law).

* * *

Max Bazerman, in Judgment in Managerial Decision Making, writes:

(Our tendency to ignore base rates) is even stronger when the specific information is vivid and compelling, as Kahneman and Tversky illustrated in one study from 1972. Participants were given a brief description of a person who enjoyed puzzles and was both mathematically inclined and introverted. Some participants were told that this description was selected from a set of seventy engineers and thirty lawyers. Others were told that the description came from a list of thirty engineers and seventy lawyers. Next, participants were asked to estimate the probability that the person described was an engineer. Even

though people admitted that the brief description did not offer a foolproof means of distinguishing lawyers from engineers, most tended to believe the description was of an engineer. Their assessments were relatively impervious to differences in base rates of engineers (70 percent versus 30 percent of the sample group.)

Participants do use base-rate data correctly when no other information is provided. In the absence of a personal description, people use the base rates sensibly and believe that a person picked at random from a group made up mostly of lawyers is most likely to be a lawyer. Thus, people understand the relevance of base-rate information, but tend to disregard such data when individuating data are also available.

Ignoring base rates has many unfortunate implications. ... Similarly, unnecessary emotional distress is caused in the divorce process because of the failure of couples to create prenuptial agreements that facilitate the peaceful resolution of a marriage. The suggestion of a prenuptial agreement is often viewed as a sign of bad faith. However, in far too many cases, the failure to create prenuptial agreements occurs when individuals approach marriage with the false belief that the high base rate for divorce does not apply to them.

* * *

Of course, this applies to investing as well. This conversation with Sanjay Bakshi speaks to this:

One of the great lessons from studying history is to do with “base rates”. “Base rate” is a technical term of describing odds in terms of prior probabilities. The base rate of having a drunken-driving accident is higher than those of having accidents in a sober state.

So, what’s the base rate of investing in IPOs? When you buy a stock in an IPO, and if you flip it, you make money if it’s a hot IPO. If it’s not a hot IPO, you lose money. But what’s the base rate – the averaged out experience – the prior probability of the activity of subscribing for IPOs – in the long run?

If you do that calculation, you’ll find that the base rate of IPO investing (in fact, it’s not even investing ... it’s speculating) sucks! [T]hat’s the case, not just in India, but in every market, in different time periods.

[...]

When you evaluate whether smoking is good for you or not, if you look at the average experience of 1,000 smokers and compare them with a 1,000 non-smokers, you’ll see what happens.

People don’t do that. They get influenced by individual stories like a smoker who lived till he was 95. Such a smoker will force many people to ignore base rates, and to focus on his story, to fool themselves into believing that smoking can’t be all that bad for them.

What is the base rate of investing in leveraged companies in bull markets?

[...]

This is what you learn by studying history. You know that the base rate of investing in an airline business sucks. There’s this famous joke about how to become a millionaire. You start with a billion, and then you buy an airline. That applies very well in this business. It applies in so many other businesses.

Take the paper industry as an example. Averaged out returns on capital for paper industry are bad for pretty good reasons. You are selling a commodity. It’s an extremely capital intensive business. There’s a lot of over-capacity. And if you understand microeconomics, you really are a price taker. There’s no pricing power for you. Extreme competition in such an environment is going to cause your returns on capital to be below what you would want to have.

It’s not hard to figure this out (although I took a while to figure it out myself). Look at the track record of paper companies around the world, and the airline companies around the world, or the IPOs around the world, or the textile companies around the world. Sure, there’ll be exceptions. But we need to focus on the average experience and not the

exceptional ones. The metaphor I like to use here is that of a pond. You are the fisherman. If you want to catch a lot of fish, then you must go to a pond where there's a lot of fish. You don't want to go to fish in a pond where there's very little fish. You may be a great fisherman, but unless you go to a pond where there's a lot of fish, you are not going to find a lot of fish.

[...]

So one of the great lessons from studying history is to see what has really worked well and what has turned out to be a disaster – and to learn from both.

40. Five Rules to help you Learn to Love Volatility

Nassim Taleb's book Antifragile: Things That Gain from Disorder is having a profound impact on how I see the world.

In this adapted piece from Antifragile, which appeared in the Wall Street Journal, Taleb offers five policy rules that can help us establish antifragility as a principle of our socioeconomic life.

Rule 1: Think of the economy as being more like a cat than a washing machine.

We are victims of the post-Enlightenment view that the world functions like a sophisticated machine, to be understood like a textbook engineering problem and run by wonks. In other words, like a home appliance, not like the human body. If this were so, our institutions would have no self-healing properties and would need someone to run and micromanage them, to protect their safety, because they cannot survive on their own.

By contrast, natural or organic systems are antifragile: They need some dose of disorder in order to develop. Deprive your bones of stress and they become brittle. This denial of the antifragility of living or complex systems is the costliest mistake that we have made in modern times. Stifling natural fluctuations masks real problems, causing the explosions to be both delayed and more intense when they do take place. As with the flammable material accumulating on the forest floor in the absence of forest fires, problems hide in the absence of stressors, and the resulting cumulative harm can take on tragic proportions.

And yet our economic policy makers have often aimed for maximum stability, even for eradicating the business cycle. "No more boom and bust," as voiced by the U.K. Labor leader Gordon Brown, was the policy pursued by Alan Greenspan in order to "smooth" things out, thus micromanaging us into the current chaos. Mr. Greenspan kept trying to iron out economic fluctuations by injecting cheap money into the system, which eventually led to monstrous hidden leverage and real-estate bubbles. On this front there is now at least a glimmer of hope, in the U.K. rather than the U.S., alas: Mervyn King, governor of the Bank of England, has advocated the idea that central banks should intervene only when an economy is truly sick and should otherwise defer action.

Promoting antifragility doesn't mean that government institutions should avoid intervention altogether. In fact, a key problem with overzealous intervention is that, by depleting resources, it often results in a failure to intervene in more urgent situations, like natural disasters. So in complex systems, we should limit government (and other) interventions to important matters: The state should be there for emergency-room surgery, not nanny-style maintenance and overmedication of the patient—and it should get better at the former.

In social policy, when we provide a safety net, it should be designed to help people take more entrepreneurial risks, not to turn them into dependents. This doesn't mean that we should be callous to the underprivileged. In the long run, bailing out people is less harmful to the system than bailing out firms; we should have policies now that minimize the possibility of being forced to bail out firms in the future, with the moral hazard this entails.

Rule 2: Favor businesses that benefit from their own mistakes, not those whose mistakes percolate into the system.

Some businesses and political systems respond to stress better than others. The airline industry is set up in such a way as to make travel safer after every plane crash. A tragedy leads to the thorough examination and elimination of the cause of the problem. The same thing happens in the restaurant industry, where the quality of your next meal depends on the failure rate in the business—what kills some makes others stronger. Without the high failure rate in the restaurant business, you would be eating Soviet-style cafeteria food for your next meal out.

These industries are antifragile: The collective enterprise benefits from the fragility of the individual components, so nothing fails in vain. These businesses have properties similar to evolution in the natural world, with a well-functioning mechanism to benefit from evolutionary pressures, one error at a time.

By contrast, every bank failure weakens the financial system, which in its current form is irremediably fragile: Errors end up becoming large and threatening. A reformed financial system would eliminate this domino effect, allowing no systemic risk from individual failures. A good starting point would be reducing the amount of debt and leverage in the economy and turning to equity financing. A firm with highly leveraged debt has no room for error; it has to be extremely good at predicting future revenues (and black swans). And when one leveraged firm fails to meet its obligations, other borrowers who need to renew their loans suffer as the chastened lenders lose their appetite to extend credit. So debt tends to make failures spread through the system.

A firm with equity financing can survive drops in income, however. Consider the abrupt deflation of the technology bubble during 2000. Because technology firms were relying on equity rather than debt, their failures didn't ripple out into the wider economy. Indeed, their failures helped to strengthen the technology sector.

Rule 3: Small is beautiful, but it is also efficient.

Experts in business and government are always talking about economies of scale. They say that increasing the size of projects and institutions brings costs savings. But the "efficient," when too large, isn't so efficient. Size produces visible benefits but also hidden risks; it increases exposure to the probability of large losses. Projects of \$100 million seem rational, but they tend to have much higher percentage overruns than projects of, say, \$10 million. Great size in itself, when it exceeds a certain threshold, produces fragility and can eradicate all the gains from economies of scale. To see how large things can be fragile, consider the difference between an elephant and a mouse: The former breaks a leg at the slightest fall, while the latter is unharmed by a drop several multiples of its height. This explains why we have so many more mice than elephants.

So we need to distribute decisions and projects across as many units as possible, which reinforces the system by spreading errors across a wider range of sources. In fact, I have argued that government decentralization would help to lower public deficits. A large part of these deficits comes from underestimating the costs of projects, and such underestimates are more severe in large, top-down governments. Compare the success of the bottom-up mechanism of canton-based decision making in Switzerland to the failures of authoritarian regimes in Soviet Russia and Baathist Iraq and Syria.

Rule 4: Trial and error beats academic knowledge.

Things that are antifragile love randomness and uncertainty, which also means—crucially—that they can learn from errors. Tinkering by trial and error has traditionally played a larger role than directed science in Western invention and innovation. Indeed, advances in theoretical science have most often emerged from technological development, which is closely tied to entrepreneurship. Just think of the number of famous college dropouts in the computer industry.

But I don't mean just any version of trial and error. There is a crucial requirement to achieve antifragility: The potential cost of errors needs to remain small; the potential gain should be large. It is the asymmetry between upside and downside that allows antifragile tinkering to benefit from disorder and uncertainty.

Perhaps because of the success of the Manhattan Project and the space program, we greatly overestimate the influence and importance of researchers and academics in technological advancement. These people write books and papers; tinkerers and engineers don't, and are thus less visible. Consider Britain, whose historic rise during the Industrial Revolution came from tinkerers who gave us innovations like iron making, the steam engine and textile manufacturing. The great names of the golden years of English

science were hobbyists, not academics: Charles Darwin, Henry Cavendish, William Parsons, the Rev. Thomas Bayes. Britain saw its decline when it switched to the model of bureaucracy-driven science.

America has emulated this earlier model, in the invention of everything from cybernetics to the pricing formulas for derivatives. They were developed by practitioners in trial-and-error mode, drawing continuous feedback from reality. To promote antifragility, we must recognize that there is an inverse relationship between the amount of formal education that a culture supports and its volume of trial-and-error by tinkering. Innovation doesn't require theoretical instruction, what I like to compare to "lecturing birds on how to fly."

Rule 5: Decision makers must have skin in the game.

At no time in the history of humankind have more positions of power been assigned to people who don't take personal risks. But the idea of incentive in capitalism demands some comparable form of disincentive. In the business world, the solution is simple: Bonuses that go to managers whose firms subsequently fail should be clawed back, and there should be additional financial penalties for those who hide risks under the rug. This has an excellent precedent in the practices of the ancients. The Romans forced engineers to sleep under a bridge once it was completed.

Because our current system is so complex, it lacks elementary clarity: No regulator will know more about the hidden risks of an enterprise than the engineer who can hide exposures to rare events and be unharmed by their consequences. This rule would have saved us from the banking crisis, when bankers who loaded their balance sheets with exposures to small probability events collected bonuses during the quiet years and then transferred the harm to the taxpayer, keeping their own compensation.

In these five rules, I have sketched out only a few of the more obvious policy conclusions that we might draw from a proper appreciation of antifragility. But the significance of antifragility runs deeper. It is not just a useful heuristic for socioeconomic matters but a crucial property of life in general. Things that are antifragile only grow and improve under adversity. This dynamic can be seen not just in economic life but in the evolution of all things, from cuisine, urbanization and legal systems to our own existence as a species on this planet.

We all know that the stressors of exercise are necessary for good health, but people don't translate this insight into other domains of physical and mental well-being. We also benefit, it turns out, from occasional and intermittent hunger, short-term protein deprivation, physical discomfort and exposure to extreme cold or heat. Newspapers discuss post-traumatic stress disorder, but nobody seems to account for post-traumatic growth. Walking on smooth surfaces with "comfortable" shoes injures our feet and back musculature: We need variations in terrain.

Modernity has been obsessed with comfort and cosmetic stability, but by making ourselves too comfortable and eliminating all volatility from our lives, we do to our bodies and souls what Mr. Greenspan did to the U.S. economy: We make them fragile. We must instead learn to gain from disorder.

41. Erik Hollnagel: The Search For Causes

A great passage from Erik Hollnagel's Barriers And Accident Prevention on the search for causes:

Whenever an accident happens there is a natural concern to find out in detail exactly what happened and to determine the causes of it. Indeed, whenever the result of an action or event falls significantly short of what was expected, or whenever something unexpected happens, people try to find an explanation for it. This trait of human nature is so strong that we try to find causes even when they do not exist, such as in the case of misleading or spurious correlations. For a number of reasons humans seem to be extremely reluctant to accept that something can happen by chance. One very good reason is that we have created a way of living that depends heavily on the use of technology, and that technological systems are built to function in a deterministic, hence reliable manner. If therefore something fails, we are fully justified in trying to find the reason for it. A second reason is that our whole understanding of the world is based on the assumption of specific relations between causes and effects, as amply illustrated by the Laws of Physics. (Even in quantum physics there are assumptions of more fundamental relations that are deterministic.) A third reason is that most humans find it very uncomfortable when they do not know what to expect, i.e., when things happen in an unpredictable manner. This creates a sense of being out of control, something that is never desirable since – from an evolutionary perspective – it means that the chances of survival are reduced.

This was described by Friedrich Nietzsche when he wrote:

[T]o trace something unknown back to something known is alleviating, soothing, gratifying and gives moreover a feeling of power. Danger, disquiet, anxiety attend the unknown – the first instinct is to eliminate these distressing states. First principle: any explanation is better than none ... The cause-creating drive is thus conditioned and excited by the feeling of fear.

Hollnagel, continues:

A well-known example of this is provided by the phenomenon called the gambler's fallacy. The name refers to the fact that gamblers often seem to believe that a long row of events of one type increases the probability of the complementary event. Thus if a series of 'red' events occur on a roulette wheel, the gambler's fallacy lead people to believe that the probability of 'black' increases. ... Rather than accepting that the underlying mechanism may be random people invent all kinds of explanations to reduce the uncertainty of future events.

42. Mental Model: Equilibrium

There are many ways in which you can visualize the concept of equilibrium, but one of the simplest comes from Boombustology where a ball sits on a simple curved shape.



Source: Boombustology

A situation in which equilibrium is possible is one in which over time, if left to its own devices, the ball will find one unique location. Overshooting and undershooting this unique location is self-correcting. A situation of disequilibrium, however, is one in which the ball is unable to find a unique location. A ball in such a state does not generate self-correcting moves that dampen its moves toward a theoretical “equilibrium” or resting spot; rather, disequilibrium generates motion that is self-reinforcing and accelerates the ball’s move away from any stable state.

Let’s take a step back and thank Netwon.

In *Principia*, he describes his three laws of motion. Using planets, these laws allowed Newton to demonstrate how gravitational forces act between two bodies. He showed that the force of the sun’s gravity (pulling planets toward the sun) is offset by their forward velocity. These two forces, equal in nature, create a state of equilibrium.

Equilibrium is a balance between one or more opposing forces. As you can imagine, different types of equilibrium exist. Static equilibrium is when a system is at rest. Dynamic equilibrium is when two or more forces are equally matched. Robert Hagstorm, in the Last Liberal Art, helps illustrate the difference between the two:

A scale that is equally weighted on both sides is an example of static equilibrium. Fill a bathtub full of water and then turn off the faucet and you will observe static equilibrium. But if you unplug the drain and then turn on the faucet so the level of the bathtub does not change, you are witnessing dynamic equilibrium. Another example is the human body. It remains in dynamic equilibrium so long as the heat loss from cooling remains in balance with the consumption of sugars.

Supply and Demand + Equilibrium

The rule of supply and demand, from economics, is also an example of the law of equilibrium.

In 1997 Warren Buffett, through his company Berkshire Hathaway, purchased 11.2 million ounces of silver-based on his understanding of equilibrium. In his annual letter for that year, he succinctly sums up the investment:

In recent years, bullion inventories have fallen materially, and last summer Charlie (Munger) and I concluded that a higher price would be needed to establish equilibrium between supply and demand.

Too little supply and equilibrium is out of balance. Buffett (correctly) bet that the only way to bring the market back into a state of equilibrium was rising prices. Demand, the balancing force to supply, can also result in successful investments.

In his 2011 shareholder letter, Buffett again illustrates the concept of equilibrium through supply and demand.

Today the world’s gold stock is about 170,000 metric tons. If all of this gold were melded together, it would form a cube of about 68 feet per side. (Picture it fitting comfortably within a baseball infield.) At \$1,750 per ounce – gold’s price as I write this – its value would be

\$9.6 trillion. Call this cube pile A. Let's now create a pile B costing an equal amount. For that, we could buy all U.S. cropland (400 million acres with output of about \$200 billion annually), plus 16 Exxon Mobils (the world's most profitable company, one earning more than \$40 billion annually). After these purchases, we would have about \$1 trillion left over for walking-around money (no sense feeling strapped after this buying binge). Can you imagine an investor with \$9.6 trillion selecting pile A over pile B?

Beyond the staggering valuation given the existing stock of gold, current prices make today's annual production of gold command about \$160 billion. Buyers – whether jewelry and industrial users, frightened individuals, or speculators – must continually absorb this additional supply to merely maintain an equilibrium at present prices.

A century from now the 400 million acres of farmland will have produced staggering amounts of corn, wheat, cotton, and other crops – and will continue to produce that valuable bounty, whatever the currency may be. Exxon Mobil will probably have delivered trillions of dollars in dividends to its owners and will also hold assets worth many more trillions (and, remember, you get 16 Exxons). The 170,000 tons of gold will be unchanged in size and still incapable of producing anything. You can fondle the cube, but it will not respond.

Admittedly, when people a century from now are fearful, it's likely many will still rush to gold. I'm confident, however, that the \$9.6 trillion current valuation of pile A will compound over the century at a rate far inferior to that achieved by pile B.

In Boombustology, Mansharamani writes:

Inherent in most equilibrium-oriented approaches is a belief that higher prices generate new supply that tends to push prices down. Likewise, it is believed that lower prices generate new demand that tends to push prices up. In this way, deviations from an appropriate price level are self-correcting.

A grasp of supply and demand can help us make better investment decisions. The producers of undifferentiated goods, (e.g., an aluminium can), are (usually) poor investments because the only way they will make adequate returns is under conditions of tight supply. If any excess capacity exists in the industry, prices will trend down towards the cost of producing. In this case, owners are left with unsatisfactory returns on their investment.

The only real winners are the low cost producers. As prices trend down only they can maintain full production whereas high cost competitors must cut production, which starts reducing supply and moves the industry towards equilibrium. When business picks up again, as it inevitably does, the production that was once shuttled comes back online. Only low-cost producers can operate throughout the cycle. Opportunities to profit from equilibrium exist when demand outstrips capacity, which usually results from (1) a positive change in demand or (2) a negative change in supply.

While seductively simple, this model of equilibrium in financial markets is somewhat incomplete. We must consider reflexivity.

George Soros writes, "Reflexivity is, in effect, a two-way feedback mechanism in which reality helps shape the participants' thinking and the participants' thinking helps shape reality in an unending process in which thinking and reality may come to approach each other but can never become identical."

The implications of reflexivity on financial markets are quite profound, particularly with regard to the existence of an equilibrium price. Soros describes these implications in his own words succinctly:

Instead of a tendency towards some kind of theoretical equilibrium, the participants' views and actual state of affairs enter into a process of dynamic disequilibrium, which may be self-reinforcing at first, moving both thinking and reality in a certain direction, but is bound to become unsustainable in the long run and engender a move in the opposite direction.

Soros' testimony in 1994 to the House Banking Committee summarizes his theory of reflexivity and how it manifests itself in financial markets:

I must state at the outset that I am in fundamental disagreement with the prevailing wisdom. The generally accepted theory is that markets tend towards equilibrium and on the whole discount the future correctly. I operate using a different theory, according to which financial markets cannot possibly discount the future correctly because they do not merely discount the future, they help to shape it. In certain circumstances, financial markets can affect the so-called fundamentals which they are supposed to reflect. When that happens, markets enter into a state of dynamic disequilibrium and behave quite differently than what would be considered normal by the theory of efficient markets. Such boom/bust sequences do not arise very often, but when they do, they can be very disruptive, precisely because they affect the fundamentals of the economy.

In Boombustology, Mansharamani writes:

... financial extremes are characterized by two primary components: a prevailing trend that exists in reality and a misconception relating to it. He often uses real estate as an example to illustrate this point. The prevailing trend in reality is that there is an increased willingness to lend and a corresponding rise in prices. The misconception relating to this trend is that the prices of real estate are independent of the willingness to lend. Further, as more banks become willing to lend, and the number of buyers therefore rises, the prices of real estate rise—thereby making the banks feel more secure (given higher collateral values) and driving more lending.

Feedback Loops and Equilibrium

In Universal Principles of Design, William Lidwell & co. write:

Every action creates an equal and opposite reaction. When reactions loop back to affect themselves, a feedback loop is created. All real-world systems are composed of many such interacting feedback loops — animals, machines, businesses, and ecosystems, to name a few. There are two types of feedback loops: positive and negative. Positive feedback amplifies system output, resulting in growth or decline. Negative feedback dampers output, stabilizes the system around an equilibrium point.

Positive feedback loops are effective for creating change, but generally result in negative consequences if not moderated by negative feedback loops. For example, in response to head and neck injuries in football in the late 1950s, designers created plastic football helmets with internal padding to replace leather helmets. The helmets provided more protection, but induced players to take increasingly greater risks when tackling. More head and neck injuries occurred (after the introduction of plastic helmets) than before. By concentrating on the problem in isolation (e.g., not considering changes in player behavior) designers inadvertently created a positive feedback loop in which players used their head and neck in increasingly risky ways. This resulted in more injuries which resulted in additional redesigns that made the helmet shells harder and more padded and so on.

Negative feedback loops are effective for resisting change. For example, the Segway Human Transporter uses negative feedback loops to maintain equilibrium. As a rider leans forward or backward, the Segway accelerates or decelerates to keep the system in equilibrium. To achieve this smoothly, the Segway makes hundreds of adjustments every second. Given the high adjustment rate, the oscillations around the point of equilibrium are so small as to not be detectable. However, if fewer adjustments were made per second, the oscillations would increase in size and the ride would become increasingly jerky.

Diseases and Equilibrium

Malcolm Gladwell illustrates this in The Tipping Point with a hypothetical outbreak of the flu.

Suppose, for example, that one summer 1,000 tourists come to Manhattan from Canada carrying an untreatable strain of twenty-four-hour virus. This strain of flu has a 2 percent infection rate, which is to say that one out of every 50 people who come into close contact

with someone carrying it catches the bug himself. Let's say that 50 is also exactly the number of people the average Manhattanite — in the course of riding the subways and mingling with colleagues at work — comes into contact with every day. What we have, then, is a disease in equilibrium. Those 1,000 Canadian tourists pass on the virus to 1,000 new people on the day they arrive. And the next day those 1,000 newly infected people pass on the virus to another 1,000 people, just as the original 1,000 tourists who started the epidemic are returning to health. With those getting sick and those getting well so perfectly in balance, the flu chugs along at a steady but unspectacular clip through the test of summer and fall.

But then comes the Christmas season. The subways and buses get more crowded with tourists and shoppers, and instead of running into an even 50 people a day, the average Manhattanite now has close contact with, say, 55 people a day. All of a sudden, the equilibrium is disrupted. The 1,000 flu carriers now run into 55,000 people a day and at a 2 percent infection rate, that translates into 1,100 cases the following day. Those 1,100, in turn, are now passing on their virus to 55,000 people as well, so that by day three there are 1,210 Manhattanites with the flu and by day four 1,331 and by the end of the week there are nearly 2,000, and so on up, in an exponential spiral until Manhattan has a full-blow flu epidemic on its hands by Christmas Day. That moment when the average flu carrier went from running into 50 people a day to running into 55 was the Tipping point. It was the point at which an ordinary and stable phenomenon — a low-level flu outbreak — turned into a public health crisis. If you were to draw a graph of the progress of the Canadian flu epidemic, the Tipping point would be the point on the graph where it suddenly turned upward.

43. Competitive Strategy

An organization's core capabilities are those activities that, when performed at the highest level, enable the organization to bring its where-to-play and how-to-win choices to life. They are best understood as operating as a system of reinforcing activities— a concept first articulated by Harvard Business School's Michael Porter. Porter noted that powerful and sustainable competitive advantage is unlikely to arise from any one capability (e.g., having the best sales force in the industry or the best technology in the industry), but rather from a set of capabilities that both fit with one another (i.e., that don't conflict with one another) and actually reinforce one another (i.e., that make each other stronger than they would be alone).

For Porter, a company's "strategic position is contained in a set of tailored activities designed to deliver it." He calls the visual depiction of this set of activities an activity system. Since "competitive strategy is about being different ... [and] means deliberately choosing a different set of activities to deliver unique value," an activity system must also be distinctive from the activity systems of competitors. In his landmark 1996 article "What Is Strategy?," Porter illustrated his theory with examples from Southwest Airlines, Progressive Insurance, and The Vanguard Group, articulating the way in which each organization made distinctive choices and tailored an activity system to deliver on those choices. The activity system is a visual representation of the firm's competitive advantage, capturing on a single page the core capabilities of the firm. Articulating a firm's core capabilities is a vital step in the strategy process. Identifying the capabilities required to deliver on the where-to-play and how-to-win choices crystallizes the area of focus and investment for the company. It enables a firm to continue to invest in its current capabilities, to build up others, and to reduce the investment in capabilities that are not essential to the strategy.

44. The Nature of Explanation

We unconsciously construct mental models of the world and these models help aid our thinking.

This idea is not new. In fact, in 1943 Kenneth Craik proposed that thinking is the manipulation of internal representations of the world in his book The Nature of Explanation.

“This deceptively simple notion,” argues Philip Johnson-Laird in Mental Models, “has rarely been taken sufficiently seriously by psychologists, particularly by those studying language and thought.”

They certainly argue that there are mental representations — images, or strings of symbols — and that information in them is processed by the mind; but they ignore a crucial issue: what it is that makes a mental entity a representation of something. In consequence, psychological theories of meaning almost invariably fail to deal satisfactorily with referential phenomena. A similar neglect of the subtleties of mental representation has led to psychological theories of reasoning that almost invariably assume, either explicitly or implicitly, the existence of a mental logic.

Explanation depends on understanding. If you don't understand something you cannot explain it. Although what is explanation? “It is easier to give criteria for what counts as understanding than to capture its essence — perhaps because it has no essence,” writes Johnson-Laird.

This will no doubt strike many of you as fuzzy. Justice Stewart found it impossible to formulate a test for obscenity but nevertheless asserted, “I know it when I see it,” so can we, in an inexact, yet useful way, when it comes to explanations.

Explanations certainly require knowledge and understanding. Johnson-Laird writes:

If you know what causes a phenomenon, what results from it, how to influence, control, initiate, or prevent it, how it relates to other states of affairs or how it resembles them, how to predict its onset and course, what its internal or underlying “structure” is, then to some extent you understand it.

The psychological core of understanding, I shall assume, consists in your having a “working model” of the phenomenon in your mind. If you understand inflation, a mathematical proof, the way a computer works, DNA or a divorce, then you have a mental representation that serves as a model of an entity in much the same way as, say, a clock functions as a model of the earth's rotation.

This is where Kenneth Craik comes into the picture. His 1943 book The Nature of Explanation was one of the first, if not the first, to propose that human beings think by manipulating internal representations of the world. This manipulation — or reasoning — involves three distinct processes:

1. A translation of some external process into an internal representation in terms of words, numbers, or other symbols.
2. The derivation of other symbols from them by some sort of inferential process.
3. A re-translation of these symbols into actions, or at least a recognition of the correspondence between these symbols and external events, as in realizing that a prediction is fulfilled.

In The Nature of Explanation Craik writes this beautiful passage:

One other point is clear; this process of reasoning has produced a final result similar to that which might have been reached by causing the actual physical processes to occur (e.g. building the bridge haphazard mid measuring its strength or compounding certain chemicals and seeing what happened); but it is also clear that this is not what has happened; the man's mind does not contain a material bridge or the required chemicals. Surely, however, this process of prediction is not unique to minds, though no doubt it is hard to imitate the flexibility and versatility of mental prediction. A calculating machine, an

anti-aircraft 'predictor', and Kelvin's tidal predictor all show the same ability. In all these latter cases, the physical process which it is desired to predict is imitated by some mechanical device or model which is cheaper, or quicker, or more convenient in operation. Here we have a very close parallel to our three stages of reasoning-the 'translation' of the external processes into their representatives (positions of gears, etc.) in the model; the arrival at other positions of gears, etc., by mechanical processes in the instrument; and finally, the retranslation of these into physical processes of the original type.

By a model we thus mean any physical or chemical system, which has a similar relation-structure to that of the process it imitates. By relation-structure I do not mean some obscure non-physical entity which attends the model, but the fact that it is a physical working model which works in the same way as the process it parallels, in the aspects under consideration at any moment. Thus, the model need not resemble the real object pictorially; Kelvin's tide predictor, which consists of a number of pulleys on levers, does not resemble a tide in appearance, but it works in the same way in certain essential respects-it combines oscillations of various frequencies so as to produce an oscillation which closely resembles in amplitude at each moment the variation in tide level at any place. ...

My hypothesis then is that thought models, or parallels, reality — that its essential feature is not 'the mind', 'the self', 'sense-data' nor propositions but symbolism, and that this symbolism is largely of the same kind as that which is familiar to us in mechanical devices which aid thought and calculation. ...

If the organism carries a 'small-scale model' of external reality and of its own possible actions within its head, it is able to try out various alternatives, conclude which is the best of them, react to future situations before they arise, utilize the knowledge of past events in dealing with the present and future, and in every way to react in a much fuller, safer, and more competent manner to the emergencies which face it. Most of the greatest advances of modern technology have been instruments, which extended the scope of our sense-organs, our brains or our limbs. Such are telescopes and microscopes, wireless, calculating machines, typewriters, motor cars, ships and aeroplanes. Is it not possible, therefore, that our brains themselves utilize comparable mechanisms to achieve the same ends and that these mechanisms can parallel phenomena in the external world as a calculating machine can parallel the development of strains in a bridge?

Small models of reality need neither be wholly accurate nor correspond completely with what they model to be useful. Your model of an iPhone may contain only the idea of a rectangle that serves multiple functions such as sending and receiving data, apps, displaying moving pictures with accompanying sound. Alternatively, it may consist of an understanding of the programming necessary to make the device work, the protocols, the physical limitations, and how the display actually functions, in which case you've eclipsed me. Your model may be deeper still, into the hardware and how it works, etc. A person who repairs iPhones is likely to have a more comprehensive model of them than someone who only operates one. The engineers at Apple are likely to have a richer model than most of us.

What must be questioned now is whether adding information increases the usefulness of the model. If I explain how operating systems and API's work, you will have a much richer model of an iPhone. For some of you that will mean a more useful model and for some it will not.

"Many of the models in people's minds are," Johnson-Laird writes, "little more than high-grade simulations, but they are none the less useful provided that the picture is accurate; all representations of physical phenomena necessarily contain an element of simulation." So the nature of an explanation is to understand something – to have a working model of it. All explanations are incomplete because at some point they all must take something for granted. When you explain something to another person, "what is conveyed is a blueprint for the construction of a working model."

Obviously, a satisfactory blueprint for one individual may be grossly inadequate for another, since any set of instructions demands the knowledge and ability to understand them. ... In most domains of expertise, there is a consensus about what counts as a satisfactory explanation — a consensus based on common knowledge and formulable in public criteria."

Still Curious? Try reading these three books in the following order: 1) The Nature of Explanation; 2) Mental Models; and 3) How We Reason.

45. Power Laws: How Nonlinear Relationships Amplify Results

“The greatest shortcoming of the human race is our inability to understand the exponential function.”

— Albert Allen Bartlett

Defining A Power Law

Consider a person who begins weightlifting for the first time.

During their initial sessions, they can lift only a small amount of weight. But as they invest more time, they find that for each training session, their strength increases a surprising amount.

For a while, they make huge improvements. Eventually, however, their progress slows down. At first, they could increase their strength by as much as 10% per session; now it takes months to improve by even 1%. Perhaps they resort to taking performance-enhancing drugs or training more often. Their motivation is sapped, and they find themselves getting injured, without any real change in the amount of weight they can lift. Now, let's imagine that our frustrated weightlifter decides to take up running instead. Something similar happens. While the first few runs are incredibly difficult, the person's endurance increases rapidly with the passing of each week, until it levels off and diminishing returns set in again.

Both of these situations are examples of *power laws* — a relationship between two things in which a change in one thing can lead to a large change in the other, regardless of the initial quantities. In both of our examples, a small investment of time at the beginning of the endeavor leads to a large increase in performance.

Power laws are interesting because they reveal surprising correlations between disparate factors. As a mental model, power laws are versatile, with numerous applications in different fields of knowledge.

If parts of this post look intimidating to non-mathematicians, bear with us. Understanding the math behind power laws is worthwhile to grasp their many applications. Invest a little time in reading this and reap the value — which is in itself an example of a power-law!

A power law is often represented by an equation with an exponent:

$$Y=MX^B$$

Each letter represents a number. Y is a function (the result); X is the variable (the thing you can change); B is the order of scaling (the exponent), and M is a constant (unchanging). If M is equal to 1, the equation is then $Y=X^B$. If $B=2$, the equation becomes $Y=X^2$ ($Y=X$ squared). If X is 1, Y is also 1. But if $X=2$, then $Y=4$; if $X=3$, then $Y=9$, and so on. A small change in the value of X leads to a proportionally large change in the value of Y.

$B=1$ is known as the linear scaling law.

To double a cake recipe, you need twice as much flour. To drive twice as far will take twice as long. (Unless you have kids, in which case you need to factor in bathroom breaks that seemingly have little to do with distance.) Linear relationships, in which twice-as-big requires twice-as-much, are simple and intuitive.

Nonlinear relationships are more complicated. In these cases, you don't need twice as much of the original value to get twice the increase in some measurable characteristic. For example, an animal that's twice our size requires only about 75% more food than we do. This means that on a per-unit-of-size basis, larger animals are more energy-efficient than smaller ones. As animals get bigger, the energy required to support each unit decreases. One of the characteristics of a complex system is that the behavior of the system differs from the simple addition of its parts. This characteristic is called emergent behavior. “In many instances,” write Geoffrey West in *Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organisms, Cities, Economies, and Companies*, “the whole seems to take on a life of its own, almost dissociated from the specific characteristics of its individual building blocks.”

This collective outcome, in which a system manifests significantly different characteristics from those resulting from simply adding up all of the contributions of its individual constituent parts, is called an emergent behavior.

When we set out to understand a complex system, our intuition tells us to break it down into its component pieces. But that's *linear* thinking, and it explains why so much of our thinking about complexity falls short. Small changes in a complex system can cause sudden and large changes. Small changes cause cascades among the connected parts, like knocking over the first domino in a long row.

Let's return to the example of our hypothetical weightlifter-turned-runner. As they put in more time on the road, constraints will naturally arise on their progress.

Recall our exponential equation: $Y = MX^B$. Try applying it to the runner. (We're going to simplify running, but stick with it.)

Y is the distance the runner can run before becoming exhausted. That's what we're trying to calculate. M, the constant, represents their running ability: some combination of their natural endowment and their training history. (Think of it this way: Olympic champion Usain Bolt has a high M; film director Woody Allen has a low M.)

That leaves us with the final term: X^B . The variable X represents the thing we have control over: in this case, our training mileage. If B, the exponent, is between 0 and 1, then the relationship between X and Y— between training mileage and endurance — becomes progressively less proportional. All it takes is plugging in a few numbers to see the effect. Let's set M to 1 for the sake of simplicity. If $B = 0.5$ and $X = 4$, then $Y = 2$. Four miles on the road gives the athlete the ability to run two miles at a clip.

Increase X to 16, and Y increases only to 4. The runner has to put in four times the road mileage to merely double their running endurance.

Here's the kicker: With both running and weightlifting, as we increase X, *we're likely to see the exponent, B, decline!* Quadrupling our training mileage from 16 to 64 miles is unlikely to double our endurance again. It might take a 10x increase in mileage to do that.

Eventually, the ratio of training mileage to endurance will become nearly infinite.

We know this state, of course, as diminishing returns: the point where more input yields progressively less output. Not only is the relationship between training mileage and endurance not linear to begin with, but it also gets *less* linear as we increase our training.

And what about negative exponents?

It gets even more interesting. If $B = -0.5$ and $X = 4$, then $Y = 0.5$. Four miles on the road gets us a half-mile of endurance. If X is increased to 16, Y declines to 0.25. More training, *less* endurance! This is akin to someone putting in way too much mileage, way too soon: the training is less than useful as injuries pile up.

With negative numbers, the more X increases, the more Y *shrinks*. This relationship is known as an *inverse power law*. $B = -2$, for example, is known as the *inverse square law* and is an important equation in physics.

The relationship between gravity and distance follows an inverse power law. G is the gravitational constant; it's the constant in Newton's law of gravitation, relating gravity to the masses and separation of particles, equal to:

$$6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$$

Any force radiating from a single point — including heat, light intensity, and magnetic and electrical forces — follows the inverse square law. At 1m away from a fire, 4 times as much heat is felt as at 2m, and so on.

Higher-Order Power Laws

When B is a positive integer (a whole number larger than zero), there are names for the power laws.

When B is equal to 1, we have a linear relationship, as we discussed above. This is also known as a first-order power law.

Things really get interesting after that.

When B is 2, we have a second-order power law. A great example of this is kinetic energy. Kinetic energy = $\frac{1}{2} mv^2$

When B is 3, we have a third-order power law. An example of this is the power converted from the wind into rotational energy.

Power Available = $\frac{1}{2} (\text{Air Density})(\pi r^2)(\text{Windspeed}^3)(\text{Power Coefficient})$

(There is a natural limit here. Albert Betz concluded in 1919 that wind turbines cannot convert more than 59.3% of the kinetic energy of the wind into mechanical energy. This number is called the Betz Limit and represents the power coefficient above.)[1]

The law of heat radiation is a fourth-order power law. Derived first by the Austrian physicist Josef Stefan in 1879 and separately by Austrian physicist Ludwig Boltzmann, the law works like this: the radiant heat energy emitted from a unit area in one second is equal to the constant of proportionality (the Stefan-Boltzmann constant) times the absolute temperature to the fourth power.[2]

There is only one power-law with a variable exponent, and it's considered to be one of the most powerful forces in the universe. It's also the most misunderstood. We call it compounding. The formula looks like this:

Future Value = (Present Value)(1+i)ⁿ

where i is the interest rate, and n is the number of years.

Unlike in the other equations, the relationship between X and Y is potentially limitless. As long as B is positive, Y will increase as X does.

Non-integer power laws (where B is a fraction, as with our running example above) are also of great use to physicists. Formulas in which B=0.5 are common.

Imagine a car driving at a certain speed. A non-integer power law applies. V is the speed of the car, P is the petrol burnt per second to reach that speed, and A is the air resistance. For the car to go twice as fast, it must use 4 times as much petrol, and to go 3 times as fast, it must use 9 times as much petrol. Air resistance increases as speed increases, and that is why faster cars use such ridiculous amounts of petrol. It might seem logical to think that a car going from 40 miles an hour to 50 miles an hour would use a quarter more fuel. That is incorrect, though, because the relationship between air resistance and speed is itself a power law.

Another instance of a power law is the area of a square. Double the length of two parallel sides and the area quadruples. Do the same for a 3D cube, and the area increases by a factor of eight. It doesn't matter if the length of the square went from 1cm to 2cm, or from 100m to 200m; the area still quadruples. We are all familiar with second-order (or square) power laws. This name comes from squares since the relationship between length and area reflects the way second-order power laws change a number. Third-order (or cubic) power laws are likewise named due to their relationship to cubes.

Using Power Laws in Our Lives

Now that we've gotten through the complicated part let's take a look at how power laws crop up in many fields of knowledge. Most careers involve an understanding of them, even if it might not be so obvious.

"What's the most powerful force in the universe? Compound interest. It builds on itself. Over time, a small amount of money becomes a large amount of money. Persistence is similar. A little bit improves performance, which encourages greater persistence, which improves persistence even more. And on and on it goes."

— Daniel H. Pink, The Adventures of Johnny Bunko

The Power Behind Compounding

Compounding is one of our most important mental models and is absolutely vital to understand for investing, personal development, learning, and other crucial areas of life. In economics, we calculate compound interest by using an equation with these variables: P is the original sum of money. P' is the resulting sum of money, r is the annual interest

rate, n is the compounding frequency, and t is the length of time. Using an equation, we can illustrate the power of compounding.

If a person deposits \$1000 in a bank for five years, at a quarterly interest rate of 4%, the equation becomes this:

Future Value = Present Value * $((1 + \text{Quarterly Interest Rate})^{\text{Number of Quarters}})$

This formula can be used to calculate how much money will be in the account after five years. The answer is \$2,220.20.

Compound interest is a power law because the relationship between the amount of time a sum of money is left in an account and the amount accumulated at the end is non-linear.

In *A Random Walk Down Wall Street*, Burton Malkiel gives the example of two brothers, William and James. Beginning at age 20 and stopping at age 40, William invests \$4,000 per year. Meanwhile, James invests the same amount per year between the ages of 40 and 65. By the time William is 65, he has invested less money than his brother but has allowed it to compound for 25 years. As a result, when both brothers retire, William has 600% more money than James — a gap of \$2 million. One of the smartest financial choices we can make is to start saving as early as possible: by harnessing power laws, we increase the exponent as much as possible.

Compound interest can help us achieve financial freedom and wealth, without the need for a large annual income. Members of the financial independence movement (such as the blogger Mr. Money Mustache) are living examples of how we can apply power laws to our lives.

As far back as the 1800s, Robert G. Ingersoll emphasized the importance of compound interest:

One dollar at compound interest, at twenty-four per cent., for one hundred years, would produce a sum equal to our national debt. Interest eats night and day, and the more it eats the hungrier it grows. The farmer in debt, lying awake at night, can, if he listens, hear it gnaw. If he owes nothing, he can hear his corn grow. Get out of debt as soon as possible. You have supported idle avarice and lazy economy long enough.

Compounding can apply to areas beyond finance — personal development, health, learning, relationships, and more. For each area, a small input can lead to large output, and the results build upon themselves.

Nonlinear Language Learning

When we learn a new language, it's always a good idea to start by learning the 100 or so most used words.

In all known languages, a small percentage of words make up the majority of usage. This is known as Zipf's law, after George Kingsley Zipf, who first identified the phenomenon. The most used word in a language may make up as much as 7% of all words used, while the second-most-used word is used half as much, and so on. As few as 135 words can together form half of a language (as used by native speakers).

Why Zipf's law holds true is unknown, although the concept is logical. Many languages include a large number of specialist terms that are rarely needed (including legal or anatomy terms). A small change in the frequency ranking of a word means a huge change in its usefulness.

Understanding Zipf's law is a central component of accelerated language learning. Each new word we learn from the most common 100 words will have a huge impact on our ability to communicate. As we learn less-common words, diminishing returns set in. If each word in a language were listed in order of frequency of usage, the further we moved down the list, the less useful a word would be.

Power Laws in Business, Explained by Peter Thiel

Peter Thiel, the founder of PayPal (as well as an early investor in Facebook and Palantir), considers power laws to be a crucial concept for all businesspeople to understand. In his fantastic book, *Zero to One*, Thiel writes:

Indeed, the single most powerful pattern I have noticed is that successful people find value in unexpected places, and they do this by thinking about business from first principles instead of formulas.

And:

In 1906, economist Vilfredo Pareto discovered what became the “Pareto Principle,” or the 80-20 rule, when he noticed that 20% of the people owned 80% of the land in Italy—a phenomenon that he found just as natural as the fact that 20% of the peapods in his garden produced 80% of the peas. This extraordinarily stark pattern, when a small few radically outstrip all rivals, surrounds us everywhere in the natural and social world. The most destructive earthquakes are many times more powerful than all smaller earthquakes combined. The biggest cities dwarf all mere towns put together. And monopoly businesses capture more value than millions of undifferentiated competitors. Whatever Einstein did or didn’t say, the power law—so named because exponential equations describe severely unequal distributions—is the law of the universe. It defines our surroundings so completely that we usually don’t even see it.

... [I]n venture capital, where investors try to profit from exponential growth in early-stage companies, a few companies attain exponentially greater value than all others. ... [W]e don’t live in a normal world; we live under a power law.

... The biggest secret in venture capital is that the best investment in a successful fund equals or outperforms the entire rest of the fund combined.

This implies two very strange rules for VCs. First, only invest in companies that have the potential to return the value of the entire fund. ... This leads to rule number two: because rule number one is so restrictive, there can’t be any other rules.

...[L]ife is not a portfolio: not for a startup founder, and not for any individual. An entrepreneur cannot “diversify” herself; you cannot run dozens of companies at the same time and then hope that one of them works out well. Less obvious but just as important, an individual cannot diversify his own life by keeping dozens of equally possible careers in ready reserve.

Thiel teaches a class called Startup at Stanford, where he hammers home the value of understanding power laws. In his class, he imparts copious wisdom. From Blake Masters’ notes on Class 7:

Consider a prototypical successful venture fund. A number of investments go to zero over a period of time. Those tend to happen earlier rather than later. The investments that succeed do so on some sort of exponential curve. Sum it over the life of a portfolio and you get a J curve. Early investments fail. You have to pay management fees. But then the exponential growth takes place, at least in theory. Since you start out underwater, the big question is when you make it above the water line. A lot of funds never get there.

To answer that big question you have to ask another: what does the distribution of returns in [a] venture fund look like? The naïve response is just to rank companies from best to worst according to their return in multiple of dollars invested. People tend to group investments into three buckets. The bad companies go to zero. The mediocre ones do maybe 1x, so you don’t lose much or gain much. And then the great companies do maybe 3-10x.

But that model misses the key insight that actual returns are incredibly skewed. The more a VC understands this skew pattern, the better the VC. Bad VCs tend to think the dashed line is flat, i.e. that all companies are created equal, and some just fail, spin wheels, or grow. In reality you get a power law distribution.

Thiel explains how investors can apply the mental model of power laws (more from Masters’ notes on Class 7):

... Given a big power law distribution, you want to be fairly concentrated. ... There just aren’t that many businesses that you can have the requisite high degree of conviction

about. A better model is to invest in maybe 7 or 8 promising companies from which you think you can get a 10x return. ...

Despite being rooted in middle school math, exponential thinking is hard. We live in a world where we normally don't experience anything exponentially. Our general life experience is pretty linear. We vastly underestimate exponential things.

He also cautions against over-relying on power laws as a strategy (an assertion that should be kept in mind for all mental models). From Masters' notes:

One shouldn't be mechanical about this heuristic, or treat it as some immutable investment strategy. But it actually checks out pretty well, so at the very least it compels you to think about power law distribution.

Understanding exponents and power law distributions isn't just about understanding VC. There are important personal applications too. Many things, such as key life decisions or starting businesses, also result in similar distributions.

Thiel then explains why founders should focus on one key revenue stream, rather than trying to build multiple equal ones:

Even within an individual business, there is probably a sort of power law as to what's going to drive it. It's troubling if a startup insists that it's going to make money in many different ways. The power law distribution on revenues says that one source of revenue will dominate everything else.

For example, if you're an entrepreneur who opens a coffee shop, you'll have a lot of ways you can make money. You can sell coffee, cakes, paintings, merchandise, and more. But each of those things will not contribute to your success in an equal way. While there is value in the discovery process, once you've found the variable that matters most, you should place more time on that one and less on the others. The importance of finding this variable cannot be overstated.

He also acknowledges that power laws are one of the great secrets of investing success. From Masters' notes on Class 11:

On one level, the anti-competition, power law, and distribution secrets are all secrets about nature. But they're also secrets hidden by people. That is crucial to remember. Suppose you're doing an experiment in a lab. You're trying to figure out a natural secret. But every night another person comes into the lab and messes with your results. You won't understand what's going on if you confine your thinking to the nature side of things. It's not enough to find an interesting experiment and try to do it. You have to understand the human piece too.

... We know that, per the power law secret, companies are not evenly distributed. The distribution tends to be bimodal; there are some great ones, and then there are a lot of ones that don't really work at all. But understanding this isn't enough. There is a big difference between understanding the power law secret in theory and being able to apply it in practice.

The key to all mental models is knowing the facts and being able to use the concept. As George Box said, "all models are false but some are useful." Once we grasp the basics, the best next step is to start figuring out how to apply it.

The metaphor of an unseen person sabotaging laboratory results is an excellent metaphor for how cognitive biases and shortcuts cloud our judgment.

Natural Power Laws

Anyone who has kept a lot of pets will have noticed the link between an animal's size and its lifespan. Small animals, like mice and hamsters, tend to live for a year or two. Larger ones, like dogs and cats, can live to 10-20 years, or even older in rare cases. Scaling up, even more, some whales can live for 200 years. This comes down to power laws.

Biologists have found clear links between an animal's size and its metabolism. Kleiber's law (identified by Max Kleiber) states that an animal's metabolic rate increases at three-fourths of the power of the animal's weight (mass). If an average rabbit (2 kg) weighs one

hundred times as much as an average mouse (20g), the rabbit's metabolic rate will be 32 times the mouse's. In other words, the rabbit's structure is more efficient. It all comes down to the geometry behind their mass.

This leads us to another biological power law: Smaller animals require more energy per gram of body weight, meaning that mice eat around half their body weight in dense foods each day. The reason is that, in terms of the percentage of mass, larger animals have more structure (bones, etc.) and fewer reserves (fat stores).

Research has illustrated how power laws apply to blood circulation in animals. The end units through which oxygen, water, and nutrients enter cells from the bloodstream are the same size in all animals. Only the number per animal varies. The relationship between the total area of these units and the size of the animal is a third-order power law. The distance blood travels to enter cells, and the actual volume of blood is also subject to power laws.

The Law of Diminishing Returns

As we have seen, a small change in one area can lead to a huge change in another. However, past a certain point, diminishing returns set in and more is worse. Working an hour extra per day might mean more gets done, whereas working three extra hours is likely to lead to less getting done due to exhaustion. Going from a sedentary lifestyle to running two days a week may result in greatly improved health, but stepping up to seven days a week will cause injuries. Overzealousness can turn a positive exponent into a negative exponent. For a busy restaurant, hiring an extra chef will mean that more people can be served, but hiring two new chefs might spoil the proverbial broth.

Perhaps the most underappreciated diminishing return, the one we never want to end up on the wrong side of, is the one between money and happiness.

In *David and Goliath*, Malcolm Gladwell discusses how diminishing returns relate to family incomes. Most people assume that the more money they make, the happier they and their families will be. This is true — up to a point. An income that's too low to meet basic needs makes people miserable, leading to far more physical and mental health problems. A person who goes from earning \$30,000 a year to earning \$40,000 is likely to experience a dramatic boost in happiness. However, going from \$100,000 to \$110,000 leads to a negligible change in well-being.

Gladwell writes:

The scholars who research happiness suggest that more money stops making people happier at a family income of around seventy-five thousand dollars a year. After that, what economists call "diminishing marginal returns" sets in. If your family makes seventy-five thousand and your neighbor makes a hundred thousand, that extra twenty-five thousand a year means that your neighbor can drive a nicer car and go out to eat slightly more often. But it doesn't make your neighbor happier than you, or better equipped to do the thousands of small and large things that make for being a good parent.

46. Intelligent Preparation: The World Is Multidisciplinary

We live in a society that demands specialization. Being the best means being an expert in something. Letters after your name and decades in the trenches of experience are required before you can claim to know anything. In one sense there is nothing wrong with this — specialized knowledge is required to solve problems and advance our global potential. But a byproduct of this niche focus is that it narrows the ways we think we can apply our knowledge without being called a fraud.

So we think physicists can't teach us about love; mathematicians can't instruct us on how to run a business; poets don't know squat about "my life." And bloggers can't contribute to philosophy.

I don't believe this is true.

Knowledge is hard to come by.

It takes work and commitment, and I think we owe it to ourselves to take it out of the box it comes in and experiment with it. We should blow past conformity and apply all the knowledge at our disposal to the problems and challenges we face every day.

Think about it. Over time you've picked up a lot of fundamentals about how the world works. You may have read a book about the Manhattan Project and the building of the nuclear bomb that was launched at Hiroshima. This story conveys the awesome power of self-sustaining nuclear reactions. Have you ever thought about applying those ideas to your life? You should.

47. Multiplicative Systems: Understanding The Power of Multiplying by Zero

We all learned in math class that anything times zero is zero. But if you stop XF about the idea here, you don't see all the practical applications that understanding multiplicative systems can give you in life.

Let's run through a little elementary algebra. Try to do it in your head: What's $1,506,789 \times 9,809 \times 5.56 \times 0$?

Hopefully, you didn't have to whip out the old TI-84 to solve that one. It's a zero.

This leads us to a mental model called Multiplicative Systems and understanding it can get to the heart of a lot of issues.

The Weakest Link in the Chain

Suppose you were trying to become the best basketball player in the world. You've got the following things going for you:

1. God-given talent. You're 6'9", quick, skillful, can leap out of the building, and have been the best player in a competitive city since you can remember.
2. Support. You live in a city that reveres basketball and you're raised by parents who care about your goals.
3. A proven track record. You were the player of the year in a very competitive Division 1 college conference.
4. A clear path forward. You're selected as the second overall pick in the NBA Draft by the Boston Celtics.

Sounds like you have a shot, right? As good as anyone could have, right? What would you put the odds at of this person becoming one of the better players in the world? Pretty high?

Let's add one more piece of information:

5. You've developed a cocaine habit.

What are your odds now?

This little exercise isn't an academic one, it's the sad case of Leonard "Len" Bias, a young basketball prodigy who died of a cocaine overdose after being selected to play in the NBA for the Boston Celtics in 1986. Many call Bias the best basketball player who never played professionally.

What the story of Len Bias illustrates so well is the truth that anything times zero must still be zero, no matter how large the string of numbers preceding it. In some facets of life, all of your hard work, dedication to improvement, and good fortune may still be worth nothing if there is a weak link in the chain.

Something all engineers learn very early on is that a system is no stronger than its weakest component. Take, for example, the case of a nuclear power plant. We have a very good understanding of how to make the nuclear power plant quite safe, nearly indestructible, which it must be considering the magnitude of a failure.

But in reality, what is the weakest link in the chain for most nuclear power plants? *The human beings running them.* We're part of the system! And since we've yet to perfect the human being, we have yet to perfect the nuclear power plant. How could it be otherwise?

An additive system does not work this way. In an additive system, each component adds on to one another to create the final outcome. Going back to algebra, let's say our equation was additive rather than

multiplicative: $1,506,789 \text{ plus } 9,809 \text{ plus } 5.56 \text{ plus } 0$. The answer is 1,516,603.56 — still a pretty big number!

Think of an additive system as something like a great Thanksgiving dinner. You've got a great turkey, some whipped potatoes, a mass of stuffing, and a lump of homemade cranberry sauce, and you're hanging with your family. Awesome!

Let's say the potatoes get burnt in the oven, and they're inedible. Problem? Sure, but dinner still works out just fine. Someone shows up with a pie for dessert? Great! But it won't change the dinner all that much.

The interaction of the parts makes the dinner range from good to great. Take some parts away or add new ones in, and you get a different outcome, but not a *binary*, win/lose one. The meal still happens. Additive systems and multiplicative systems react differently when components are added or taken away.

Most businesses, for example, operate in a multiplicative system. But they too often *think* they're operating in additive ones: Ever notice how some businesses will add one feature on top of another to their products but fail at basic customer service, so you leave, never to return? That's a business that thinks it's in an additive system when they really need to be resolving the big fat *zero* in the middle of the equation instead of adding more stuff.

Financial systems are, of course, multiplicative. General Motors, founded in 1908 by William Durant and C.S. Mott, came to dominate the American car market to the tune of 50% market share through a series of brilliant innovations and management practices and was for many years the dominant and most admirable corporation in America. Even today, after more than a century of competition, no American carmaker produces more automobiles than General Motors.

And yet, the original shareholders of GM ended up with a *zero* in 2008 as the company went into bankruptcy due to years of financial mismanagement. It didn't matter that they had several generations of leadership: All of that becomes naught in a multiplicative system.

On a smaller scale, take the case of a young corporate climber who feels they just can't get ahead. They seem to have all their ducks in a row: great resume, great background, great experience...the problem is that they suck at dealing with other people and treat others like stepping stones. That's a *zero* that can negate *all* of the big numbers preceding it. The rest doesn't matter.

And so we arrive at the "must be true" conclusion that understanding when you're in an additive system versus a multiplicative system, and which components need absolute reliability for the system to work, is a critical model to have in your head. Multiplicative thinking is a model related to the greater idea of systems thinking, another mental model well worth acquiring.

48. The Skill You've Never Been Taught: How to Think Better

No skill is more valuable or harder to come by than the ability to critically think through problems.

Thinking better than others means you'll have more free time and fewer problems. If you can't think well, you'll spend a lot of time fixing avoidable mistakes.

If you stop thinking when most people stop thinking, you'll come to the same conclusions most people come to. Thinking is hard, so it's natural that most people stop as soon as possible. We get the gist of something and move on to the next problem.

Where do the ideas come from? Mine come from sitting and thinking.

Ed Thorp

How can we learn to think better?

One answer comes from the lecture Solitude and Leadership by William Deresiewicz, author of the *New York Times* bestseller *Excellent Sheep: The Miseducation of the American Elite and the Way to a Meaningful Life*. The entire speech, which was delivered at Westpoint, is worth reading, but here is the essential takeaway.

Learning How To Think

Let's start with how you don't learn to think. A study by a team of researchers at Stanford came out a couple of months ago. The investigators wanted to figure out how today's college students were able to multitask so much more effectively than adults. How do they manage to do it, the researchers asked? The answer, they discovered—and this is by no means what they expected—is that they don't. The enhanced cognitive abilities the investigators expected to find, the mental faculties that enable people to multitask effectively, were simply not there. In other words, people do not multitask effectively. And here's the really surprising finding: the more people multitask, the worse they are, not just at other mental abilities, but at multitasking itself.

One thing that made the study different from others is that the researchers didn't test people's cognitive functions while they were multitasking. They separated the subject group into high multitaskers and low multitaskers and used a different set of tests to measure the kinds of cognitive abilities involved in multitasking. They found that in every case the high multitaskers scored worse. They were worse at distinguishing between relevant and irrelevant information and ignoring the latter. In other words, they were more distractible. They were worse at what you might call "mental filing": keeping information in the right conceptual boxes and being able to retrieve it quickly. In other words, their minds were more disorganized. And they were even worse at the very thing that defines multitasking itself: switching between tasks.

Multitasking, in short, is not only not thinking, it impairs your ability to think. Thinking means concentrating on one thing long enough to develop an idea about it. Not learning other people's ideas, or memorizing a body of information, however much those may sometimes be useful. Developing your own ideas. In short, thinking for yourself. You simply cannot do that in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.

I find for myself that my first thought is never my best thought. My first thought is always someone else's; it's always what I've already heard about the subject, always the conventional wisdom. It's only by concentrating, sticking to the question, being patient, letting all the parts of my mind come into play, that I arrive at an original idea. By giving my brain a chance to make associations, draw connections, take me by surprise. And often even that idea doesn't turn out to be very good. I need time to think about it, too, to make mistakes and recognize them, to make false starts and correct them, to outlast my impulses, to defeat my desire to declare the job done and move on to the next thing.

I used to have students who bragged to me about how fast they wrote their papers. I would tell them that the great German novelist Thomas Mann said that a writer is someone for whom writing is more difficult than it is for other people. The best writers write much more slowly than everyone else, and the better they are, the slower they write. James Joyce wrote Ulysses, the greatest novel of the 20th century, at the rate of about a hundred words a day—half the length of the selection I read you earlier from Heart of Darkness—for seven years. T. S. Eliot, one of the greatest poets our country has ever produced, wrote about 150 pages of poetry over the course of his entire 25-year career. That's half a page a month. So it is with any other form of thought. You do your best thinking by slowing down and concentrating.

Improving Thinking

The best way to improve your thinking ability is to spend time thinking.

Immersing ourselves in a subject and giving it our full attention offers insights that can't be gained simply by skimming on the surface.

How can we force ourselves to spend more time thinking?

One way to engage with an idea is to write about it.

If you're thinking without writing, you only think you're thinking.

Leslie Lamport

While we naturally understand that writing is a good way to share ideas with others, we under-appreciate just how much good writing helps us think about an idea ourselves.

Writing is not only a means of communication, it enables us to practice reasoning.

Writing forces you to slow down, focus, and think deeply. In a world where attention is fragmented into seconds, thinking becomes more reactive than reasoned. Only when take time to play with our ideas can we hope to think about them substantially. Writing requires sticking with something a little longer and developing a deeper understanding.

Writing is the process by which we realize we do not understand and the process by which we come to understand.

Writing requires the compression of an idea. When done poorly, compression removes crucial information. When done well, compression keeps the essential and removes the rest. Compression requires both thinking and clarity, which is one reason writing is an important aid to thinking.

It's only by concentrating, sticking to the question, being patient, letting all the parts of my mind come into play, that I arrive at an original idea. By giving my brain a chance to make associations, draw connections, take me by surprise.

— William Deresiewicz

Good writing gives poor thinking nowhere to hide. It's easy to read and flows. Poor writing is a drag as your mind is forced to sift through the obfuscation to try and pull out the right information. Poor writing is a strong indication of poor thinking.

Good writing requires thinking. Thinking takes time. Good thinking is expensive, but bad thinking costs a fortune.

The Bottom Line

The process of writing helps you think through an idea.

Writing forces you to test your thinking. Strangers can't know your thoughts, unless you put them into words. So one way to test your ideas is to let other people read them.

Take the time to write down your thoughts.

49. Mental Model: Bias from Insensitivity to Sample Size

The widespread misunderstanding of randomness causes a lot of problems.

Today we're going to explore a concept that causes a lot of human misjudgment. It's called the bias from insensitivity to sample size, or, if you prefer, the law of small numbers.

Insensitivity to small sample sizes causes a lot of problems.

* * *

If I measured one person, who happened to measure 6 feet, and then told you that everyone in the whole world was 6 feet, you'd intuitively realize this is a mistake. You'd say, you can't measure only one person and then draw such a conclusion. To do that you'd need a much larger sample.

And, of course, you'd be right.

While simple, this example is a key building block to our understanding of how insensitivity to sample size can lead us astray.

As Stuard Suterhland writes in Irrationality:

Before drawing conclusions from information about a limited number of events (a sample) selected from a much larger number of events (the population) it is important to understand something about the statistics of samples.

In Thinking, Fast and Slow, Daniel Kahneman writes "A random event, by definition, does not lend itself to explanation, but collections of random events do behave in a highly regular fashion." Kahneman continues, "extreme outcomes (both high and low) are more likely to be found in small than in large samples. This explanation is not causal."

We all intuitively know that "the results of larger samples deserve more trust than smaller samples, and even people who are innocent of statistical knowledge have heard about this law of large numbers."

The principle of regression to the mean says that as the sample size grows larger results should converge to a stable frequency. So, if we're flipping coins, and measuring the proportion of times that we get heads, we'd expect it to approach 50% after some large sample size of, say, 100 but not necessarily 2 or 4.

In our minds, we often fail to account for the accuracy and uncertainty with a given sample size.

While we all understand it intuitively, it's hard for us to realize in the moment of processing and decision making that larger samples are better representations than smaller samples. We understand the difference between a sample size of 6 and 6,000,000 fairly well but we don't, intuitively, understand the difference between 200 and 3,000.

* * *

This bias comes in many forms.

In a telephone poll of 300 seniors, 60% support the president.

If you had to summarize the message of this sentence in exactly three words, what would they be? Almost certainly you would choose "elderly support president." These words provide the gist of the story. The omitted details of the poll, that it was done on the phone with a sample of 300, are of no interest in themselves; they provide background information that attracts little attention." Of course, if the sample was extreme, say 6 people, you'd question it. Unless you're fully mathematically equipped, however, you'll intuitively judge the sample size and you may not react differently to a sample of, say, 150 and 3000. That, in a nutshell, is exactly the meaning of the statement that "people are not adequately sensitive to sample size."

Part of the problem is that we focus on the story over reliability, or, robustness, of the results.

System one thinking, that is our intuition, is "not prone to doubt. It suppresses ambiguity and spontaneously constructs stories that are as coherent as possible. Unless the

message is immediately negated, the associations that it evokes will spread as if the message were true.”

Considering sample size, unless it's extreme, is not a part of our intuition.

Kahneman writes:

The exaggerated faith in small samples is only one example of a more general illusion – we pay more attention to the content of messages than to information about their reliability, and as a result end up with a view of the world around us that is simpler and more coherent than the data justify. Jumping to conclusions is a safer sport in the world of our imagination than it is in reality.

* * *

In engineering, for example, we can encounter this in the evaluation of precedent.

Steven Vick, writing in Degrees of Belief: Subjective Probability and Engineering Judgment, writes:

If something has worked before, the presumption is that it will work again without fail. That is, the probability of future success conditional on past success is taken as 1.0.

Accordingly, a structure that has survived an earthquake would be assumed capable of surviving with the same magnitude and distance, with the underlying presumption being that the operative causal factors must be the same. But the seismic ground motions are quite variable in their frequency content, attenuation characteristics, and many other factors, so that a precedent for a single earthquake represents a very small sample size.

Bayesian thinking tells us that a single success, absent of other information, raises the likelihood of survival in the future.

In a way this is related to robustness. The more you've had to handle and you still survive the more robust you are.

Let's look at some other examples.

* * *

Hospital

Daniel Kahneman and Amos Tversky demonstrated our insensitivity to sample size with the following question:

A certain town is served by two hospitals. In the larger hospital about 45 babies are born each day, and in the smaller hospital about 15 babies are born each day. As you know, about 50% of all babies are boys. However, the exact percentage varies from day to day. Sometimes it may be higher than 50%, sometimes lower. For a period of 1 year, each hospital recorded the days on which more than 60% of the babies born were boys. Which hospital do you think recorded more such days?

1. The larger hospital
2. The smaller hospital
3. About the same (that is, within 5% of each other)

Most people incorrectly choose 3. The correct answer is, however, 2.

In Judgment in Managerial Decision Making, Max Bazerman explains:

Most individuals choose 3, expecting the two hospitals to record a similar number of days on which 60 percent or more of the babies born are boys. People seem to have some basic idea of how unusual it is to have 60 percent of a random event occurring in a specific direction. However, statistics tells us that we are much more likely to observe 60 percent of male babies in a smaller sample than in a larger sample.” This effect is easy to understand. Think about which is more likely: getting more than 60 percent heads in three flips of coin or getting more than 60 percent heads in 3,000 flips.

* * *

Another interesting example comes from Poker.

Over short periods of time luck is more important than skill. The more luck contributes to the outcome, the larger the sample you'll need to distinguish between someone's skill and pure chance.

David Einhorn explains.

People ask me "Is poker luck?" and "Is investing luck?"

The answer is, not at all. But sample sizes matter. On any given day a good investor or a good poker player can lose money. Any stock investment can turn out to be a loser no matter how large the edge appears. Same for a poker hand. One poker tournament isn't very different from a coin-flipping contest and neither is six months of investment results. On that basis luck plays a role. But over time – over thousands of hands against a variety of players and over hundreds of investments in a variety of market environments – skill wins out.

As the number of hands played increases, skill plays a larger and larger role and luck plays less of a role.

* * *

But this goes way beyond hospitals and poker. Baseball is another good example. Over a long season, odds are the best teams will rise to the top. In the short term, anything can happen. If you look at the standing 10 games into the season, odds are they will not be representative of where things will land after the full 162 game season. In the short term, luck plays too much of a role.

In Moneyball, Michael Lewis writes "In a five-game series, the worst team in baseball will beat the best about 15% of the time."

* * *

If you promote people or work with colleagues you'll also want to keep this bias in mind. If you assume that performance at work is some combination of skill and luck you can easily see that sample size is relevant to the reliability of performance.

That performance sampling works like anything else, the bigger the sample size the bigger the reduction in uncertainty and the more likely you are to make good decisions.

This has been studied by one of my favorite thinkers, James March. He calls it the false record effect.

He writes:

False Record Effect. A group of managers of identical (moderate) ability will show considerable variation in their performance records in the short run. Some will be found at one end of the distribution and will be viewed as outstanding; others will be at the other end and will be viewed as ineffective. The longer a manager stays in a job, the less the probable difference between the observed record of performance and actual ability. Time on the job increased the expected sample of observations, reduced expected sampling error, and thus reduced the change that the manager (or moderate ability) will either be promoted or exit.

Hero Effect. Within a group of managers of varying abilities, the faster the rate of promotion, the less likely it is to be justified. Performance records are produced by a combination of underlying ability and sampling variation. Managers who have good records are more likely to have high ability than managers who have poor records, but the reliability of the differentiation is small when records are short.

(I realize promotions are a lot more complicated than I'm letting on. Some jobs, for example, are more difficult than others. It gets messy quickly and that's part of the problem. Often when things get messy we turn off our brains and concoct the simplest explanation we can. Simple but wrong. I'm only pointing out that sample size is one input into the decision. I'm by no means advocating an "experience is best" approach, as that comes with a host of other problems.)

* * *

This bias is also used against you in advertising.

The next time you see a commercial that says “4 out of 5 Doctors recommend” These results are meaningless without knowing the sample size. Odds are pretty good that the sample size is 5.

* * *

Large sample sizes are not a panacea. Things change. Systems evolve and faith in those results can be unfounded as well.

The key, at all times, is to think.

This bias leads to a whole slew of things, such as:

- under-estimating risk
- over-estimating risk
- undue confidence in trends/patterns
- undue confidence in the lack of side-effects/problems

The Bias from insensitivity to sample size is part of the Farnam Street latticework of mental models.

50. Daniel Dennett: How to Make Mistakes

In *Intuition Pumps And Other Tools for Thinking*, Daniel Dennett, one of the world's leading philosophers offers a trove of mind-stretching thought experiments, which he calls "imagination-extendors and focus-holders" (intuition pumps). They allow us to "think reliably and even gracefully about really hard questions."

The first intuition pump is on mistakes.

More specifically, how to make mistakes and the keys to good mistakes.

History Rhymes

The history of philosophy is in large measure the history of very smart people making very tempting mistakes, and if you don't know the history, you are doomed to making the same darn mistakes all over again.

Learning

Mistakes are not just opportunities for learning; they are, in an important sense, the only opportunity for learning or making something truly new. Before there can be learning, there must be learners. There are only two non-miraculous ways for learners to come into existence: they must either evolve or be designed and built by learners that evolved. Biological evolution proceeds by a grand, inexorable process of trial and error — and without the errors the trials wouldn't accomplish anything.

Evolution is the Enabling Process of Knowledge

Evolution is one of the central themes of this book, as all my books, for the simple reason that it is the central, enabling process not only of life but also of knowledge and learning and understanding. If you attempt to make sense of the world of ideas and meanings, free will and morality, art and science and even philosophy itself without a sound and quite detailed knowledge of evolution, you have one hand tied behind your back. ... For evolution, which knows nothing, the steps into novelty are blindly taken by mutations, which are random copying "errors" in DNA.

The Key to Good Mistakes

The chief trick to making good mistakes is not to hide them — especially not from yourself. Instead of turning away in denial when you make a mistake, you should become a connoisseur of your own mistakes, turning them over in your mind as if they were works of art, which in a way they are. The fundamental reaction to any mistake ought to be this: "Well, I won't do that again!" Natural selection doesn't actually think the thought; it just wipes out the goofers before they can reproduce; natural selection won't do that again, at least not as often. Animals that can learn—learn not to make that noise, touch that wire, eat that food—have something with a similar selective force in their brains. (B. F. Skinner and the behaviorists understood the need for this and called it "reinforcement" learning; that response is not reinforced and suffers "extinction.") We human beings carry matters to a much more swift and efficient level. We can actually think the thought, reflecting on what we have just done: "Well, I won't do that again!" And when we reflect, we confront directly the problem that must be solved by any mistake-maker: what, exactly, is that? What was it about what I just did that got me into all this trouble? The trick is to take advantage of the particular details of the mess you've made, so that your next attempt will be informed by it and not just another blind stab in the dark.

We have all heard the forlorn refrain "Well, it seemed like a good idea at the time!" This phrase has come to stand for the rueful reflection of an idiot, a sign of stupidity, but in fact we should appreciate it as a pillar of wisdom. Any being, any agent, who can truly say, "Well, it seemed like a good idea at the time!" is standing on the threshold of brilliance. We human beings pride ourselves on our intelligence, and one of its hall marks is that we can remember our previous thinking, and reflect on it—on how it seemed, on why it was tempting in the first place, and then about what went wrong.

[...]

So when you make a mistake, you should learn to take a deep breath, grit your teeth, and then examine your own recollections of the mistake as ruthlessly and as dispassionately as you can manage. It's not easy. The natural human reaction to making a mistake is embarrassment and anger (we are never angrier than when we are angry at ourselves), and you have to work hard to overcome these emotional reactions. Try to acquire the weird practice of savoring your mistakes, delighting in uncovering the strange quirks that led you astray. Then, once you have sucked out all the goodness to be gained from having made them, you can cheerfully set them behind you, and go on to the next big opportunity. But that is not enough: you should actively seek out opportunities to make grand mistakes, just so you can then recover from them.

Natural Selection

Every organism on the earth dies sooner or later after one complicated life story or another. How on earth could natural selection see through the fog of all these details in order to figure out what positive factors to “reward” with offspring and what negative factors to “punish” with childless death? Can it really be that some of our ancestors’ siblings died childless because their eyelids were the wrong shape? If not, how could the process of natural selection explain why our eyelids came to have the excellent shapes they have? Part of the answer is familiar: following the old adage: “If it ain’t broke, don’t fix it,” leave almost all of your old, conservative design solutions in place and take your risks with a safety net in place. Natural selection automatically conserves whatever has worked up to now, and fearlessly explores innovations large and small; the large ones almost always lead immediately to death. A terrible waste, but nobody’s counting. Our eyelids were mostly designed by natural selection long before there were human beings or even primates or even mammals.

Card Tricks

Here is a technique that card magicians—at least the best of them—exploit with amazing results. (I don’t expect to incur the wrath of the magicians for revealing this trick to you, since this is not a particular trick but a deep general principle.) A good card magician knows many tricks depend on luck—they don’t always work, or even often work. There are some effects—they can hardly be called tricks—that might work only once in a thousand times! Here is what you do: You start by telling the audience you are going to perform a trick, and without telling them what trick you are doing, you go for the one-in-a-thousand effect. It almost never works, of course, so you glide seamlessly into a second try, for an effect that works about one time in a hundred, perhaps. When it too fails (as it almost always will) you slide into effect #3, which only works about one time in ten, so you’d better be ready with effect #4 which works half the time (let’s say), and if all else fails (and by this time, usually one of the earlier safety nets will have kept you out of this worst case), you have a failsafe effect, which won’t impress the crowd very much but at least it’s a surefire trick. In the course of a whole performance, you will be very unlucky indeed if you always have to rely on your final safety net, and whenever you achieve one of the higher-flying effects, the audience will be stupefied. “Impossible! How on earth could you have known that was my card?” Aha! You didn’t know, but you had a cute way of taking a hopeful stab in the dark that paid off. By hiding the “error” cases from view, you create a “miracle”.

Evolution Works The Same Way

Evolution works the same way: all the dumb mistakes tend to be invisible, so all we see is a stupendous string of triumphs. For instance, the vast majority — way over 90 percent — of all the creatures that have ever lived died childless, but not a single one of your ancestors suffered that fate. Talk about a line of charmed lives!

One big difference between the discipline of science and the discipline of stage magic is that while magicians conceal their false starts from the audience as best they can, in science you make your mistakes in public. You show them off so that everybody can learn from them. ... It is not so much that our brains are bigger or more powerful, or even that

we have the knack of reflecting on our own past errors, but that we share the benefits that our individual brains have won by their individual histories of trial and error.

I am amazed at how many really smart people don't understand that you can make big mistakes in public and emerge none the worse for it.

We all know people, perhaps ourselves included, who will go to great lengths to avoid admitting they were wrong. But Dennett argues:

Actually, people love it when somebody admits to making a mistake. All kinds of people love pointing out mistakes. Generous-spirited people appreciate your giving them the opportunity to help, and acknowledging it when they succeed in helping you; mean-spirited people enjoy showing you up. Let them! Either way we all win.

Of course, in general, people do not enjoy correcting the stupid mistakes of others. You have to have something worth correcting, something original to be right or wrong about ...

51. The Laws of Simplicity

“Simplicity is about subtracting the obvious,
and adding the meaningful.”

John Maeda is a graphic designer and computer scientist. His book, The Laws of Simplicity, proposes ten laws for simplifying complex systems in business and life. Think of it as simplicity 101.

Simplicity = Sanity

Technology has made our lives more full, yet at the same time we've become uncomfortably "full."

Ten Laws

1 REDUCE The simplest way to achieve simplicity is through thoughtful reduction.

2 ORGANIZE Organization makes a system of many appear fewer.

3 TIME Savings in time feel like simplicity.

4 LEARN Knowledge makes everything simpler.

5 DIFFERENCES Simplicity and complexity need each other.

6 CONTEXT What lies in the periphery of simplicity is definitely not peripheral.

7 EMOTION More emotions are better than less.

8 TRUST In simplicity we trust.

9 FAILURE Some things can never be made simple.

10 THE ONE Simplicity is about subtracting the obvious, and adding the meaningful.

Three Keys

In addition to the ten Laws, Maeda offers three Keys to achieving simplicity in the technology domain.

1 AWAY More appears like less by simply moving it far, far away.

2 OPEN Openness simplifies complexity.

3 POWER Use less, gain more.

Let's take a look at a few of these.

The simplest way to achieve simplicity.

The simplest way to achieve simplicity is through thoughtful reduction. When in doubt, just remove. But be careful of what you remove. ... When it is possible to reduce a system's functionality without significant penalty, true simplification is realized.

What is simplicity about?

Simplicity is about the unexpected pleasure derived from what is likely to be insignificant and would otherwise go unnoticed.

The relationship between space and clutter

At first, a larger home lowers the clutter to space ratio. But ultimately, the greater space enables more clutter.

Small changes in organization create big differences in a design.

Squint at the world.

The best designers in the world all squint when they look at something. They squint to see the forest from the trees-to find the right balance. Squint at the world. You will see more, by seeing less.

Time Savings

When forced to wait, life seems unnecessarily complex. Savings in time feel like simplicity. ... A shot from the doctor hurts less when it happens quickly, and even less when we know that the shot will save our lives.

Knowledge makes everything simpler.

This is true for any object, no matter how difficult. The problem with taking time to learn a task is that you often feel you are wasting time, a violation of the third Law. We are well aware of the dive-in-head-first approach-"I don't need the instructions, let me just do it." But in fact this method often takes longer than following the directions in the manual.

Good Design

The best designers marry function with form to create intuitive experiences that we understand immediately-no lessons (or cursing) needed. Good design relies to some extent on the ability to instill a sense of instant familiarity.

Need to Know vs. Nice to Know

Difficult tasks seem easier when they are “need to know” rather than “nice to know.” A course in history, mathematics, or chemistry is nice to know for a teenager, but completing driver’s education satisfies a fundamental need for autonomy.

Simplicity and complexity need each other.

The more complexity there is in the market, the more that something simpler stands out.

It’s best to preserve emptiness because nothing is an important something.

The opportunity lost by increasing the amount of blank space is gained back with enhanced attention on what remains. More white space means that less information is presented. In turn, proportionately more attention shall be paid to that which is made less available. When there is less, we appreciate everything much more.

Some things can never be made simple. Complexity can be beautiful.

Concentrate on the deep beauty of a flower. Notice the many thin, delicate strands that emanate from the center and the sublime gradations of hue that occur even in the simplest white blossom. Complexity can be beautiful. At the same time, the beautiful simplicity of planting a seed and just adding water lies at even the most complex flower’s beginning.

Remember, “Technology and life only become complex if you let it be so.”

52. The Timeless Parable of Mr. Market

There is no one better to explain the concept of Mr. Market than Warren Buffett, who has used to to make billions of dollars and remain calm when all around him were losing their heads.

In the 1987 letter to Berkshire Hathaway shareholders, Buffett unfolds the concept for us. *Ben Graham, my friend and teacher, long ago described the mental attitude toward market fluctuations that I believe to be most conducive to investment success. He said that you should imagine market quotations as coming from a remarkably accommodating fellow named Mr. Market who is your partner in a private business. Without fail, Mr. Market appears daily and names a price at which he will either buy your interest or sell you his. Even though the business that the two of you own may have economic characteristics that are stable, Mr. Market's quotations will be anything but. For, sad to say, the poor fellow has incurable emotional problems. At times he feels euphoric and can see only the favorable factors affecting the business. When in that mood, he names a very high buy-sell price because he fears that you will snap up his interest and rob him of imminent gains. At other times he is depressed and can see nothing but trouble ahead for both the business and the world. On these occasions, he will name a very low price, since he is terrified that you will unload your interest on him.*

Mr. Market has another endearing characteristic: He doesn't mind being ignored. If his quotation is uninteresting to you today, he will be back with a new one tomorrow. Transactions are strictly at your option. Under these conditions, the more manic-depressive his behavior, the better for you.

But, like Cinderella at the ball, you must heed one warning or everything will turn into pumpkins and mice: Mr. Market is there to serve you, not to guide you. It is his pocketbook, not his wisdom, that you will find useful. If he shows up some day in a particularly foolish mood, you are free to either ignore him or to take advantage of him, but it will be disastrous if you fall under his influence. Indeed, if you aren't certain that you understand and can value your business far better than Mr. Market, you don't belong in the game. As they say in poker, "If you've been in the game 30 minutes and you don't know who the patsy is, you're the patsy."

Ben's Mr. Market allegory may seem out-of-date in today's investment world, in which most professionals and academicians talk of efficient markets, dynamic hedging and betas. Their interest in such matters is understandable, since techniques shrouded in mystery clearly have value to the purveyor of investment advice. After all, what witch doctor has ever achieved fame and fortune by simply advising "Take two aspirins"? The value of market esoterica to the consumer of investment advice is a different story. In my opinion, investment success will not be produced by arcane formulae, computer programs or signals flashed by the price behavior of stocks and markets. Rather an investor will succeed by coupling good business judgment with an ability to insulate his thoughts and behavior from the super-contagious emotions that swirl about the marketplace. In my own efforts to stay insulated, I have found it highly useful to keep Ben's Mr. Market concept firmly in mind.

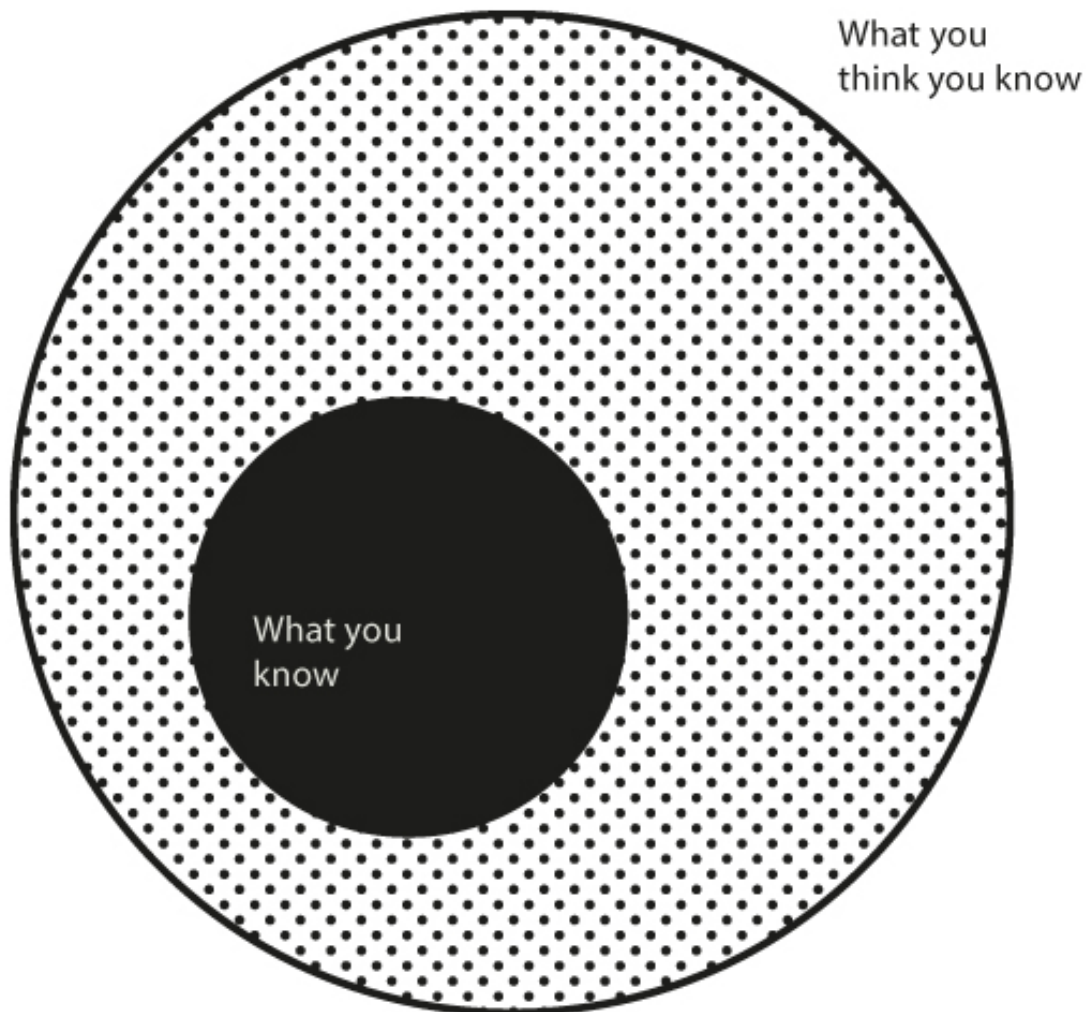
Following Ben's teachings, Charlie and I let our marketable equities tell us by their operating results – not by their daily, or even yearly, price quotations – whether our investments are successful. The market may ignore business success for a while, but eventually will confirm it. As Ben said: "In the short run, the market is a voting machine but in the long run it is a weighing machine." The speed at which a business's success is recognized, furthermore, is not that important as long as the company's intrinsic value is increasing at a satisfactory rate. In fact, delayed recognition can be an advantage: It may give us the chance to buy more of a good thing at a bargain price.

Of course, this concept can be applied outside of stock markets as well.

“In the short run, the market is a voting machine but in the long run it is a weighing machine.”

— Ben Graham

52. Mastering Success: Navigating Within Your Circle of Competence



Understanding where you have an edge and where you don't can help you prevent problems, spot opportunities others miss, and rapidly learn.

We all have a circle of competence – an area in which we have a lot of earned knowledge. The size of that circle is not important. What is important is knowing when you are approaching the perimeter.

Within your circle of competence, you operate with an advantage. As you approach the perimeter (the limitations of your knowledge), your advantage starts to reduce. As you cross the perimeter, not only does your advantage vanish, but it transfers to other people. Suddenly, you find yourself playing in an area where others have an edge.

Just because you are good at something doesn't mean you are good at everything.

A Grandmaster in chess is at home on the chessboard, but those skills don't translate into being competent in other areas of life, such as cooking in the kitchen. In fact, it's often the case that extreme skills in one area create extreme weaknesses in others.

I want to think about things where I have an advantage over other people. I don't want to play a game where people have an advantage over me. I don't play in a game where other

people are wise and I am stupid. I look for a game where I am wise and they are stupid. And believe me it works better. God bless our stupid competitors. They make us rich.

Charlie Munger

As we cross the perimeter from what we know to what we don't, confidence does not diminish as fast as competence. The biggest risk when operating outside of your circle of competence is what you don't see.

While most people are concerned with the *size* of their circle, it's a lot more important to know when you are approaching the *perimeter*.

Circle Of Competence

I'm no genius. I'm smart in spots—but I stay around those spots.

Tom Watson Sr., Founder of IBM

Warren Buffett described circle of competence using one of his former business managers, Rose Blumkin, a Russian immigrant with poor English who built the largest furniture store in Nebraska:

I couldn't have given her \$200 million worth of Berkshire Hathaway stock when I bought the business because she doesn't understand stock. She understands cash. She understands furniture. She understands real estate. She doesn't understand stocks, so she doesn't have anything to do with them. If you deal with Mrs. B in what I would call her circle of competence... She is going to buy 5,000 end tables this afternoon (if the price is right). She is going to buy 20 different carpets in odd lots, and everything else like that [snaps fingers] because she understands carpet. She wouldn't buy 100 shares of General Motors if it was at 50 cents a share.

It did not hurt Mrs. B to have such a narrow area of competence. In fact, one could argue the opposite. Her rigid devotion to that area allowed her to focus. Only by focusing on one thing could she overcome her handicaps and achieve such extreme success.

Charlie Munger applies the concept to life in general. He sought to answer the essential question: Where should we devote our limited time to achieve the most success?

You have to figure out what your own aptitudes are. If you play games where other people have the aptitudes and you don't, you're going to lose. And that's as close to certain as any prediction that you can make. You have to figure out where you've got an edge. And you've got to play within your own circle of competence.

If you want to be the best tennis player in the world, you may start out trying and soon find out that it's hopeless—that other people blow right by you. However, if you want to become the best plumbing contractor in Bemidji, that is probably doable by two-thirds of you. It takes a will. It takes the intelligence. But after a while, you'd gradually know all about the plumbing business in Bemidji and master the art. That is an attainable objective, given enough discipline. And people who could never win a chess tournament or stand in center court in a respectable tennis tournament can rise quite high in life by slowly developing a circle of competence—which results partly from what they were born with and partly from what they slowly develop through work.

It becomes easier to stay within your circle of competence when you focus on outcome over ego.

When asked why Berkshire Hathaway hasn't invested in pharmaceuticals, Charlie Munger responded:

By and large, we haven't invested in pharmaceuticals because we've got no edge. I don't know enough about biology and medicine and chemistry to have any edge in guessing

which new pharmaceutical attempt is likely to succeed and other people who know those things, not that they have perfect knowledge, but it's way better than mine. Why in the hell would I play against other people in a game where they're much better at it than I am when I'm playing for something desperately important to me like a way of feeding my family. So of course, we didn't go near it.

I would argue that — in practical life, if you want to succeed, you got to do two things. You got to have a certain amount of confidence. And you have to know what you know and what you don't know. You have to know the edge of your competency. And if you know the edge of your competency, you're a much safer thinker and a much safer investor than you are if you don't know it.

It's better to have an IQ of 160 and think it's 150 than an IQ of 160 and think it's 200. That guy is going to kill you because he doesn't know the edge of his own competence and he thinks he knows everything.

Partly, Warren and I, we pretty much know what we know and what we don't know, what we're good at, what we're not good at. And one of the things we're not good at is guessing which new pharmaceuticals. So we don't even look at it. After all, it's a big universe out there and if we have to leave a certain kind of investment behind because we lack the capacity to deal with it as well as some other people. That's all right. We don't need an infinite number of opportunities.

To improve the odds of success in life and business, understand the perimeter of your circle of competence and operate well inside. Over time, work to expand that circle, but don't fool yourself about where the perimeter is, and never be afraid to say, "I don't know."

60. Margin of Safety: An Introduction to the Mental Model

Previously on Farnam Street, we covered the idea of Redundancy — a central concept in both the world of engineering and in practical life. Today we're going to explore a related concept: Margin of Safety.

The margin of safety is another concept rooted in engineering and quality control. Let's start there, then see where else our model might apply in practical life, and lastly, where it might have limitations.

* * *

Consider a highly-engineered jet engine part. If the part were to fail, the engine would also fail, perhaps at the worst possible moment—while in flight with passengers on board. Like most jet engine parts, let us assume the part is replaceable over time—though we don't want to replace it too often (creating prohibitively high costs), we don't expect it to last the lifetime of the engine. We design the part for 10,000 hours of average flying time.

That brings us to a central question: After how many hours of service do we replace this critical part? The easily available answer might be 9,999 hours. Why replace it any sooner than we have to? Wouldn't that be a waste of money?

The first problem is, we know nothing of the composition of the 10,000 hours any individual part has gone through. Were they 10,000 particularly tough hours, filled with turbulent skies? Was it all relatively smooth sailing? Somewhere in the middle?

Just as importantly, how confident are we that the part will really last the full 10,000 hours? What if it had a slight flaw during manufacturing? What if we made an assumption about its reliability that was not conservative enough? What if the material degraded in bad weather to a degree we didn't foresee?

The challenge is clear, and the implication obvious: we do not wait until the part has been in service for 9,999 hours. Perhaps at 7,000 hours, we seriously consider replacing the part, and we put a hard stop at 7,500 hours.

The difference between waiting until the last minute and replacing it comfortably early gives us a margin of safety. The sooner we replace the part, the more safety we have—by not pushing the boundaries, we leave ourselves a cushion. (Ever notice how your gas tank indicator goes on long before you're really on empty? It's the same idea.)

The principle is essential in bridge building. Let's say we calculate that, on an average day, a proposed bridge will be required to support 5,000 tons at any one time. Do we build the structure to withstand 5,001 tons? I'm not interested in driving on that bridge. What if we get a day with much heavier traffic than usual? What if our calculations and estimates are a little off? What if the material weakens over time at a rate faster than we imagined? To account for these, we build the bridge to support 20,000 tons. Only now do we have a margin of safety.

This fundamental engineering principle is useful in many practical areas of life, even for non-engineers. Let's look at one we all face.

* * *

Take a couple earning \$100,000 per year after taxes, or about \$8,300 per month. In designing their life, they must necessarily decide what standard of living to enjoy. (The part which can be quantified, anyway.) What sort of monthly expenses should they allow themselves to accumulate?

One all-too-familiar approach is to build in monthly expenses approaching \$8,000. A \$4,000 mortgage, \$1,000 worth of car payments, \$1,000/month for private schools...and so on. The couple rationalizes that they have "earned" the right live large.

However, what if there are some massive unexpected expenditures thrown their way? (In the way life often does.) What if one of them lost their job and their combined monthly income dropped to \$4,000?

The couple must ask themselves whether the ensuing misery is worth the lavish spending. If they kept up their \$8,000/month spending habit after a loss of income, they would have to choose between two difficult paths: Rapidly eating into their savings or considerably downsizing their life. Either is likely to cause extreme misery from the loss of long-held luxuries.

Thinking in reverse, how can we avoid the potential misery?

A common refrain is to tell the couple to make sure they've stashed away some money in case of emergency, to provide a buffer. Often there is a specific multiple of current spending we're told to have in reserve—perhaps 6-12 months. In this case, savings of \$48,000-\$96,000 should suffice.

However, is there a way we can build them a much larger margin for error?

Let's say the couple decides instead to permanently limit their monthly spending to \$4,000 by owning a smaller house, driving less expensive cars, and trusting their public schools.

What happens?

Our margin of safety now compounds. Obviously, a savings rate exceeding 50% will rapidly accumulate in their favor — \$4,300 put away by the first month, \$8,600 by the second month, and so on. The mere act of systematically underspending their income rapidly gives them a cushion without much trying. If an unexpected expenditure comes up, they'll almost certainly be ready.

The unseen benefit and the extra margin of safety in this choice comes if either spouse loses their income – either by choice (perhaps to care for a child) or by bad luck (health issues). In this case, not only has a high savings rate accumulated in their favor, but because their spending is systematically low, they can avoid tapping it altogether! Their savings simply stop growing temporarily while they live on one income. This sort of “belt and suspenders” solution is the essence of margin-of-safety thinking.

(On a side note: Let's take it even one step further. Say their former \$8,000 monthly spending rate meant they probably could not retire until age 70, given their current savings rate, investment choices, and desired lifestyle post-retirement. Reducing their needs to \$4,000 not only provides them much needed savings, quickly accelerating their retirement date, but they now need even less to retire on in the first place. Retiring at 70 can start to look like retiring at 45 in a hurry.)

* * *

Clearly, the margin of safety model is very powerful, and we're wise to use it whenever possible to avoid failure. But it has limitations.

One obvious issue, most salient in the engineering world, comes in the tradeoff with time and money. Given an unlimited runway of time and the most expensive materials known to mankind, it's likely that we could “fail-proof” many products to such a ridiculous degree as to be impractical in the modern world.

For example, it's possible to imagine Boeing designing a plane that would have a fail rate indistinguishable from zero, with parts being replaced 10% into their useful lives, built with rare but super-strong materials, etc.—so long as the world was willing to pay \$25,000 for a coach seat from Boston to Chicago. Given the impracticability of that scenario, our tradeoff has been to accept planes that are not “fail-proof,” but merely extremely unlikely to fail, to give the world safe enough air travel at an affordable cost. This tradeoff has been enormously wise and helpful to the world. Simply put, the margin-of-safety idea can be pushed into farce without careful judgment.

* * *

This brings us to another limitation of the model, which is the failure to engage in “total systems” thinking.

“The reliability that matters is not the simple reliability of one component of a system, but the final reliability of the total control system.”

— Garrett Hardin in Filters Against Folly

Let's return to the Boeing analogy. Say we did design the safest and most reliable jet airplane imaginable, with parts that would not fail in one billion hours of flight time under the most difficult weather conditions imaginable on Earth—and then let it be piloted by a drug addict high on painkillers.

The problem is that the whole flight system includes much more than just the reliability of the plane itself. Just because we built-in safety margins in one area does not mean the system will not fail. This illustrates not so much a failure of the model itself, but a common mistake in the way the model is applied.

* * *

This brings us to a final issue with the margin of safety model—naïve extrapolation of past data. Let's look at a common insurance scenario to illustrate this one.

Suppose we have a 100-year-old reinsurance company – PropCo – which reinsures major primary insurers in the event of property damage in California caused by a catastrophe – most worrying being an earthquake and its aftershocks. Throughout its entire (long) history, PropCo had never experienced a yearly loss on this sort of coverage worse than \$1 billion. Most years saw no loss worse than \$250 million, and in fact, many years had no losses at all – giving them comfortable profit margins.

Thinking like engineers, the directors of PropCo insisted that the company have such a strong financial position so that they could safely cover a loss twice as bad as anything ever encountered. Given their historical losses, the directors believed this extra capital would give PropCo a comfortable “margin of safety” against the worst case. Right?

However, our directors missed a few crucial details. The \$1 billion loss, the insurer's worst, had been incurred in the year 1994 during the Northridge earthquake. Since then, the building density of Californian cities had increased significantly, and due to ongoing budget issues and spreading fraud, strict building codes had not been enforced. Considerable inflation in the period since 1994 also ensured that losses per damaged square foot would be far higher than ever faced previously.

With these conditions present, let's propose that California is hit with an earthquake reading 7.0 on the Richter scale, with an epicenter 10 miles outside of downtown LA. PropCo faces a bill of \$5 billion – not twice as bad, but five times as bad as it had ever faced. In this case, PropCo fails.

This illustration (which recurs every so often in the insurance field) shows the limitation of naïvely assuming a margin of safety is presently based on misleading or incomplete past data.

* * *

The margin of safety is an important component of some decisions and life. You can think of it as a reservoir to absorb errors or poor luck. Size matters. At least, in this case, bigger is better. And if you need a calculator to figure out how much room you have, you're doing something wrong.

61. An Introduction to Complex Adaptive Systems

Let's explore the concept of the Complex Adaptive Systems and see how this model might apply in various walks of life.

To illustrate what a complex adaptive system is, and just as importantly, what it is not, let's take the example of a "driving system" – or as we usually refer to it, a car. (I have cribbed some parts of this example from the excellent book by John Miller and Scott Page.)

The interior of a car, at first glance is *complicated*. There are seats, belts, buttons, levers, knobs, a wheel, etc. Removing the passenger car seats would make this system *less* complicated. However, the system would remain essentially functional. Thus, we would not call the car interior *complex*.

The mechanical workings of a car, however, *are* complex. The system has interdependent components that must all simultaneously serve their function in order for the system to work. The higher-order function, driving, derives from the interaction of the parts in a very specific way.

Let's say instead of the passenger seats, we remove the timing belt. Unlike the seats, the timing belt is a necessary node for the system to function properly. Our "driving system" is now useless. The system has complexities, but they are not what we would call *adaptive*. To understand complex adaptive systems, let's put hundreds of "driving systems" on the same road, each with the goal of reaching their destination within an expected amount of time. We call this traffic. Traffic is a complex system in which its inhabitants *adapt* to each other's actions. Let's see it in action.

On a popular route into a major city, we observe a car in flames on the side of the road, with firefighters working to put out the fire. Naturally, cars will slow to observe the wreck. As the first cars slow, the cars behind them slow in turn. The cars behind them must slow as well. With everyone becoming increasingly agitated, we've got a traffic jam. The jam emerges from the interaction of the parts of the system.

With the traffic jam formed, potential entrants to the jam—let's call them Group #2—get on their smartphones and learn that there is an accident ahead which may take hours to clear. Upon learning of the accident, they predictably begin to adapt by finding another route.

Suppose there is only one alternate route into the city. What happens now? The alternate route forms a second jam! (I'm stressed out just writing about this.)

Now let's introduce a *third* group of participants, which must choose between jams.

Predicting the actions of this third group is very hard to do. Perhaps so many people in group #2 have altered their route that the second jam is worse than the first, causing the majority of the third group to choose jam #1. Perhaps, anticipating that others will follow that same line of reasoning, they instead choose jam #2. Perhaps they stay at home!

What we see here are the emergent properties of a complex adaptive system called traffic. By the time we hit this third layer of participants, predicting the behavior of the system has become extremely difficult, if not impossible.

The key element to complex adaptive systems is the social element. The belts and pulleys inside a car do not communicate with one another and adapt their behavior to the behavior of the other parts in an infinite loop. *Drivers*, on the other hand, do exactly that.

Where else do we see this phenomenon? The stock market is a great example. Instead of describing it myself, let's use the words of John Maynard Keynes, who brilliantly related the nature of the market's complex adaptive parts to that of a beauty contest in chapter 12 of *The General Theory*.

Or, to change the metaphor slightly, professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice

most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees.

Like traffic, the complex, adaptive nature of the market is very clear. The participants in the market are interacting with one another constantly and *adapting their behavior* to what they know about others' behavior. Stock prices jiggle all day long in this fashion.

Forecasting outcomes in this system is extremely challenging.

To illustrate, suppose that a very skilled, influential, and perhaps lucky, market forecaster successfully calls a market crash. (There were a few in 2008, for example.) Five years later, he publicly calls for a second crash. Given his prescience in the prior crash, market participants might decide to sell their stocks rapidly, causing a crash for no other reason than the fact that it was predicted! Like traffic reports on the radio, the very act of observing and predicting has a crucial impact on the behavior of the system.

Thus, although we know that over the long term, stock prices roughly track the value of their underlying businesses, in the short run almost anything can occur due to the highly adaptive nature of market participants.

This understanding helps us understand some things that are *not* complex adaptive systems. Take the local weather. If the Doppler 3000 forecast on the local news predicts rain on Thursday, is the rain any less likely to occur? No. The act of predicting has not influenced the outcome. Although near-term weather is extremely complex, with many interacting parts leading to higher-order outcomes, it does have an element of predictability.

On the other hand, we might call the Earth's climate partially adaptive, due to the influence of human beings. (Have the cries of global warming and predictions of it worsening not begun affecting the very behavior causing the warming?)

Thus, behavioral dynamics indicate a key difference between weather and climate, and between systems that are simply complex and those that are also adaptive. Failure to use higher-order thinking when considering outcomes in complex adaptive systems is a common cause of overconfidence in prediction making.

62. Charlie Munger: Adding Mental Tools to Your Toolbox

In The Art of War, Sun Tzu said: “The general who wins a battle makes many calculations in his temple before the battle is fought.”

Those ‘calculations’ are the tools we have available to think better. One of the best questions you can ask is how we can make our mental processes work better.

Charlie Munger says that “developing the habit of mastering the multiple models which underlie reality is the best thing you can do.”

Those models are mental models.

Mental Models fall into a few categories, two of which are: (1) ones that help us simulate time (and predict the future) and better understand how the world works (e.g. understanding a useful idea autocatalysis), and (2) ones that help us better understand how our mental processes lead us astray (e.g., availability bias).

When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don’t line up with reality as we think something that isn’t true.

In Peter Bevelin’s Seeking Wisdom, he highlights Munger talking about autocatalysis:

If you get a certain kind of process going in chemistry, it speeds up on its own. So you get this marvellous boost in what you’re trying to do that runs on and on. Now, the laws of physics are such that it doesn’t run on forever. But it runs on for a goodly while. So you get a huge boost. You accomplish A – and, all of a sudden, you’re getting A + B + C for awhile.

He continues telling us how this idea can be applied:

Disney is an amazing example of autocatalysis ... They had those movies in the can. They owned the copyright. And just as Coke could prosper when refrigeration came, when the videocassette was invented, Disney didn’t have to invent anything or do anything except take the thing out of the can and stick it on the cassette.

This leads us to an interesting problem. The world is always changing, so which models should we prioritize learning?

How we prioritize our learning has implications beyond the day-to-day. Often we focus on things that change quickly. We chase the latest study, the latest findings, the most recent best-sellers. We do this to keep up-to-date with the latest-and-greatest.

Despite our intentions, learning in this way fails to account for cumulative knowledge.

Instead, we consume all of our time keeping up to date.

If we are prioritize learning, we should focus on things that change slowly.

The models that come from hard science and engineering are the most reliable models on this Earth. And engineering quality control – at least the guts of it that matters to you and me and people who are not professional engineers – is very much based on the elementary mathematics of Fermat and Pascal: It costs so much and you get so much less likelihood of it breaking if you spend this much...

And, of course, the engineering idea of a backup system is a very powerful idea. The engineering idea of breakpoints – that’s a very powerful model, too. The notion of a critical mass – that comes out of physics – is a very powerful model.

After we learn a model, we have to make it useful. We have to integrate it into our existing knowledge.

Our world is multi-dimensional and our problems are complicated. Most problems cannot be solved using one model alone. The more models we have, the better able we are to solve problems.

But if we don’t have the models, we become the proverbial man with a hammer. To the man with a hammer, everything looks like a nail. If you only have one model, you will fit whatever problem you face to the model you have. If you have more than one model; however, you can look at the problem from a variety of perspectives and increase the odds you come to a better solution.

“Since no single discipline has all the answers,” Peter Bevelin writes in Seeking Wisdom, “we need to understand and use the big ideas from all the important disciplines: Mathematics, physics, chemistry, engineering, biology, psychology, and rank and use them in order of reliability.”

Charles Munger illustrates the importance of this:

Suppose you want to be good at declarer play in contract bridge. Well, you know the contract – you know what you have to achieve. And you can count up the sure winners you have by laying down your high cards and your invincible trumps.

But if you’re a trick or two short, how are you going to get the other needed tricks? Well, there are only six or so different, standard methods: You’ve got long-suit establishment. You’ve got finesses. You’ve got throw-in plays. You’ve got cross-ruffs. You’ve got squeezes. And you’ve got various ways of misleading the defense into making errors. So it’s a very limited number of models. But if you only know one or two of those models, then you’re going to be a horse’s patoot in declarer play...

If you don’t have the full repertoire, I guarantee you that you’ll overutilize the limited repertoire you have — including use of models that are inappropriate just because they’re available to you in the limited stock you have in mind.

As for how we can use different ideas, Munger again shows the way ...

Have a full kit of tools ... go through them in your mind checklist-style.. you can never make any explanation that can be made in a more fundamental way in any other way than the most fundamental way. And you always take with full attribution to the most fundamental ideas that you are required to use. When you’re using physics, you say you’re using physics. When you’re using biology, you say you’re using biology.

But ideas alone are not enough. We need to understand how they interact and combine. This leads to lollapalooza effects.

You get lollapalooza effects when two, three or four forces are all operating in the same direction. And, frequently, you don’t get simple addition. It’s often like a critical mass in physics where you get a nuclear explosion if you get to a certain point of mass – and you don’t get anything much worth seeing if you don’t reach the mass.

Sometimes the forces just add like ordinary quantities and sometimes they combine on a break-point or critical-mass basis ... More commonly, the forces coming out of ... models are conflicting to some extent. And you get huge, miserable trade-offs ... So you [must] have the models and you [must] see the relatedness and the effects from the relatedness.

63. Overconfidence: How to Fail Spectacularly



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“What a Man wishes, he will also believe” – Demosthenes

Bias from overconfidence is a natural human state. All of us believe good things about ourselves and our skills.

In *Seeking Wisdom*, Peter Bevelin writes:

Most of us believe we are better performers, more honest and intelligent, have a better future, have a happier marriage, are less vulnerable than the average person, etc. But we can't all be better than average.

This inherent base rate of overconfidence is especially strong when projecting our beliefs about our future. Over-optimism is a form of overconfidence. Bevelin again:

We tend to Overestimate our ability to predict the future. People tend to put a higher probability on desired events than undesired events.

The bias from overconfidence is insidious because of how many factors can create and inflate it. Emotional, cognitive, and social factors all influence it. Emotional, as we see, because of the emotional pain of believing bad things about ourselves or our lives.

Emotional and Cognitive distortion that creates overconfidence is the dangerous and unavoidable accompaniment to any form of success.

Roger Lowenstein writes in *When Genius Failed*, “there is nothing like success to blind one to the possibility of failure.”

In *Seeking Wisdom*, Bevelin adds:

What tends to inflate the price that CEOs pay for acquisitions? Studies found evidence of infection through three sources of hubris: 1) overconfidence after recent success, 2) a sense of self-importance; the belief that a high salary compared to other senior ranking executives implies skill, and 3) the CEOs belief in their own press coverage. The media tend to glorify the CEO and over-attribute business success to the role of the CEO rather

than to other factors and people. This makes CEOs more likely to become both more overconfident about their abilities and more committed to the actions that made them media celebrities.

This isn't an effect confined to CEOs and large transactions. This feedback loop happens every day between employees and their managers. Or between students and professors, even peers and spouses.

Perhaps the most surprising, pervasive, and dangerous reinforcer of Overconfidence is the social incentives. Take a look at this example of social pressures on doctors from Kahneman in Thinking, Fast and Slow:

Generally, it is considered a weakness and a sign of vulnerability for clinicians to appear unsure. Confidence is valued over uncertainty and there is a prevailing censure against disclosing uncertainty to patients.

An unbiased appreciation of uncertainty is a cornerstone of rationality—but that is not what people and organizations want. Extreme uncertainty is paralyzing under dangerous circumstances, and the admission that one is merely guessing is especially unacceptable when the stakes are high. Acting on pretended knowledge is often the preferred solution. And what about those who don't succumb to this social pressure to let the Overconfidence bias run wild?

Kahneman writes, "Experts who acknowledge the full extent of their ignorance may expect to be replaced by more confident competitors, who are better able to gain the trust of the clients."

It's important to structure environments that allow for uncertainty, or the system will reward the most overconfident, not the most rational, of the decision-makers.

Making perfect forecasts isn't the goal — self-awareness is, in the form of wide confidence intervals. Kahneman, again in Thinking, Fast and Slow, writes:

For a number of years, professors at Duke University conducted a survey in which the chief financial officers of large corporations estimated the results of the S&P index over the following year. The Duke scholars collected 11,600 such forecasts and examined their accuracy. The conclusion was straightforward: financial officers of large corporations had no clue about the short-term future of the stock market; the correlation between their estimates and the true value was slightly less than zero! When they said the market would go down, it was slightly more likely than not that it would go up. these findings are not surprising. The truly bad news is that the CFOs did not appear to know that their forecasts were worthless.

You don't have to be right. You just have to know that you're not very likely to be right.

As always, with the lollapalooza effect of overlapping, combining, and compounding psychological effects, this one has powerful partners in some of our other mental models. Overconfidence bias is often caused or exacerbated by: doubt-avoidance, inconsistency-avoidance, incentives, denial, believing-first-and-doubting-later, and the endowment effect. Restraining Overconfidence

One way to restrain our tendency toward overconfidence is to habitually position ourselves in such a way that renders a prediction of the future unnecessary.

You might not know with certainty when the 100-year flood is coming, but you do know with certainty it will come. And that means you should leave yourself positioned accordingly.

The purpose of positioning is to make prediction unnecessary. You are prepared, or you are not. The argument for not preparing is one of efficiency. It's more efficient to only prepare when you need to. Being prepared all the time carries a cost.

Overconfidence lulls you into a false sense of security about the future and ensures your position is weakest at the very moment you need it to be strongest. When the storm comes, it won't give you a warning.

And in Seeking Wisdom, Bevelin reminds us that “Overconfidence can cause unreal expectations and make us more vulnerable to disappointment.” A few sentences later, he advises us to “focus on what can go wrong and the consequences.”

Build in some margin of safety in decisions. Know how you will handle things if they go wrong. Surprises occur in many unlikely ways. Ask: How can I be wrong? Who can tell me if I’m wrong?

64. Regression Toward the Mean: An Introduction with Examples

Regression to the mean is a common statistical phenomenon that can mislead us when we observe the world. Learning to recognize when regression to the mean is at play can help us avoid misinterpreting data and seeing patterns that don't exist.

It is important to minimize instances of bad judgment and address the weak spots in our reasoning. Learning about regression to the mean can help us.

Nobel prize-winning psychologist Daniel Kahneman wrote a book about biases that cloud our reasoning and distort our perception of reality. It turns out there is a whole set of logical errors that we commit because our intuition and brains do not deal well with simple statistics. One of the errors that he examines in Thinking Fast and Slow is the infamous regression toward the mean.

The notion of regression to the mean was first worked out by Sir Francis Galton. The rule goes that, in any series with complex phenomena that are dependent on many variables, where chance is involved, extreme outcomes tend to be followed by more moderate ones. In Seeking Wisdom, Peter Bevelin offers the example of John, who was dissatisfied with the performance of new employees so he put them into a skill-enhancing program where he measured the employees' skill:

Their scores are now higher than they were on the first test. John's conclusion: "The skill-enhancing program caused the improvement in skill." This isn't necessarily true. Their higher scores could be the result of regression to the mean. Since these individuals were measured as being on the low end of the scale of skill, they would have shown an improvement even if they hadn't taken the skill-enhancing program. And there could be many reasons for their earlier performance — stress, fatigue, sickness, distraction, etc. Their true ability perhaps hasn't changed.

Our performance always varies around some average true performance. Extreme performance tends to get less extreme the next time. Why? Testing measurements can never be exact. All measurements are made up of one true part and one random error part. When the measurements are extreme, they are likely to be partly caused by chance. Chance is likely to contribute less on the second time we measure performance.

If we switch from one way of doing something to another merely because we are unsuccessful, it's very likely that we do better the next time even if the new way of doing something is equal or worse.

This is one of the reasons it's dangerous to extrapolate from small sample sizes, as the data might not be representative of the distribution. It's also why James March argues that the longer someone stays in their job, "the less the probable difference between the observed record of performance and actual ability." Anything can happen in the short run, especially in any effort that involves a combination of skill and luck. (The ratio of skill to luck also impacts regression to the mean.)

"Regression to the mean is not a natural law. Merely a statistical tendency. And it may take a long time before it happens."

— Peter Bevelin

Regression to the Mean

The effects of regression to the mean can frequently be observed in sports, where the effect causes plenty of unjustified speculations.

In Thinking Fast and Slow, Kahneman recalls watching men's ski jump, a discipline where the final score is a combination of two separate jumps. Aware of the regression to the mean, Kahneman was startled to hear the commentator's predictions about the second jump. He writes:

Norway had a great first jump; he will be tense, hoping to protect his lead and will probably do worse” or “Sweden had a bad first jump and now he knows he has nothing to lose and will be relaxed, which should help him do better.

Kahneman points out that the commentator had noticed the regression to the mean and come up with a story for which there was no causal evidence (see narrative fallacy). This is not to say that his story could not be true. Maybe, if we measured the heart rates before each jump, we would see that they are more relaxed if the first jump was bad. However, that's not the point. The point is, regression to the mean happens when luck plays a role, as it did in the outcome of the first jump.

The lesson from sports applies to any activity where chance plays a role. We often attach explanations of our influence over a particular process to the progress or lack of it.

In reality, the science of performance is complex, situation dependent and often much of what we think is within our control is truly random.

In the case of ski jumps, a strong wind against the jumper will lead to even the best athlete showing mediocre results. Similarly, a strong wind and ski conditions in favor of a mediocre jumper may lead to a considerable, but a temporary bump in his results. These effects, however, will disappear once the conditions change and the results will regress back to normal.

This can have serious implications for coaching and performance tracking. The rules of regression suggest that when evaluating performance or hiring, we must rely on track records more than outcomes of specific situations. Otherwise, we are prone to be disappointed.

When Kahneman was giving a lecture to Israeli Air Force about the psychology of effective training, one of the officers shared his experience that extending praise to his subordinates led to worse performance, whereas scolding led to an improvement in subsequent efforts. As a consequence, he had grown to be generous with negative feedback and had become rather wary of giving too much praise.

Kahneman immediately spotted that it was regression to the mean at work. He illustrated the misconception by a simple exercise you may want to try yourself. He drew a circle on a blackboard and then asked the officers one by one to throw a piece of chalk at the center of the circle with their backs facing the blackboard. He then repeated the experiment and recorded each officer's performance in the first and second trial.

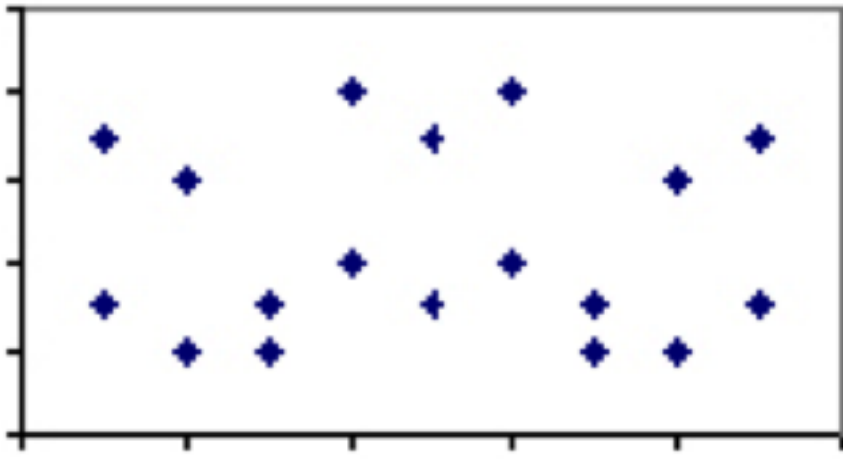
Naturally, those that did incredibly well on the first try tended to do worse on their second try and vice versa. The fallacy immediately became clear: the change in performance occurs naturally. That again is not to say that feedback does not matter at all – maybe it does, but the officer had no evidence to conclude it did.

The Imperfect Correlation and Chance

At this point, you might be wondering why the regression to the mean happens and how we can make sure we are aware of it when it occurs.

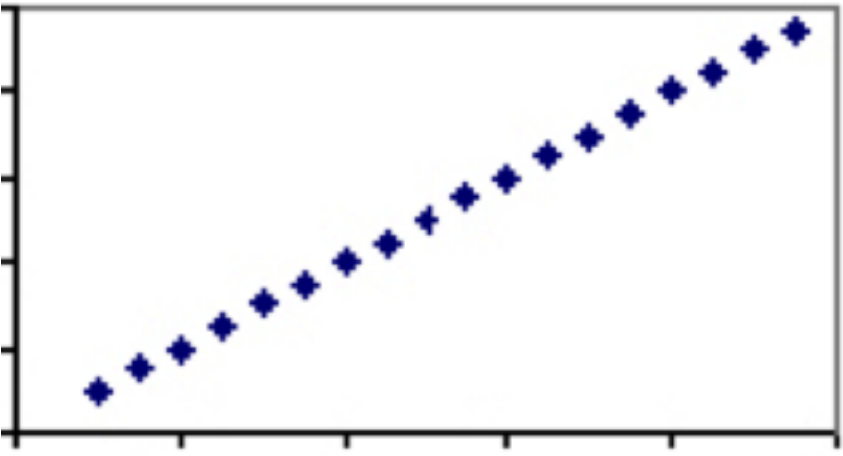
In order to understand regression to the mean, we must first understand correlation.

The correlation coefficient between two measures which varies between -1 and 1, is a measure of the relative weight of the factors they share. For example, two phenomena with few factors shared, such as bottled water consumption versus suicide rate, should have a correlation coefficient of close to 0. That is to say, if we looked at all countries in the world and plotted suicide rates of a specific year against per capita consumption of bottled water, the plot would show no pattern at all.



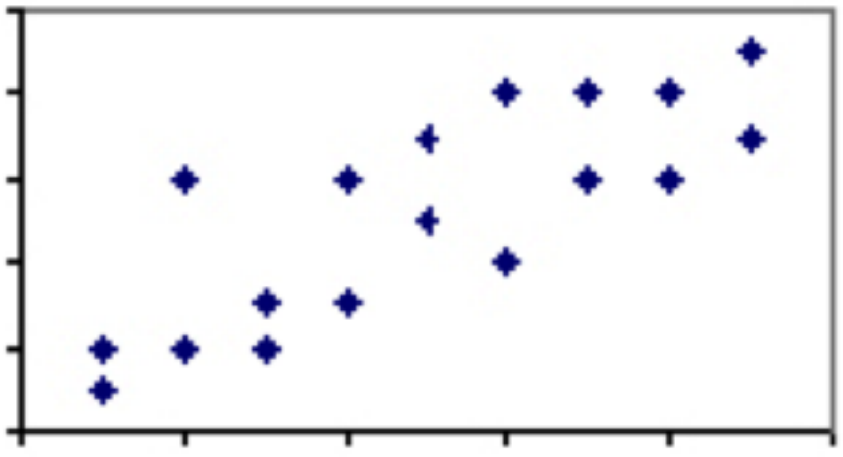
No Correlation

On the contrary, there are measures which are solely dependent on the same factor. A good example of this is temperature. The only factor determining temperature – velocity of molecules — is shared by all scales, hence each degree in Celsius will have exactly one corresponding value in Fahrenheit. Therefore temperature in Celsius and Fahrenheit will have a correlation coefficient of 1 and the plot will be a straight line.



Perfect Correlation

There are few if any phenomena in human sciences that have a correlation coefficient of 1. There are, however, plenty where the association is weak to moderate and there is some explanatory power between the two phenomena. Consider the correlation between height and weight, which would land somewhere between 0 and 1. While virtually every three-year-old will be lighter and shorter than every grown man, not all grown men or three-year-olds of the same height will weigh the same.



Weak to Moderate Correlation

This variation and the corresponding lower degree of correlation implies that, while height is generally speaking a good predictor, there clearly are factors other than the height at play. When the correlation of two measures is less than perfect, we must watch out for the effects of regression to the mean.

Kahneman observed a general rule: Whenever the correlation between two scores is imperfect, there will be regression to the mean.

This at first might seem confusing and not very intuitive, but the degree of regression to the mean is directly related to the degree of correlation of the variables. This effect can be illustrated with a simple example.

Assume you are at a party and ask why it is that highly intelligent women tend to marry men who are less intelligent than they are. Most people, even those with some training in statistics, will quickly jump in with a variety of causal explanations ranging from avoidance of competition to the fears of loneliness that these females face. A topic of such controversy is likely to stir up a great debate.

Now, what if we asked why the correlation between the intelligence scores of spouses is less than perfect? This question is hardly as interesting and there is little to guess – we all know this to be true. The paradox lies in the fact that the two questions happen to be algebraically equivalent. Kahneman explains:

[...] If the correlation between the intelligence of spouses is less than perfect (and if men and women on average do not differ in intelligence), then it is a mathematical inevitability that highly intelligent women will be married to husbands who are on average less intelligent than they are (and vice versa, of course). The observed regression to the mean cannot be more interesting or more explainable than the imperfect correlation.

Assuming that correlation is imperfect, the chances of two partners representing the top 1% in terms of any characteristic is far smaller than one partner representing the top 1% and the other – the bottom 99%.

The Cause, Effect, and Treatment

We should be especially wary of the regression to the mean phenomenon when trying to establish causality between two factors. Whenever correlation is imperfect, the best will always appear to get worse and the worst will appear to get better over time, regardless of any additional treatment. This is something that the general media and sometimes even trained scientists fail to recognize.

Consider the example Kahneman gives:

Depressed children treated with an energy drink improve significantly over a three-month period. I made up this newspaper headline, but the fact it reports is true: if you treated a group of depressed children for some time with an energy drink, they would show a clinically significant improvement. It is also the case that depressed children who spend some time standing on their head or hug a cat for twenty minutes a day will also show improvement.

Whenever coming across such headlines it is very tempting to jump to the conclusion that energy drinks, standing on the head or hugging cats are all perfectly viable cures for depression. These cases, however, once again embody the regression to the mean:

Depressed children are an extreme group, they are more depressed than most other children—and extreme groups regress to the mean over time. The correlation between depression scores on successive occasions of testing is less than perfect, so there will be regression to the mean: depressed children will get somewhat better over time even if they hug no cats and drink no Red Bull.

We often mistakenly attribute a specific policy or treatment as the cause of an effect, when the change in the extreme groups would have happened anyway. This presents a fundamental problem: how can we know if the effects are real or simply due to variability?

Luckily there is a way to tell between a real improvement and regression to the mean. That is the introduction of the so-called control group, which is expected to improve by regression alone. The aim of the research is to determine whether the treated group improve more than regression can explain.

In real life situations with the performance of specific individuals or teams, where the only real benchmark is the past performance and no control group can be introduced, the effects of regression can be difficult if not impossible to disentangle. We can compare against industry average, peers in the cohort group or historical rates of improvement, but none of these are perfect measures.

Luckily awareness of the regression to the mean phenomenon itself is already a great first step towards a more careful approach to understanding luck and performance.

If there is anything to be learned from the regression to the mean it is the importance of track records rather than relying on one-time success stories. I hope that the next time you come across an extreme quality in part governed by chance you will realize that the effects are likely to regress over time and will adjust your expectations accordingly.

65. Second-Order Thinking: What Smart People Use to Outperform



Understanding how to think things through – to push your mind past the first step – can help you solve problems, avoid problems, and take better actions.

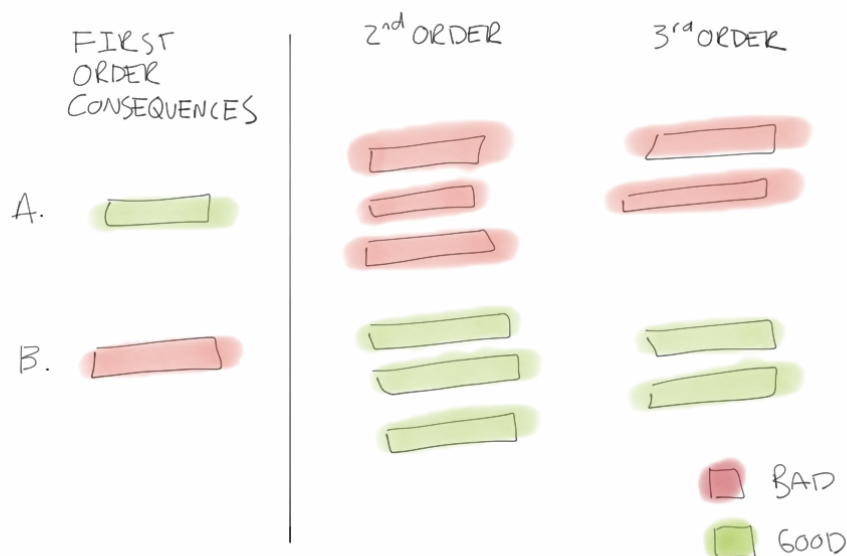
The best way to examine the long-term consequences of our decisions is to think things through. This is called use second-order thinking.

It's often easier to identify when people don't adequately consider the second and subsequent-order impacts. For example, consider a country that, wanting to inspire regime change in another country, funds and provides weapons to a group of "moderate rebels." Only it turns out that those moderate rebels will become powerful and then go to war with the sponsoring country for decades. Whoops.

Failing to consider second- and third-order consequences is the cause of a lot of painfully bad decisions, and it is especially deadly when the first inferior option confirms your own biases. Never seize on the first available option, no matter how good it seems, before you've asked questions and explored.

Ray Dalio

The ability to think through problems to the second, third, and nth order—or what we will call second-order thinking for short—is a powerful thinking tool that not only solves problems but avoids them.



Second-Order Thinking

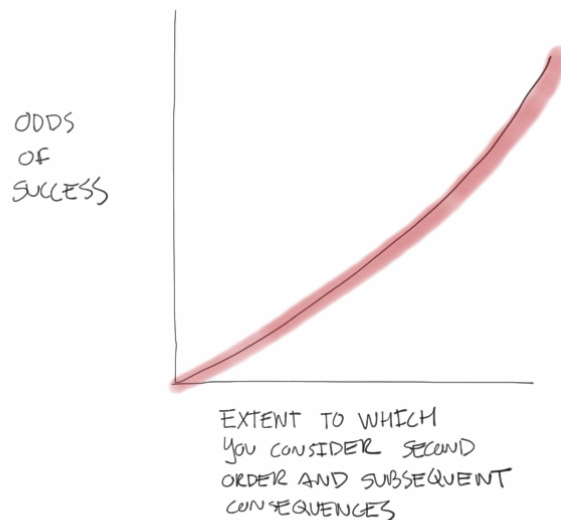
In his book, *The Most Important Thing*, Howard Marks explains the concept of second-order thinking, which he calls second-level thinking.

First-level thinking is simplistic and superficial, and just about everyone can do it (a bad sign for anything involving an attempt at superiority). All the first-level thinker needs is an opinion about the future, as in "The outlook for the company is favorable, meaning the stock will go up." Second-level thinking is deep, complex and convoluted.

First-order thinking is fast and easy. It happens when we look for something that only solves the immediate problem without considering the consequences. For example, you can think of this as I'm hungry, so let's eat a chocolate bar.

Second-order thinking is more deliberate. It is thinking in terms of interactions and time, understanding that despite our intentions our interventions often cause harm. Second order thinkers ask themselves the question "And then what?" This means thinking about the consequences of repeatedly eating a chocolate bar when you are hungry and using that to inform your decision. If you do this you're more likely to eat something healthy.

First-level thinking looks similar. Everyone reaches the same conclusions. This is where things get interesting. The road to out-thinking people can't come from first-order thinking. It must come from second-order thinking. Extraordinary performance comes from seeing things that other people can't see.



Improving Your Ability To Think

Here are some ways to put second-order thinking into practice today.

1. Always ask yourself, "And then what?"
2. Think across time — What do the consequences look like in 10 minutes? 10 months? 10 Years?
3. Create templates like the second image above with 1st, 2nd, and 3rd order consequences. Identify your decision, think it through, and write down the consequences. If you review these regularly you'll be able to help calibrate your thinking.
4. If you're using this to think about business decisions, ask yourself how important parts of the ecosystem are likely to respond. How will employees deal with this? What will my competitors likely do? What about my suppliers? What about the regulators? Often, the answer will be little to no impact, but you want to understand the immediate and second-order consequences before you make the decision.

A lot of extraordinary things in life are the result of things that are first-order negative, second order positive. So just because things look like they have no immediate payoff, doesn't mean that's the case. All it means is that you'll have less competition if the second and third order consequences are positive because everyone who thinks at the first order won't think things through.

Second-order thinking takes a lot of work. It's not easy to think in terms of systems, interactions, and time. However, doing so is a smart way to separate yourself from the masses.

66. Mental Model: Misconceptions of Chance

We expect the immediate outcome of events to represent the broader outcomes expected from a large number of trials. We believe that chance events will immediately self-correct and that small sample sizes are representative of the populations from which they are drawn. All of these beliefs lead us astray.

Our understanding of the world around us is imperfect, and when dealing with chance, our brains tend to come up with ways to cope with the unpredictable nature of our world.

"We tend," writes Peter Bevelin in *Seeking Wisdom*, "to believe that the probability of an independent event is lowered when it has happened recently or that the probability is increased when it hasn't happened recently."

In short, we believe an outcome is due, and that chance will self-correct. The problem with this view is that nature doesn't have a sense of fairness or memory. We only fool ourselves when we mistakenly believe that independent events offer influence or meaningful predictive power over future events.

Furthermore, we also mistakenly believe that we can control chance events. This applies to risky or uncertain events.

Chance events, coupled with positive reinforcement or negative reinforcement, can be a dangerous thing. Sometimes we become optimistic and think our luck will change, and sometimes we become overly pessimistic or risk-averse.

How do you know if you're dealing with chance? A good heuristic is to ask yourself if you can lose on purpose. If you can't, you're likely far into the chance side of the skill vs. luck continuum. No matter how hard you practice, the probability of chance events won't change.

"We tend," writes Nassim Taleb in *The Black Swan*, "to underestimate the role of luck in life in general (and) overestimate it in games of chance."

We are only discussing independent events. If events are dependent, where the outcome depends on the outcome of some other event, all bets are off.

Misconceptions of Chance

Daniel Kahneman coined the term misconceptions of chance to describe the phenomenon of people extrapolating large-scale patterns to samples of a much smaller size. Our trouble navigating the sometimes counterintuitive laws of probability, randomness, and statistics leads to misconceptions of chance.

Kahneman found that "people expect that a sequence of events generated by a random process will represent the essential characteristics of that process even when the sequence is short."

In the paper, Belief in the Law of Small Numbers, Kahneman and Tversky reflect on the results of an experiment, where subjects were instructed to generate a random sequence of hypothetical tosses of a fair coin.

They [the subjects] produce sequences where the proportion of heads in any short segment stays far closer to .50 than the laws of chance would predict. Thus, each segment of the response sequence is highly representative of the "fairness" of the coin.

Unsurprisingly, the same nature of errors occurred when the subjects, instead of being asked to generate sequences themselves, were simply asked to distinguish between random and human-generated sequences. It turns out that when considering tosses of a coin for heads or tails people regard the sequence H-T-H-T-T-H to be more likely than the sequence H-H-H-T-H-T, which does not appear random, and also more likely than the sequence H-H-H-H-T-H. In reality, each one of those sequences has the exact same probability of occurring. This is a misconception of chance.

The aspect that most of us find so hard to grasp about this case is that any pattern of the same length is just as likely to occur in a random sequence. For example, the odds of getting 5 tails in a row are 0.03125 or simply stated 0.5 (the odds of a specific outcome at each trial) to the power of 5 (number of trials).

The same probability rule applies for getting the specific sequences of HHTHT or THTHT – where each sequence is obtained by once again taking 0.5 (the odds of a specific outcome at each trial) to the power of 5 (number of trials), which equals 0.03125.

This probability is true for sequences – but it implies no relation between the odds of a specific outcome at each trial and the representation of the true proportion within these short sequences.

Yet it's still surprising. This is because people expect that the single event odds will be reflected not only in the proportion of events as a whole but also in the specific short sequences we encounter. But this is not the case. A perfectly alternating sequence is just as extraordinary as a sequence with all tails or all heads.

In comparison, “a locally representative sequence,” Kahneman writes, in *Thinking, Fast and Slow*, “deviates systematically from chance expectation: it contains too many alternations and too few runs. Another consequence of the belief in local representativeness is the well-known gambler’s fallacy.”

Gambler’s Fallacy

There is a specific variation of the misconceptions of chance that Kahneman calls the Gambler’s fallacy (elsewhere also called the Monte Carlo fallacy).

The gambler’s fallacy implies that when we come across a local imbalance, we expect that the future events will smoothen it out. We will act as if every segment of the random sequence must reflect the true proportion and, if the sequence has deviated from the population proportion, we expect the imbalance to soon be corrected.

Kahneman explains that this is unreasonable – coins, unlike people, have no sense of equality and proportion:

The heart of the gambler’s fallacy is a misconception of the fairness of the laws of chance. The gambler feels that the fairness of the coin entitles him to expect that any deviation in one direction will soon be cancelled by a corresponding deviation in the other. Even the fairest of coins, however, given the limitations of its memory and moral sense, cannot be as fair as the gambler expects it to be.

He illustrates this with an example of the roulette wheel, and our expectations when a reasonably long sequence of repetition occurs.

After observing a long run of red on the roulette wheel, most people erroneously believe that black is now due, presumably because the occurrence of black will result in a more representative sequence than the occurrence of an additional red.

In reality, of course, roulette is a random, non-evolving process, in which the chance of getting a red or a black will never depend on the past sequence. The probabilities restore after each run, yet we still seem to take the past moves into account.

Contrary to our expectations, the universe does not keep an accounting of a random process, so streaks are not necessarily tilted towards the true proportion. Your chance of getting a red after a series of blacks will always be equal to that of getting another red as long as the wheel is fair.

The gambler’s fallacy need not to be committed inside the casino only. Many of us commit it frequently by thinking that a small, random sample will tend to correct itself.

For example, assume that the average IQ at a specific country is known to be 100. And for the purposes of assessing intelligence at a specific district, we draw a random sample of 50 persons. The first person in our sample happens to have an IQ of 150. What would you expect the mean IQ to be for the whole sample?

The correct answer is $(100 \times 49 + 150 \times 1) / 50 = 101$. Yet without knowing the correct answer, it is tempting to say it is still 100 – the same as in the country as a whole.

According to Kahneman and Tversky, such expectation could only be justified by the belief that a random process is self-correcting and that the sample variation is always proportional. They explain:

Idioms such as “errors cancel each other out” reflect the image of an active self-correcting process. Some familiar processes in nature obey such laws: a deviation from a stable equilibrium produces a force that restores the equilibrium.

Indeed, this may be true in thermodynamics, chemistry, and arguably also economics. These, however, are false analogies. It is important to realize that the laws governed by chance are not guided by principles of equilibrium, and the number of random outcomes in a sequence does not have a common balance.

“Chance,” Kahneman writes in *Thinking, Fast and Slow*, “is commonly viewed as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium. In fact, deviations are not “corrected” as a chance process unfolds, they are merely diluted.”

The Law of Small Numbers

Misconceptions of chance are not limited to gambling. In fact, most of us fall for them all the time because we intuitively believe (and there is a whole best-seller section at the bookstore to prove) that inferences drawn from small sample sizes are highly representative of the populations from which they are drawn.

By illustrating people’s expectations of random heads and tails sequences, we already established that we have preconceived notions of what randomness looks like. This, coupled with the unfortunate tendency to believe in the self-correcting process in a random sample, generates expectations about sample characteristics and representativeness, which are not necessarily true. The expectation that the patterns and characteristics within a small sample will be representative of the population as a whole is called the law of small numbers.

Consider the sequence:

1, 2, 3, __, __, __

What do you think are the next three digits?

The task almost seems laughable because the pattern is so familiar and obvious – 4,5,6. However, there is an endless variation of different algorithms that would still fit the first three numbers, such as the Fibonacci sequence (5, 8, 13), a repeated sequence (1,2,3), a random sequence (5,8,2) and many others. Truth is, in this case, there simply is not enough information to say what the rules governing this specific sequence are with any reliability.

The same rule applies to sampling problems – sometimes, we feel we have gathered enough data to tell a real pattern from an illusion. Let me illustrate this fallacy with yet another example.

Imagine that you face a tough decision between investing in the development of two different product opportunities. Let’s call them Product A or Product B. You are interested in which product would appeal to the majority of the market, so you decide to conduct customer interviews. Out of the first five pilot interviews, four customers show a preference for Product A. While the sample size is quite small, given the time pressure involved, many of us would already have some confidence in concluding that the majority of customers would prefer Product A.

However, a quick statistical test will tell you that the probability of a result just as extreme is, in fact 3/8, assuming that there is no preference among customers at all. This in simple terms, means that if customers had no preference between Products A and B, you would still expect 3 customer samples out of 8 to have four customers vouching for Product A. Basically, a study of such size has little to no predictive validity – these results could easily be obtained from a population with no preference for one or the other product. This, of course, does not mean that talking to customers is of no value. Quite the contrary – the

more random cases we examine, the more reliable and accurate the results of the true proportion will be. If we want absolute certainty, we must be prepared for a lot of work. There will always be cases where a guesstimate based on a small sample will be enough because we have other critical information guiding the decision-making process or we simply do not need a high degree of confidence. Yet rather than assuming that the samples we come across are always perfectly representative, we must treat random selection with the suspicion it deserves. Accepting the role imperfect information and randomness play in our lives and being actively aware of what we don't know already makes us better decision-makers.

67. Bias from Association: Why We Shoot the Messenger

We automatically connect a stimulus (thing/person) with pain (fear) or pleasure (hope). As pleasure seeking animals, we seek out positive associations and attempt to remove negative ones. This happens when we experience the positive or negative consequences of a stimulus. The more vivid the event, the easier it is to remember. Brands (including people) attempt to influence our behavior by associating with positive things.

Bias from Association

Our life and memory revolve around associations. The smell of a good lunch makes our stomach growl, the songs we hear remind us about the special times that we have had and horror movies leave us with goosebumps.

These natural, uncontrolled responses upon a specific signal are examples of classical conditioning. Classical conditioning, or in simple terms — learning by association, was discovered by a Russian scientist Ivan Petrovich Pavlov. Pavlov was a physiologist whose work on digestion in dogs won him a Nobel Prize in 1904.

In the course of his work in physiology, Pavlov made an accidental observation that dogs started salivating even before their food was presented to them.

With repeated testing, he noticed that the dogs began to salivate in anticipation of a specific signal, such as the footsteps of their feeder or if conditioned that way, even after the sound of a tone.

Pavlov's genius lay in his ability to understand the implications of his discovery. He knew that dogs have a natural reflex of salivating to food but not to footsteps or tones. He was on to something. Pavlov realized that, if coupling the two signals together induced the same reactive response in dogs, then other physical reactions may be inducible via similar associations.

In effect, with *Pavlovian association*, we respond to a stimulus because we anticipate what comes next: the reality that would make our response correct.

Now things get interesting.

Rules of Conditioning

Suppose we want to condition a dog to salivate to a tone. If we sound the tone without having taught the dog to specifically respond, the ears of the dog might move, but the dog will not salivate. The tone is just a neutral stimulus, at this point. On the other hand, food for the dog is an unconditioned stimulus, because it always makes the dog salivate.

If we now pair the arrival of food and the sound of the tone, we elicit a learning trial for the dog. After several such trials, the association develops and is strong enough to make the dog salivate even though there is no food. The tone, at this point, has become a conditioned stimulus. This is learned hope. Learned fear is more easily acquired.

The speed and degree to which the dog learns to display the response will depend on several factors.

The best results come when the conditioned stimulus is paired with the unconditioned one several times. This develops a strong association. It takes time for our brains to detect specific patterns.

Classical conditioning involves automatic or reflexive responses and not voluntary behavior.

There are also cases to which this principle does not apply. When we undergo high impact events, such as a car crash, robbery, or firing from a job, a single event will be enough to create a strong association.

Why We Shoot The Messenger

One of our goals should be to understand how the world works. A necessary condition for this is understanding our problems. However, sometimes people are afraid to tell us problems.

This is also known as The Pavlovian Messenger Syndrome.

The original messenger wasn't shot, he was beheaded. In Plutarch's Lives, we find: *The first messenger, that gave notice of Lucullus' coming was so far from pleasing Tigranes that, he had his head cut off for his pains; and no man dared to bring further information. Without any intelligence at all, Tigranes sat while war was already blazing around him, giving ear only to those who flattered him.*

The number of times that happens in an organization is countless. A related sentiment exists in Antigone by Sophocles as "No one loves the messenger who brings bad news." In A Lesson on Worldly Wisdom, Charlie Munger said:

If people tell you what you really don't want to hear — what's unpleasant — there's an almost automatic reaction of antipathy. You have to train yourself out of it. It isn't foredestined that you have to be this way. But you will tend to be this way if you don't think about it.

In Antony and Cleopatra, when told Antony has married another, Cleopatra threatens to treat the messenger poorly, eliciting the response "Gracious madam, I that do bring the news made not the match."

And the advice "Don't shoot the messenger" appears in Henry IV, Part 2.

If you happen to be the messenger, it might be best to deliver the news first via and appear in person later to minimize the negative feelings towards you.

If, on the other hand, you're the receiver of bad news, it's best to follow the advice of Warren Buffett, who comments on being informed of bad news:

We only give a couple of instructions to people when they go to work for us: One is to think like an owner. And the second is to tell us bad news immediately — because good news takes care of itself. We can take bad news, but we don't like it late.

Pavlov showed that sequence matters: the association is most clear to us when the conditioned stimulus appears first and remains after the unconditioned stimulus is introduced.

Unsurprisingly, our learning responses become weaker if the two stimuli are introduced at the same time and are even slower if they are presented in reverse (unconditioned then conditioned stimulus) order.

Attraction and Repulsion

There's no doubt that classical conditioning influences what attracts us and even arouses us. Most of us will recognize that images and videos of kittens will make our hearts softer and perfume or a look from our partner can make our hearts beat faster.

Charlie Munger explains the case of building Coca-Cola, whose marketing and product strategy is built on strong foundations of conditioning.

Munger walks us through the creation of the brand by using conditioned reflexes:

The neural system of Pavlov's dog causes it to salivate at the bell it can't eat. And the brain of man yearns for the type of beverage held by the pretty woman he can't have. And so, Glotz, we must use every sort of decent, honorable Pavlovian conditioning we can think of. For as long as we are in business, our beverage and its promotion must be associated in consumer minds with all other things consumers like or admire.

By repeatedly pairing a product or brand with a favorable impression, we can turn it into a conditioned stimulus that makes us buy.

This goes even beyond advertising — conditioned reflexes are also encompassed in Coca Cola's name. Munger continues:

Considering Pavlovian effects, we will have wisely chosen the exotic and expensive-sounding name "Coca-Cola," instead of a pedestrian name like "Glotz's Sugared, Caffeinated Water."

And even texture and taste:

And we will carbonate our water, making our product seem like champagne, or some other expensive beverage, while also making its flavor better and imitation harder to arrange for competing products.

Combining these and other clever, non-Pavlovian techniques lead to what Charlie Munger calls the lollapalooza effect, causing so many consumers to buy and making Coca-Cola an excellent business for over a century.

While Coca-Cola has some of its advantages rooted in positive Pavlovian association, there are cases when associations do no good. In childhood, many of us were afraid of doctors or dentists, because we quickly learned to associate these visits with pain.

While we may have lost our fear of dentists, by now many of us experience similarly unpleasant feelings when opening a letter from the police or anticipating a negative performance review.

Constructive criticism can be one of life's great gifts and an engine for improvement, however, before we can benefit from it, we must be prepared that some of it will hurt. If we are not at least implicitly aware of the conditioning phenomena and have people telling us what we don't want to hear, we may develop a certain disliking to those delivering the news.

The number of people in leadership positions unable to detach the information from the messenger can be truly surprising. In *The Psychology of Human Misjudgement*, Munger tells about the ex-CEO of CBS, William Paley, who had a blind spot for ideas that did not align with his views.

Television was dominated by one network-CBS-in its early days. And Paley was a god. But he didn't like to hear what he didn't like to hear, and people soon learned that. So they told Paley only what he liked to hear. Therefore, he was soon living in a little cocoon of unreality and everything else was corrupt although it was a great business.

In the case of Paley, his inability to take criticism and recognize incentives was soon noticed by those around him, and it resulted in sub-optimal outcomes.

... If you take all the acquisitions that CBS made under Paley after the acquisition of the network itself, with all his dumb advisors-his investment bankers, management consultants, and so forth, who were getting paid very handsomely-it was absolutely terrible.

Paley is by no means the only example of such dysfunction in the high ranks of business. In fact, the higher up you are in an organization, the more people fear telling you the truth. Providing sycophants with positive reinforcement will only encourage this behavior and ensure you're insulated from reality.

To make matters worse, as we move up in seniority, we also tend to become more confident about our own judgments being correct. This is a dangerous tendency, but we need not be bound by it.

We can train ourselves out of it with reflection and effort.

Escaping Associations

No doubt that learning via associations is crucial for our survival — it alerts us about the arrival of an important event and gives us time to prepare for the appropriate response. Sometimes, however, learned associations do not serve us and our relationships well. We find that we have become subject to negative responses in others or recognize unreasonable responses in ourselves.

Awareness and understanding may serve as good first steps. Yet, even when taken together, they may not be sufficient to unlearn some of the more stubborn associations. In such cases, we may want to try several known techniques to desensitize them or reverse their negative effects.

One way to proceed is via habituation.

When we habituate someone, we blunt down their conditioned response by exposing them to the specific stimulus pairing continuously. After a while, they simply stop responding.

This loss of interest is a natural learning response that allows us to conserve energy for stimuli that are unfamiliar and therefore draw the attention of the mind.

Continuous exposure can yield results as powerful as becoming fully indifferent to stimuli as strong as violence and death.

In Man's Search For Meaning, Viktor Frankl, a holocaust survivor, tells about experiencing absolute desensitization to the most horrific events imaginable:

Disgust, horror and pity are emotions that our spectator [Frankl] could not really feel any more. The sufferers, the dying and the dead, became such commonplace sights to him after a few weeks of camp life that they could not move him any more.

Of course, habituation can also serve good motives, such as getting ourselves over fear, overcoming trauma, or harmonizing relationships by making each side less sensitive to the other side's vices. However, as powerful as habituation is, we must recognize its limitations.

If we want someone to respond differently rather than become indifferent, flooding them with stimuli will not help us achieve our aims.

Consider the case for teaching children – the last thing we would want is to make them indifferent to what we say. Therefore instead of habituation, we should employ another strategy.

A frequently used technique in coaching, exposure therapy, involves cutting back our criticism for a while and reintroducing it by gradually lowering the person's threshold for becoming defensive.

The key difference between exposure therapy and habituation lies in being subtle rather than blunt.

If we try to avoid forming negative associations and achieve behavioral change at the same time, we will always want the positive vs. negative feedback ratio to be in favor of the positive. This is why we so often provide feedback in a "sandwich," where a positive remark is followed by what must be improved and then finished with another positive remark.

Aversion therapy is the exact opposite of exposure therapy.

Aversion therapy aims to exchange a positive association with a negative one within a few high impact events. For example, some parents teach out a sweet tooth by forcing their children to consume an insurmountable amount of sweets in one sitting under their supervision.

While ethically questionable this idea is not completely unfounded.

If the experience is traumatic enough, the positive associations of, for example, a sugar high, will be replaced by the negative association of nausea and sickness.

This controversial technique was used in experiments with alcoholics. While effective in theory, it was known to yield only mixed results in practice, with patients often resorting back to past conditions over time.

This is also why there are gross and terrifying pictures on cigarette packages in many countries.

Overall, creating habits that last or permanently breaking them can be a tough mission to embark upon.

In the case of feedback, we may try to associate our presence with positive stimuli, which is why building great first impressions and appearing friendly matters.

Keep in Mind

When thinking about this bias it's important to keep in mind that: (1) people are neither good nor bad because we associate something positive or negative to them; (2) bad news should be sought immediately and your reaction to it will dictate how much of it you hear; (3) to end a certain behavior or habit you can create an association with a negative emotion.

68. Bias from Self-Interest — Self Deception and Denial to Reduce Pain or Increase Pleasure

Our desire to feel good about ourselves permeates everything we do. Wanting to maintain a positive self-image often leads us to adopt a biased image of the world. If we want to learn to align ourselves with the facts, we must stop denying reality and rationalizing our choices.

Our Self-Esteem

Our self-esteem can be a very important aspect of personal well-being, adjustment, and happiness. It has been reported that people with higher self-esteem are happier with their lives, have fewer interpersonal problems, achieve at a higher and more consistent level and give in less to peer pressure.

The strong motivation to preserve a positive and consistent self-image is more than evident in our lives.

We attribute success to our own abilities and failures to environmental factors and we continuously rate ourselves as better than average on any subjective measure – ethics, beauty, and ability to get along with others.

Look around – these positive illusions appear to be the rule rather than the exception in well-adjusted people.

However, sometimes life is harsh on us and gives few if any reasons for self-love.

We get fired, a relationship ends, and we end up making decisions that are not well aligned with our inner selves. And so we come up with ways to straighten our damaged self-image.

Under the influence of bias from self-interest, we may find ourselves drifting away from facts and spinning them to the point they become acceptable. While the tendency is mostly harmless and episodic, there are cases when it grows extreme.

The imperfect and confusing realities of our life can activate strong responses, which helps us preserve ourselves and our fragile self-images. Usually amplified by love, death or chemical dependency, strong self-serving bias may leave the person with little capacity to assess the situation objectively.

In his speech, *The Psychology of Human Misjudgment*, Charlie Munger reflects on the extreme tendencies that serious criminals display in Tolstoy's novels and beyond. Their defense mechanisms can be divided into two distinct types – they are either in denial of committing the crime at all or they think that the crime is justifiable in light of their hardships.

Munger coins the two cases *the Tolstoy effect*.

Avoiding Reality by Denying It

Denial occurs, when we encounter a serious thought about reality, but decide to ignore it. Imagine one day you notice a strange, dark spot on your skin. You feel a sudden sense of anxiety, but soon go on with your day and forget about it. Weeks later, it has not gone away and has slowly become darker and you eventually decide to take action and visit the doctor.

In such cases, small doses of denial might serve us well. We have time to absorb the information slowly and figure out the next steps for action, in case our darkest fears come true. However, once denial becomes a prolonged measure for coping with troubling matters, causing our problems to amplify, we are bound to suffer from consequences.

The consequences can be different. The mildest one is a simple inability to move on with our lives.

Charlie Munger was startled to see a case of persistent denial in a family friend:

This first really hit me between the eyes when a friend of our family had a super-athlete, super-student son who flew off a carrier in the north Atlantic and never came back, and his mother, who was a very sane woman, just never believed that he was dead.

The case made him realize that denial is often amplified by intense feelings of love and death. We're denying to avoid pain.

While denial of the death of someone close is usually harmless and understandable, it can become a significant problem, when we deny an issue that is detrimental to ourselves and others.

A good example of such issues are physical dependencies, such as alcoholism or drug addiction.

Munger advises staying away from any opportunity to slip into an addiction since the psychological effects are most damaging. The reality distortion that happens in the minds of drug addicts leads them to believe that they have remained in a respectable condition and with reasonable prospects even as their condition keeps deteriorating.

Rationalizing Our Choices

A less severe case of distortion, but no less foolish, is our tendency to rationalize the choices we have made.

Most of us have a positive concept of ourselves and we believe ourselves to be competent, moral and smart.

We can go to great lengths to preserve this self-image. No doubt we have all engaged in behaviors that are less than consistent with our inner self-image and then used phrases, such as "not telling the truth is not lying", "I didn't have the time" and "others are even worse" to justify our less than ideal actions.

This tendency in part can be explained by the engine that drives self-justification called cognitive dissonance. It is the state of tension that occurs, whenever we hold two opposing facts in our heads, such as "smoking is bad" and "I smoke two packs a day".

Dissonance bothers us under any circumstances, but it becomes particularly unbearable when our self-concept is threatened by it. After all, we spend our lives trying to lead lives that are consistent and meaningful. This drive "to save face" is so powerful that it often overrules and contradicts the pure effects of rewards and punishments as assumed by economic theory or observed in simple animal behavioral research.

The most obvious way to quiet dissonance is by quitting. However, a smoker that has tried to quit and failed can also quiet the other belief – namely that smoking is not all that bad. It is a simple and failure-free option that allows her to feel good about herself and requires hardly any effort. Having suspended our moral compass only once and found rationales for the bad, but fixable, choices gives us permission to repeat them in the future and continue the vicious cycle.

The Vicious Cycle of Self-Justification

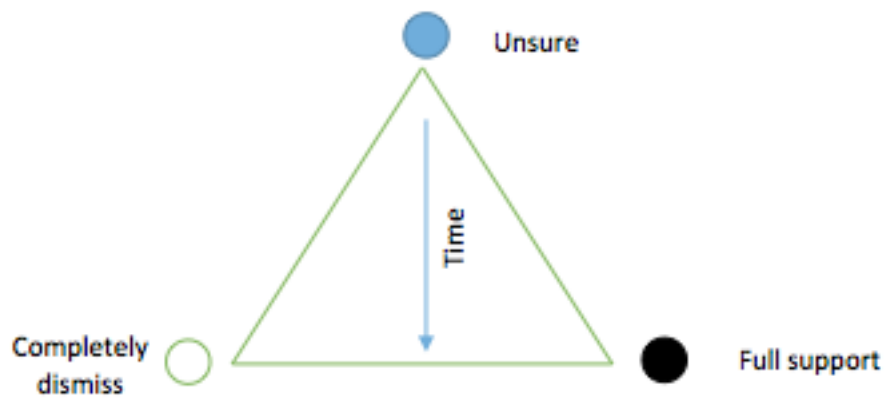
Carol Tavris and Elliot Aronson in their book Mistakes Were Made (But Not by Me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts explain the vicious cycle of choices with an analogy of a pyramid.

Consider the case of two reasonably honest students at the beginning of the term. They face the temptation to cheat on an important test. One of them gives in and the other does not. How do you think they will feel about cheating a week later?

Most likely their initially torn opinions will have polarized in light of their initial choices. Now take this effect and amplify it over the term. By the time they are through with the term two things will have happened:

- 1) They will be very far from each other in their beliefs
- 2) They will be convinced that they have always felt strongly about the issue and their side of the argument

Just like those students, we are often at the top of the choice pyramid, facing a decision whose consequences are morally ambiguous. This first choice then starts a process of entrapment of action – justification – further action, which increases the intensity of our commitment



Over time our choices reinforce themselves and towards the bottom of the pyramid, we find ourselves rolling toward increasingly extreme views.

Consider the famous Stanley Milgram experiment, where two thirds of the 3,000 subjects administered a life threatening level of electric shock to another person. While this study is often used to illustrate our obedience to authority, it also demonstrates the effects of *self-justification*.

Simply imagine the scenario of someone asking you to do the favor inflicting 500V of potentially deadly and incredibly painful shock on another person for the sake of science. Chances are most of us would refuse it under any circumstances.

Now suppose the researcher tells you he is interested in effects of punishment on learning and you will have to inflict hardly noticeable electric impulses on another person. You are even encouraged to try the lower levels of 10V yourself to feel that the pain is hardly noticeable.

When you come along, suddenly the experimenter asks you to increase the shock to 20V, which seems like a small increase, so you agree without thinking much. Then the cascade continues – if you gave 20V shock, what is the harm in giving 30V? Suddenly you find yourself unable to draw the line, so you simply tag along with the instructions.

When people are asked in advance whether they would administer shock above 450V, nearly nobody believes they would. However, when facing the choice under pressing circumstances, two-thirds of them did!

The implications here are powerful – if we don't actively draw the line ourselves, our habits and circumstances will decide for us.

Making Smarter Choices

We will all do dumb things. We can't help it. We are wired that way. However, we are not doomed to live in denial or keep striving to justify our actions. We always have the choice to correct our tendencies, once we recognize them.

A better understanding of our minds serves as the first step towards breaking the self-justification habit. It takes time, self-reflection and willingness to become more mindful about our behavior and reasons for our behavior, but it is well worth the effort.

The authors of Mistakes Were Made (But not By Me) give an example of conservative William Safire, who wrote a column criticizing (then and current) American presidential candidate Hillary Clinton's efforts to conceal the identity of her health care task force. A few years later Dick Cheney, a Republican (conservative) candidate whom Safire admired, made a similar move to Clinton by insisting on keeping his energy task force secret. The alarm bell in Safire's head rang and he admits that the temptation to rationalize the occasion and apply double standards was enormous. However, he recognized the dissonance effects and ended up writing a similar column about Cheney.

We know that Safire's ability to spot his own dissonance and do the fair thing is rare.

People will bend over backward to reduce dissonance in a way that is favorable to them and their team. Resisting that urge is not easy to do, but it is much better than letting the

natural psychological tendencies cripple the integrity of our behaviors. There are ways to make fairness easier.

Making Things Easier

On the personal level, Charlie Munger suggests we should face two simple facts. Firstly, fixable, but unfixed bad performance is bad character and tends to create more of itself and cause more damage — a sort of Gresham's Law. And, secondly, in demanding places like athletic teams, excuses and bad behavior will not get us far.

On the institutional level, Munger advises building a fair, meritocratic, demanding culture plus personnel handling methods that build up morale. His second piece of advice is the severance of the worst offenders, when possible.

Munger expands on the second point by noting that it is not in any case possible to let go our children, but we must, therefore, try to fix them to our best ability. He gives a real life example of a child, who had the habit of taking candy from the stock of his father's employer with the excuse that he had intended to replace it later. The father said words that never left the child:

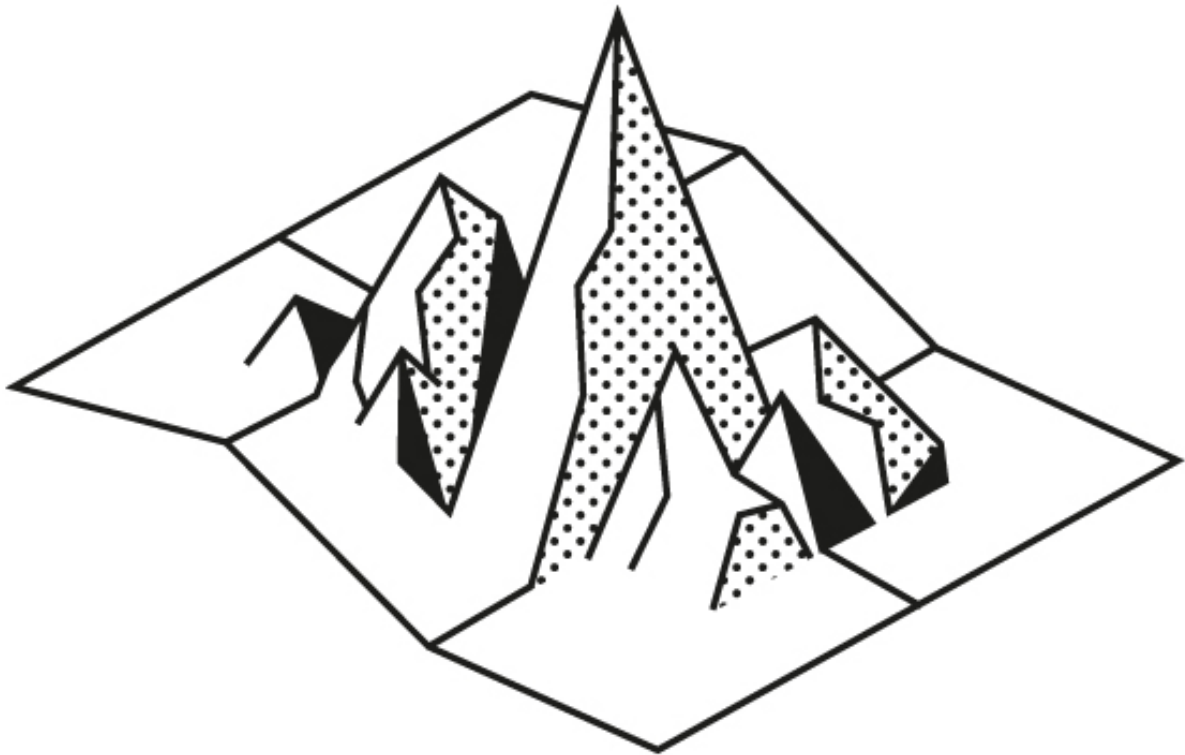
"Son, it would be better for you to simply take all you want and call yourself a thief every time you do it."

Turns out the child in this example was the dean of University of Southern California Business School, where Munger delivered the speech.

If we are effective, the lessons we teach our children will serve them well throughout their lives.

There is so much more to touch on with bias from self-interest, including its relation to hierarchy, how it distorts information, how it feeds our desire for self-preservation and scarcity, how it impacts group preservation, its relationship to terror etc.

69. The Map Is Not the Territory



The map-territory mental model is about understanding the difference between perceptions (the 'map') and the actual reality (the 'territory'). It's like having a map of a city: the map can help you navigate and understand the city, but it's not the same as walking the streets and experiencing it yourself. Roads close. Intersections get blocked. So, just like a map can be outdated or incomplete, our beliefs might not always match the real world exactly.

The map of reality is not reality. Even the best maps are imperfect. That's because they are reductions of what they represent. If a map were to represent the territory with perfect fidelity, it would no longer be a reduction and thus would no longer be useful to us. A map can also be a snapshot of a point in time, representing something that no longer exists. This is important to remember as we think through problems and make better decisions. The map appears to us more real than the land.

— D.H. Lawrence
The Relationship Between Map and Territory

In 1931, in New Orleans, Louisiana, mathematician Alfred Korzybski presented a paper on mathematical semantics. To the non-technical reader, most of the paper reads like an abstruse argument on the relationship of mathematics to human language and physical reality. Important stuff, certainly, but not necessarily immediately useful for the layperson. In his string of arguments on language structure, Korzybski introduced and popularized the idea that *the map is not the territory*. In other words, the description of the thing is not the thing itself. The model is not reality. The abstraction is not abstracted. *This* has enormous practical consequences.

In Korzybski's words:

A.) A map may have a structure similar or dissimilar to the structure of the territory.

B.) Two similar structures have similar 'logical' characteristics. Thus, if in a correct map, Dresden is given as between Paris and Warsaw, a similar relation is found in the actual territory.

C.) A map is not the actual territory.

D.) An ideal map would contain the map of the map, the map of the map of the map, etc., endlessly...We may call this characteristic self-reflexiveness.

Maps are necessary but flawed. (By maps, we mean any abstraction of reality, including descriptions, theories, models, etc.) The problem with a map is not simply that it is an abstraction; we need abstraction. A map with a scale of one mile to one mile would not have the problems that maps have, nor would it be helpful.

To solve this problem, the mind creates maps of reality to understand it. The only way we can process the complexity of reality is through abstraction. We might be able to see the world in 4k video, but we can't handle all the details. Our minds work to omit what isn't necessary.

Frequently, we don't understand our maps or their limits. In fact, we are so reliant on abstraction that we will frequently use an incorrect model simply because we feel *any* model is preferable to *no* model. (Reminding one of the drunk looking for his keys under the streetlight because "That's where the light is!")



Even the best and most useful maps suffer from limitations, and Korzybski gives us a few to explore: (A.) The map could be *incorrect* without us realizing it; (B.) The map is, by necessity, a *reduction* of the actual thing, a process in which you lose certain important information; and (C.) A map needs *interpretation*, a process that can cause major errors. (The only way to solve the last would be an endless chain of maps of maps, which he called self-reflexiveness.)

With the aid of modern psychology, we also see another issue: the human brain takes great leaps and shortcuts to make sense of its surroundings.

As Charlie Munger has pointed out, a good idea and the human mind act like the sperm and the egg — after the first good idea gets in, the door closes. This makes the map-territory problem a close cousin of man-with-a-hammer tendency.

This tendency is obviously problematic in our effort to simplify reality. When we see a powerful model work well, we tend to over-apply it, using it in non-analogous situations. We have trouble delimiting its usefulness, which causes errors.

Let's check out an example.

By most accounts, Ron Johnson was one the most successful and desirable retail executives by the summer of 2011. Not only was he handpicked by Steve Jobs to build the Apple Stores, a venture which had itself come under major scrutiny — one retort printed in Bloomberg magazine: "I give them two years before they're turning out the lights on a very painful and expensive mistake" — but he had been credited with playing a major role in turning Target from a K-Mart look-alike into the trendy-but-cheap *Tar-zhey* by the late 1990s and early 2000s.

Johnson's success at Apple was not immediate, but it was undeniable. By 2011, Apple stores were by far the most productive in the world on a per-square-foot basis and had become the envy of the retail world. Their sales figures left Tiffany's in the dust. The

gleaming glass cube on Fifth Avenue became a more popular tourist attraction than the Statue of Liberty. It was a lollapalooza, something beyond ordinary success. And Johnson had led the charge.

(History) offers a ridiculous spectacle of a fragment expounding the whole.

Will Durant

With that success, in 2011, Johnson was hired by Bill Ackman, Steven Roth, and other luminaries of the financial world to turn around the dowdy old department store chain JC Penney. The situation of the department store was dour: Between 1992 and 2011, the retail market share held by department stores had declined from 57% to 31%.

Their core position was a no-brainer, though. JC Penney had immensely valuable real estate, anchoring malls across the country. Johnson argued that their physical mall position was valuable if for no other reason than that people often parked next to them and walked through them to get to the center of the mall. Foot traffic was a given. Because of contracts signed in the '50s, '60s, and '70s, the heyday of the mall building era, rent was also cheap, another major competitive advantage. And unlike some struggling retailers, JC Penney made (some) money. There was cash in the register to help fund a transformation. The idea was to take the best ideas from his experience at Apple: great customer service, consistent pricing with no markdowns and markups, immaculate displays, and world-class products, and apply them to the department store.

Johnson planned to turn the stores into little malls-within-malls. He went as far as comparing the ever-rotating stores-within-a-store to Apple's "apps." Such a model would keep the store constantly fresh, and avoid the creeping staleness of retail.

Johnson pitched his idea to shareholders in a series of trendy New York City meetings reminiscent of Steve Jobs' annual "But wait, there's more!" product launches at Apple. He was persuasive: JC Penney's stock price went from \$26 in the summer of 2011 to \$42 in early 2012 on the strength of the pitch.

The idea failed almost immediately. His new pricing model (eliminating discounting) was a flop. The coupon hunters rebelled. Much of his new product was deemed too trendy. His new store model was wildly expensive for a middling department store chain – including operating losses purposefully endured, he'd spent several billion dollars trying to effect the physical transformation of the stores. JC Penney customers had no idea what was going on, and by 2013, Johnson was sacked. The stock price sank into the single digits, where it remains two years later.

What went wrong in the quest to build America's Favorite Store? It turned out that Johnson was using a map of Tulsa to navigate Tuscaloosa. Apple's products, customers, and history had far too little in common with JC Penney's. Apple had a rabid, young, affluent fan-base *before* they built stores; JC Penney's was not associated with youth or affluence. Apple had shiny products, and needed a shiny store; JC Penney was known for its affordable sweaters. Apple had never relied on discounting in the first place; JC Penney was taking *away* discounts given prior, triggering massive deprivation super-reaction.

All models are wrong but some are useful.

George Box

In other words, the old map was not very useful. Even his success at Target, which seems like a closer analogue, was misleading in the context of JC Penney. Target had made small, incremental changes over many years, to which Johnson had made a meaningful contribution. JC Penney was attempting to reinvent the concept of the department store in a year or two, leaving behind the core customer in an attempt to gain new ones. This was a much different proposition. (Another thing holding the company back was simply its base odds: Can you name a retailer of great significance that has lost its position in the world and come back?)

The main issue was *not* that Johnson was incompetent. He wasn't. He wouldn't have gotten the job if he was. He was *extremely* competent. But it was exactly his competence and past success that got him into trouble. He was like a great swimmer that tried to tackle a grand rapid, and the model he used successfully in the past, the map that had navigated a lot of difficult terrain, was not the map he needed anymore. He had an excellent theory about retailing that applied in some circumstances, but not in others. The terrain had changed, but the old idea stuck.

One person who well understands this problem of the map and the territory is Nassim Taleb, author of the *Incerto* series – *Antifragile*, *The Black Swan*, *Fooled by Randomness*, and *The Bed of Procrustes*.

Taleb has been vocal about the misuse of models for many years, but the earliest and most vivid I can recall is his firm criticism of a financial model called Value-at Risk, or VAR. The model, used in the banking community, is supposed to help manage risk by providing a maximum potential loss within a given confidence interval. In other words, it purports to allow risk managers to say that, within 95%, 99%, or 99.9% confidence, the firm will not lose more than \$X million dollars in a given day. The higher the interval, the less accurate the analysis becomes. It might be possible to say that the firm has \$100 million at risk at any time at a 99% confidence interval, but given the statistical properties of markets, a move to 99.9% confidence might mean the risk manager has to state the firm has \$1 billion at risk. 99.99% might mean \$10 billion. As rarer and rarer events are included in the distribution, the analysis gets less useful. So, by necessity, the “tails” are cut off somewhere and the analysis is deemed acceptable.

Elaborate statistical models are built to justify and use the VAR theory. On its face, it seems like a useful and powerful idea; if you know how much you can lose at any time, you can manage risk to the decimal. You can tell your board of directors and shareholders, with a straight face, that you've got your eye on the till.

The problem, in Nassim's words, is that:

A model might show you some risks, but not the risks of using it. Moreover, models are built on a finite set of parameters, while reality affords us infinite sources of risks.

In order to come up with the VAR figure, the risk manager must take historical data and assume a statistical distribution in order to predict the future. For example, if we could take 100 million human beings and analyze their height and weight, we could then predict the distribution of heights and weights on a *different* 100 million, and there would be a microscopically small probability that we'd be wrong. That's because we have a huge sample size and we are analyzing something with very small and predictable deviations from the average.

But finance does *not* follow this kind of distribution. There's no such predictability. As Nassim has argued, the “tails” are fat in this domain, and the rarest, most unpredictable events have the largest consequences. Let's say you deem a highly threatening event (for example, a 90% crash in the S&P 500) to have a 1 in 10,000 chance of occurring in a given year, and your historical data set only has 300 years of data. How can you accurately state the probability of that event? You would need far more data.

Thus, financial events deemed to be 5, or 6, or 7 standard deviations from the norm tend to happen with a certain regularity that nowhere near matches their supposed statistical probability. Financial markets have no biological reality to tie them down: We can say with a useful amount of confidence that an elephant will not wake up as a monkey, but we can't say anything with absolute confidence in an Extremistan arena.

We see several issues with VAR as a “map,” then. The first that the model is itself a severe abstraction of reality, relying on historical data to predict the future. (As all financial models must, to a certain extent.) VAR does *not* say “The risk of losing X dollars is Y, within a confidence of Z.” (Although risk managers treat it that way). What VAR actually says is “the

risk of losing X dollars is Y, *based on the given parameters*.” The problem is obvious even to the non-technician: The future is a strange and foreign place that we do not understand. Deviations of the past may not be the deviations of the future. Just because municipal bonds have never traded at such-and-such a spread to U.S. Treasury bonds does *not* mean that they won’t in the future. They just haven’t yet. Frequently, the models are blind to this fact.

In fact, one of Nassim’s most trenchant points is that on the day before whatever “worst case” event happened in the past, you would have *not* been using the coming “worst case” as your worst case, because it wouldn’t have happened yet.

Here’s an easy illustration. October 19, 1987, the stock market dropped by 22.61%, or 508 points on the Dow Jones Industrial Average. In percentage terms, it was then and remains the worst one-day market drop in U.S. history. It was dubbed “Black Monday.” (Financial writers sometimes lack creativity — there are several other “Black Monday’s” in history.) But here we see Nassim’s point: On October 18, 1987, what would the models use as the worst possible case? We don’t know exactly, but we do know the previous worst case was 12.82%, which happened on October 28, 1929. A 22.61% drop would have been considered so many standard deviations from the average as to be near impossible. But the tails are very fat in finance — improbable and consequential events seem to happen far more often than they should based on naive statistics. There is also a severe but often unrecognized *recursiveness* problem, which is that the models themselves influence the outcome they are trying to predict. (To understand this more fully, check out our post on Complex Adaptive Systems.)

A second problem with VAR is that even if we had a vastly more robust dataset, a statistical “confidence interval” does not do the job of financial risk management. Says Taleb:

There is an internal contradiction between measuring risk (i.e. standard deviation) and using a tool [VAR] with a higher standard error than that of the measure itself. I find that those professional risk managers whom I heard recommend a “guarded” use of the VAR on grounds that it “generally works” or “it works on average” do not share my definition of risk management. The risk management objective function is survival, not profits and losses. A trader according to the Chicago legend, “made 8 million in eight years and lost 80 million in eight minutes”. According to the same standards, he would be, “in general”, and “on average” a good risk manager.

This is like a GPS system that shows you where you are at all times but doesn’t include cliffs. You’d be perfectly happy with your GPS until you drove off a mountain.

It was this type of naive trust of models that got a lot of people in trouble in the recent mortgage crisis. Backward-looking, trend-fitting models, the most common maps of the financial territory, failed by describing a territory that was only a mirage: A world where home prices only went up. (Lewis Carroll would have approved.)

This was navigating Tulsa with a map of Tatooine.

The logical response to all this is, “So what?” If our maps fail us, how do we operate in an uncertain world? This is its own discussion for another time, and Taleb has gone to great pains to try and address the concern. Smart minds disagree on the solution. But one obvious key must be building systems that are robust to model error.

The practical problem with a model like VAR is that the banks use it to *optimize*. In other words, they take on as much exposure as the model deems OK. And when banks veer into managing to a highly detailed, highly confident model rather than to informed common sense, which happens frequently, they tend to build up hidden risks that will un-hide themselves in time.

If one were to instead assume that there *were* no precisely accurate maps of the financial territory, they would have to fall back on much simpler heuristics. (If you assume detailed statistical models of the future will fail you, you don't use them.)

In short, you would do what Warren Buffett has done with Berkshire Hathaway. Mr. Buffett, to our knowledge, has never used a computer model in his life, yet manages an institution half a trillion dollars in size by assets, a large portion of which are financial assets. How? The approach requires not only assuming a future worst case far more severe than the past, but also dictates building an institution with a robust set of backup systems, and margins-of-safety operating at multiple levels. Extra cash rather than extra leverage. Taking great pains to make sure the tails can't kill you. Instead of optimizing to a model, accept the limits of your clairvoyance.

When map and terrain differ, follow the terrain.

The trade-off, of course, is short-run rewards much less great than those available under more optimized models. Speaking of this, Charlie Munger has noted:

Berkshire's past record has been almost ridiculous. If Berkshire had used even half the leverage of, say, Rupert Murdoch, it would be five times its current size.

For Berkshire at least, the trade-off seems to have been worth it.

The salient point then is that in our march to simplify reality with useful models, of which Farnam Street is an advocate, we confuse the models with reality. For many people, the model creates its *own* reality. It is as if the spreadsheet comes to life. We forget that reality is a lot messier. The map isn't the territory. The theory isn't what it describes, it's simply a way we choose to interpret a certain set of information. Maps can also be *wrong*, but even if they are essentially correct, they are an abstraction, and abstraction means that information is lost to save space. (Recall the mile-to-mile scale map.)

How do we do better? This is fodder for another post, but the first step is to realize that *you do not understand a model, map, or reduction unless you understand and respect its limitations*. We must always be vigilant by stepping back to understand the context in which a map is useful, and where the cliffs might lie. Until we do that, we are the turkey.

70. How Analogies Reveal Connections, Spark Innovation, and Sell Our Greatest Ideas

Analogies are a means of drawing a parallel between two different things which we often use to convey complex ideas and to communicate effectively. We often use analogies to aid our reasoning. In this post, we explore how analogies work and how you can best utilize them.

John Pollack is a former Presidential Speechwriter. If anyone knows the power of words to move people to action, shape arguments, and persuade, it is he.

In Shortcut: How Analogies Reveal Connections, Spark Innovation, and Sell Our Greatest Ideas, he explores the powerful role of analogy in persuasion and creativity.

One of the key tools he uses for this is analogy.

While they often operate unnoticed, analogies aren't accidents, they're arguments—arguments that, like icebergs, conceal most of their mass and power beneath the surface. In arguments, whoever has the best argument wins.

But analogies do more than just persuade others — they also play a role in innovation and decision making.

From the bloody Chicago slaughterhouse that inspired Henry Ford's first moving assembly line, to the "domino theory" that led America into the Vietnam War, to the "bicycle for the mind" that Steve Jobs envisioned as a Macintosh computer, analogies have played a dynamic role in shaping the world around us.

Despite their importance, many people have only a vague sense of the definition.

What is an Analogy?

In broad terms, an analogy is simply a comparison that asserts a parallel—explicit or implicit—between two distinct things, based on the perception of a share property or relation. In everyday use, analogies actually appear in many forms. Some of these include metaphors, similes, political slogans, legal arguments, marketing taglines, mathematical formulas, biblical parables, logos, TV ads, euphemisms, proverbs, fables and sports clichés.

Because they are so disguised they play a bigger role than we consciously realize. Not only do analogies effectively make arguments, but they trigger emotions. And emotions make it hard to make rational decisions.

While we take analogies for granted, the ideas they convey are notably complex.

All day every day, in fact, we make or evaluate one analogy after the other, because some comparisons are the only practical way to sort a flood of incoming data, place it within the content of our experience, and make decisions accordingly.

Remember the powerful metaphor — that arguments are war. This shapes a wide variety of expressions like "your claims are indefensible," "attacking the weakpoints," and "You disagree, OK shoot."

Or consider the Map and the Territory — Analogies give people the map but explain nothing of the territory.

Warren Buffett is one of the best at using analogies to communicate effectively. One of my favorite analogies is when he noted "You never know who's swimming naked until the tide goes out." In other words, when times are good everyone looks amazing. When times suck, hidden weaknesses are exposed. The same could be said for analogies:

We never know what assumptions, deceptions, or brilliant insights they might be hiding until we look beneath the surface.

Most people underestimate the importance of a good analogy. As with many things in life, this lack of awareness comes at a cost. Ignorance is expensive.

Evidence suggests that people who tend to overlook or underestimate analogy's influence often find themselves struggling to make their arguments or achieve their goals. The

converse is also true. Those who construct the clearest, most resonant and apt analogies are usually the most successful in reaching the outcomes they seek.

The key to all of this is figuring out why analogies function so effectively and how they work. Once we know that, we should be able to craft better ones.

Don't Think of an Elephant

Effective, persuasive analogies frame situations and arguments, often so subtly that we don't even realize there is a frame, let alone one that might not work in our favor. Such conceptual frames, like picture frames, include some ideas, images, and emotions and exclude others. By setting a frame, a person or organization can, for better or worse, exert remarkable influence on the direction of their own thinking and that of others.

He who holds the pen frames the story. The first person to frame the story controls the narrative and it takes a massive amount of energy to change the direction of the story. Sometimes even the way that people come across information, shapes it — stories that would be a non-event if disclosed proactively became front page stories because someone found out.

In Don't Think of an Elephant, George Lakoff explores the issue of framing. The book famously begins with the instruction "Don't think of an elephant."

What's the first thing we all do? Think of an elephant, of course. It's almost impossible not to think of an elephant. When we stop consciously thinking about it, it floats away and we move on to other topics — like the new email that just arrived. But then again it will pop back into consciousness and bring some friends — associated ideas, other exotic animals, or even thoughts of the GOP.

"Every word, like elephant, evokes a frame, which can be an image of other kinds of knowledge," Lakoff writes. This is why we want to control the frame rather than be controlled by it.

In Shortcut Pollack tells of Lakoff talking about an analogy that President George W. Bush made in the 2004 State of the Union address, in which he argued the Iraq war was necessary despite the international criticism. Before we go on, take Bush's side here and think about how you would argue this point — how would you defend this?

In the speech, Bush proclaimed that "America will never seek a permission slip to defend the security of our people."

As Lakoff notes, Bush could have said, "We won't ask permission." But he didn't. Instead he intentionally used the analogy of permission slip and in so doing framed the issue in terms that would "trigger strong, more negative emotional associations that endured in people's memories of childhood rules and restrictions."

Commenting on this, Pollack writes:

Through structure mapping, we correlate the role of the United States to that of a young student who must appeal to their teacher for permission to do anything outside the classroom, even going down the hall to use the toilet.

But is seeking diplomatic consensus to avoid or end a war actually analogous to a child asking their teacher for permission to use the toilet? Not at all. Yet once this analogy has been stated (Farnam Street editorial: and tweeted), the debate has been framed. Those who would reject a unilateral, my-way-or-the-highway approach to foreign policy suddenly find themselves battling not just political opposition but people's deeply ingrained resentment of childhood's seemingly petty regulations and restrictions. On an even subtler level, the idea of not asking for a permission slip also frames the issue in terms of sidestepping bureaucratic paperwork, and who likes bureaucracy or paperwork.

Deconstructing Analogies

Deconstructing analogies, we find out how they function so effectively. Pollack argues they meet five essential criteria.

1. Use the highly familiar to explain something less familiar.

2. Highlight similarities and obscure differences.
3. Identify useful abstractions.
4. Tell a coherent story.
5. Resonate emotionally.

Let's explore how these work in greater detail. Let's use the example of master-thief, Bruce Reynolds, who described the Great Train Robbery as his Sistine Chapel.

The Great Train Robbery

In the dark early hours of August 8, 1963, an intrepid gang of robbers hot-wired a six-volt battery to a railroad signal not far from the town of Leighton Buzzard, some forty miles north of London. Shortly, the engineer of an approaching mail train, spotting the red light ahead, slowed his train to a halt and sent one of his crew down the track, on foot, to investigate. Within minutes, the gang overpowered the train's crew and, in less than twenty minutes, made off with the equivalent of more than \$60 million in cash.

Years later, Bruce Reynolds, the mastermind of what quickly became known as the Great Train Robbery, described the spectacular heist as "my Sistine Chapel."

Use the familiar to explain something less familiar

Reynolds exploits the public's basic familiarity with the famous chapel in the Vatican City, which after Leonardo da Vinci's Mona Lisa is perhaps the best-known work of Renaissance art in the world. Millions of people, even those who aren't art connoisseurs, would likely share the cultural opinion that the paintings in the chapel represent "great art" (as compared to a smaller subset of people who might feel the same way about Jackson Pollock's drip paintings, or Marcel Duchamp's upturned urinal).

Highlight similarities and obscure differences

Reynold's analogy highlights, through implication, similarities between the heist and the chapel—both took meticulous planning and masterful execution. After all, stopping a train and stealing the equivalent of \$60m—and doing it without guns—does require a certain artistry. At the same time, the analogy obscures important differences. By invoking the image of a holy sanctuary, Reynolds triggers a host of associations in the audience's mind—God, faith, morality, and forgiveness, among others—that camouflage the fact that he's describing an action few would consider morally commendable, even if the artistry involved in robbing that train was admirable.

Identify useful abstractions

The analogy offers a subtle but useful abstraction: Genius is genius and art is art, no matter what the medium. The logic? If we believe that genius and artistry can transcend genre, we must concede that Reynolds, whose artful, ingenious theft netted millions, is an artist.

Tell a coherent story

The analogy offers a coherent narrative. Calling the Great Train Robbery his Sistine Chapel offers the audience a simple story that, at least on the surface makes sense: Just as Michelangelo was called by God, the pope, and history to create his greatest work, so too was Bruce Reynolds called by destiny to pull off the greatest robbery in history. And if the Sistine Chapel endures as an expression of genius, so too must the Great Train Robbery. Yes, robbing the train was wrong. But the public perceived it as largely a victimless crime, committed by renegades who were nothing if not audacious. And who but the most audacious in history ever create great art? Ergo, according to this narrative, Reynolds is an audacious genius, master of his chosen endeavor, and an artist to be admired in public.

There is an important point here. The narrative need not be accurate. It is the feelings and ideas the analogy evokes that make it powerful. Within the structure of the analogy, the

argument rings true. The framing is enough to establish it succulently and subtly. That's what makes it so powerful.

Resonate emotionally

The analogy resonates emotionally. To many people, mere mention of the Sistine Chapel brings an image to mind, perhaps the finger of Adam reaching out toward the finger of God, or perhaps just that of a lesser chapel with which they are personally familiar. Generally speaking, chapels are considered beautiful, and beauty is an idea that tends to evoke positive emotions. Such positive emotions, in turn, reinforce the argument that Reynolds is making—that there's little difference between his work and that of a great artist.

Jumping to Conclusions

Daniel Kahneman explains the two thinking structures that govern the way we think: System one and system two. In his book, Thinking Fast and Slow, he writes "Jumping to conclusions is efficient if the conclusions are likely to be correct and the costs of an occasional mistake are acceptable, and if the jump saves much time and effort." "A good analogy serves as an intellectual springboard that helps us jump to conclusions," Pollack writes. He continues:

And once we're in midair, flying through assumptions that reinforce our preconceptions and preferences, we're well on our way to a phenomenon known as confirmation bias. When we encounter a statement and seek to understand it, we evaluate it by first assuming it is true and exploring the implications that result. We don't even consider dismissing the statement as untrue unless enough of its implications don't add up. And consider is the operative word. Studies suggest that most people seek out only information that confirms the beliefs they currently hold and often dismiss any contradictory evidence they encounter.

The ongoing battle between fact and fiction commonly takes place in our subconscious systems. In The Political Brain: The Role of Emotion in Deciding the Fate of the Nation, Drew Westen, an Emory University psychologist, writes: "Our brains have a remarkable capacity to find their way toward convenient truths—even if they are not all true."

This also helps explain why getting promoted has almost nothing to do with your performance.

Remember Apollo Robbins? He's a professional pickpocket. While he has unique skills, he succeeds largely through the choreography of people's attention. "Attention," he says "is like water. It flows. It's liquid. You create channels to divert it, and you hope that it flows the right way."

"Pickpocketing and analogies are in a sense the same," Pollack concludes, "as the misleading analogy picks a listener's mental pocket."

And this is true whether someone else diverts our attention through a resonant but misleading analogy—"Judges are like umpires"—or we simply choose the wrong analogy all by ourselves.

Reasoning by Analogy

We rarely stop to see how much of our reasoning is done by analogy. In a 2005 study published in the Harvard Business Review, Giovanni Gavettie and Jan Rivkin wrote: "Leaders tend to be so immersed in the specifics of strategy that they rarely stop to think how much of their reasoning is done by analogy." As a result they miss things. They make connections that don't exist. They don't check assumptions. They miss useful insights. By contrast "Managers who pay attention to their own analogical thinking will make better strategic decisions and fewer mistakes."

71. Shane Parrish on Mental Models, Decision Making, Charlie Munger, Farnam Street, And More

An interview I gave that I think you'll enjoy as I talk about reading, mental models, investing, learning and more.

Shane Parrish is the curator for the popular Farnam Street Blog, an intellectual hub of curated interestingness that covers topics like human misjudgment, decision making, strategy, and philosophy. Shane is a strategist for both individuals and organizations and is dedicated to mastering the best of what other people have already figured out.

Can you discuss your background and the origins of Farnam Street?

Farnam Street started as a byproduct of my MBA. As I was going through that program it became evident that we were being taught to regurgitate material in a way that made marking easier. We weren't honing our critical thinking skills or integrating multiple disciplines. We couldn't challenge anything.

Eventually, I got frustrated. I didn't give up on the MBA, but I did start using the time that I was previously investing in homework and started to focus on my own learning and development. At first it was mostly academic. I started going back to the original Kahneman and Tversky papers, and other material that was journal based, because I figured I'd probably never have access to such a wealth of journals again outside of school.

So I started the website and it was really just for me, not for anybody else. The original URL of the website was the zipcode for Berkshire Hathaway. I didn't think anyone would find it. It eventually grew into a community of people interested in continuous learning, applying different models to certain problems, and developing ways to improve our minds in a practical way. The strong reception surprised me at first, but now the community has become very large, stimulating, and encouraging. I should point out that I don't come up with anything original myself—I'm just trying to master the best of what other people like Buffett, Kaufman, Bevelin, and Munger have already figured out. In fact, that's our tagline. It reminds me of something Munger said once when asked what he learned from Einstein, and he replied, only half-jokingly, "Well he taught me relativity. I wasn't smart enough to figure that out on my own." That seems like a bit of a wiseass remark, but there's some untapped wisdom there.

What are your motivations for Farnam Street?

I want to embrace the opportunity I have, which has been created largely through luck, and I want to give readers and subscribers enormous value in three ways.

First, I want to help them make better decisions. To do our best to figure out how the world really works. Second, I want to help people discover new interests and connections across disciplines. Finally, I want to help people explore what it means to live a good life and how we should live. I hope by sharing my intellectual and personal journey I can help people better navigate theirs.

It seems pretty clear that you have a profound admiration for investors. Farnam Street is the street Berkshire Hathaway is located on, and you discuss Charlie Munger's views quite a bit. What appeals to you about investing?

For Munger and Buffett specifically, it's not necessarily that they're just investors, it is that they've modeled a path of life that resonates with me. I also appreciate the values that are associated with their investment success. I think what they've done is they've taken other people's ideas, stood on the shoulders of giants, so to speak, and applied those ideas in better ways than the people who came up with the ideas. For example, with regard to psychological biases and Kahneman's work, Munger and Buffett have found a way to institutionalize this to a point where they can actually avoid most of these biases.

Whereas Kahneman himself just says something along the lines of, “I’ve studied biases all my life, but I’m not better.” Yet, these two guys from Omaha actually figured out how to be better.

It’s not just Kahneman and human biases. They’ve done it in a variety of disciplines like Michael Porter’s work on Competitive Strategy. They separately derived the same basic ideas, except in a way that gives them an enormous investing advantage. To my knowledge, Michael Porter has not done that. Of course, he may not have been trying to do so. Another great example is Ben Graham. He provided the bedrock that Warren Buffett built his brain on, but if you really think about it, Buffett was and is a much better investor. And lastly, regarding Munger, in my opinion, his method of organizing practical psychology is a lot better than the actual residents of that discipline, even the people who “taught” him the ideas through books.

Returning to investing, the field resonates with me because investors have skin in the game. Investors have clear accountability and measurable performance. That contrasts with many other types organizations. For the most part, investors are searching for the truth and constantly looking for ways they could be wrong and that they could be fooling themselves. There’s a pretty clear scoreboard.

Are you an investor yourself?

Yes. I used to be involved with a small registered investment advisor based in Massachusetts. I still invest personally and hope to return more of my focus to investing in the future. (Which, I’ve now done at Syrus Partners) Right now I’m focused on Farnam Street, which I see as the biggest opportunity ahead of me and the opportunity that I’m most excited about. There’s a lot to do.

Can you talk about what you have planned for Farnam Street?

I just hired somebody to help out at Farnam Street for the first time. It’s become more of a sustainable business. We are developing products. We have two courses coming out next year that we’re incredibly excited about (Update: These two are now only available for members). I think we have put over a year’s effort into one of the products, and we’re just starting the other one right now which will be released next fall.

[quote]Adapting your reading style to consider the type of material you are reading and why you are reading it makes you much more effective at skimming, understanding, synthesizing, and connecting ideas. If you take the same approach to reading everything, you will end up overwhelmed and frustrated.[/quote]

We are launching “The Art of Reading” early in the year. That course is aimed at adapting Mortimer Adler’s theory of reading to the modern age, and giving people a structured way of going about learning from books, as opposed to simply reading them.

Seems simple, but most of us never really pick it up.

Today we are bombarded constantly with information, and we often read all types of material in the same way. But that’s pretty ineffective. We don’t have to read everything the same way.

Reading is something you seem to know quite a lot about, but in a recent post, you discussed that you are purposefully reading fewer books. What is your thinking around that decision?

I fell into a trap with reading. It almost became a personal challenge that you can easily get wrapped up in. In 2014, I was basically reading a book every few days. I think I ended the year with over 140 books read, but I must have started at least 300. I realized I was reading just to finish the book. That meant I wasn’t getting as much out of it as I should. I ended up wasting a lot of time using that approach and it also impacted what I read. You have these subtle pressures to read smaller books and to digest things in a really quick way. I wasn’t spending enough time synthesizing the material with what I already knew and honing my understanding of an idea.

[quote]It's not about how many books you read but what you get out of the books you read.[/quote]

It's not about how many books you read but what you get out of the books you read. One great book, read thoroughly and understood deeply, can have a more profound impact on your life than reading 300 books without really understanding the ideas in depth and having them available for practical problem-solving.

Can you discuss some of your techniques for absorbing and synthesizing as much information as possible?

There is a lot that can be done after simply finishing a chapter. I like to summarize the chapter in my own words. I also like to apply any learnings from the chapter to my life, either by looking backward to see where concepts may have applied or by looking forward to seeing if it might make sense to incorporate something into my daily routine. I think the reason to do that is twofold. One is to give me a better understanding of that learning, and two is really a check and balance, and a feedback loop. Have you ever watched TV and somebody comes in on a commercial and says, "What are you watching," and you're like, "I have no idea," but you've been sitting there 20 minutes? Well, we can do that with books too. You'll start reading, and paragraphs will fly by, and then you'll have no idea what you were reading. It's fine if you're reading for entertainment, you might be able to catch up later, but if you're reading for understanding, that's something you want to avoid. Part of what I want to do is develop a feedback process to make sure that I'm not doing that.

I try to make extensive use of book covers for notes about areas to revisit, potential connections to other concepts, and outlining the structure of the author's argument. After I've finished a book, I usually put it on my desk for a week or two, let it sit, and then I come back to it. I reread all of my margin notes, my underlines, and highlights. Then I apply a different level of filtering to it and make a decision about what I want to do with the information now.

You also talk about the Feynman technique in some of your posts.

The Feynman technique is essentially explaining a concept or idea to yourself, on a piece of paper, as if you were teaching it to someone else with little background knowledge. When you're learning something new, it's all about going back and making sure you understand it.

Can you explain it in simple, jargon-free, language? Can you explain it in a way that is complete and demonstrates understanding? Can you take an idea and apply it to a problem outside of the original domain? Take out a piece of paper and find out.

I think that being able to do this at the end of a book is really important, especially if it's a new subject for you. The process of doing that shows you where your gaps are; this is important feedback. If you have a gap in your understanding, you can circle back to the book to better understand that point. If you can't explain it to somebody else, then you probably don't understand it as well as you think you do. It doesn't mean you don't understand it, but the inability to articulate it is definitely a flag that it's something you need to circle back to, or pay more attention to.

"Most geniuses—especially those who lead others—prosper not by deconstructing intricate complexities but by exploiting unrecognized simplicities."

— Andy Benoit

It seems like feedback mechanisms are a key part of your approach.

I think at the heart of it, you want to be an active reader. You want to selectively be an active reader and not a passive reader. These types of activities make sure that you're reading actively. Writing notes in a book, for example, is really just a way to pound what you're reading into your brain. You need engagement.

In a recent post, you brought up Peter Thiel's concept of a "secret". Essentially, what important truth do very few people agree with you on? I'd be really curious if you have something in mind that would fit this concept.

Ever since I came across this question I've been toying with it over and over in my head. I'm not sure I have a decent answer, but I'll offer one of the things that I run into a lot but couldn't really describe until Peter Kaufman pointed me to a quote by Andy Benoit, who wrote a piece in Sports Illustrated a while back. Benoit said "Most geniuses—especially those who lead others—prosper not by deconstructing intricate complexities but by exploiting unrecognized simplicities." I think he nailed it. This explains Berkshire Hathaway, the New England Patriots, Costco, Glenair, and a host of amazing organizations.

I've long had a feeling about this but couldn't really pull it out of my subconscious into my conscious mind before. Benoit gave me the words. I think we generally believe that things need to be complicated but in essence, there is great value in getting the simple things right and then sticking with them, and that takes discipline. As military folks know, great discipline can beat great brainpower.

I know of many companies that invest millions of dollars into complicated leadership development programs, but they fail to treat their people right so the return on this investment isn't even positive it's negative because it fosters cynicism. Or consider companies that focus on complicated incentive plans—they never work. It's very simple. If you relentlessly focus on the basics and develop a good corporate culture—like the one Ken Iverson mentions in his book Plain Talk—you surpass people who focus on the complex. Where I might disagree with Benoit a little is that I don't think these are unrecognized as much as under-appreciated. People think the catechism has to be more complicated.

You discuss the power of multidisciplinary learning. Do you have any example where the multidisciplinary learning has been especially powerful for you? Munger has a number of examples of him arriving at a solution faster than an expert in a field as a virtue of Munger using concepts from other fields.

If you were a carpenter you wouldn't want to show up for a job with an empty toolbox or only a hammer. No, you'd want to have as many different tools at your disposal as possible.

[quote]Nothing sucks up your time like poor decisions.[/quote]

Furthermore, you'd want to know how to use them. You can't build a house with only a hammer. And there is no point in having a saw in your toolbox if you don't know how to use it. In this sense, we're all carpenters. Only, our tools are the big ideas from multiple academic disciplines. If we have a lot of mental tools and the knowledge of how to wield them properly, we can start to think rationally about the world.

These tools allow us to make better initial decisions, help us better scramble out of bad situations, and think critically about what other people are telling us. You can't overestimate the value of making good initial decisions. Nothing sucks up your time like poor decisions and yet, perversely, we often reward people for solving the very problems they should have avoided in the first place.

It's a little weird, but in some organizations, you're better off screwing up and fixing it than making a simple, correct, decision the first time. Think about portfolio managers trumpeting how they've "smartly sold" a stock at a loss of 20%, saving them a loss of 50%, but which a wiser person never would have purchased in the first place. The sale looks smart, but the easier decision would have been avoiding misery from the get-go. That kind of thing happens all over the place.

Multidisciplinary thinking also helps with cognitive diversity. In our annual workshop on decision making, Re:Think Decision Making, we talk about the importance of looking at a problem in multiple dimensions to better understand reality and identify the variables that will govern the situation—whether it's incentives, adaptation, or proximity effects. But the

only way you're going to get to this level of understanding is to hold up the problem and look at it through the lens of multiple disciplines. These models represent how the world really works. Why wouldn't you use them?

One important thing, for example, we can learn from ecology, is second-order thinking—"and then what?" I think that a lot of people forget that there's a next phase to your thinking, and there's a second and third order effect. I've been in a lot of meetings where decisions are made and very few people think to the second level. They get an idea that sounds good and they simply stop thinking. The brain shuts down. For example, we change classification systems or incentive systems in a way that addresses the available problems, but we rarely anticipate the new problems that will arise. It's not easy. This is hard work.

Another example is when a salesman comes into a company and offers you some software program he claims is going to lower your operating costs and increase your profits. He's got all these charts on how much more competitive you'll be and how it will improve everything. You think this is great. You're sold. Well, the second order thinking is to ask, how much of those cost savings are going to go to you and how much will be passed on to the customer? Well to a large extent that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitors' door and telling them you just bought their product. We know thanks to people like Garrett Hardin, Howard Marks, and disciplines like ecology that there are second and third order effects. This is how the world really works.

Munger's got a brain that I don't have. I have to deal with what I've got. I'm not trying to come up with the fastest solution to a problem. It's great to have a 30-second mind, but it's not a race. Part of the issue I see over and over again is not that people don't have the cognitive tools, but rather they don't have time to actually think about a problem in a three-dimensional way.

[quote]If you think you're going to come up with good solutions to complicated problems in 30 seconds and your name is not Charlie Munger, I wish you luck.[/quote]

The rest of us should learn to say "I don't know" or "Let me think about it" about ten times more frequently than we do.

It makes sense that second-order and third-order effects are underappreciated.

I think a lot of people get incentives wrong and it has disastrous implications on corporate culture. Let's look at it from another angle – how would you intentionally design an incentive system that functioned horribly? You'd make it so complicated that few people understood it. You'd make everyone measured on individual and not team success. You'd have different variables and clauses and sub-clauses. No one would understand how their work impacts someone else. To make it even worse, you'd offer infrequent and small rewards. You'd offer a yearly bonus of maybe 5% of salary or something. And of course, you'd allow the people in it to game the system and the people running it to turn it into politics. I think we can all agree those are not desired outcomes and yet that is how many incentive systems work.

[quote]I think it's important to focus on getting better at making decisions over time. It is about making the process slightly better than it was last time.[/quote]

Do you have any thoughts on particularly powerful concepts or process implementations that can help investment organizations pursue investment excellence?

I think it's important to focus on getting better at making decisions over time. It is about making the process slightly better than it was last time. These improvements compound like money. You really have to flip it on its head. What's likely to not work well? Generally speaking, analysts tend to have a focused view of the world and they stay in their lane. Specialization certainly helps develop specific knowledge, but it also makes it hard to learn from the guy or girl next to you who has knowledge in a different industry, so you're not improving your intuition as much as you'd probably want. It's like chess. People once

thought great chess players were great thinkers, but they're not any better at general problem-solving than the rest of us. They're just great chess players. Investment analysis is often the same way, especially if you're siloed in some industry analyst position. It's probably not making you a great thinker, but you are learning more about your industry. [quote] have the organization learn and get better, we need to expose our decision-making process to others.[/quote]

In order to have the organization learn and get better, we need to expose our decision making process to others. One way to do this is to highlight the variables we think are relevant. Start making clear why we made our decisions and the range of outcomes we thought were possible. It needs to be done in advance. A lot of people do this through a decision journal. Some accomplish this through a discussion that flushes out which variables you think will dominate the outcome and most importantly, why. Not only does that facilitate an environment where others can challenge your thought process, but over time it enables them to get a good feel for what you think are the key variables in that particular industry. That helps me expand my circle of competence. You don't want an organization where the automobile analyst knows nothing about banking and the chemicals guy knows little about consumer products, and then a portfolio manager with a little surface knowledge of everything is pulling the trigger. I have never seen that work, but I've seen a lot of people try. The "everyone's a generalist" approach has its own limitations, like a crippling lack of specialized knowledge.

So, obviously, any investment organization has to find a middle ground. How could it be otherwise? You must start with this basic and obvious truth to solve the problem. Another challenge in the investment world is dealing with the sheer volume of the information. I get questions from portfolio managers all the time about how best to keep up with the information flow. They say "I get 500 emails a day. I have researchers' work come to me at all hours. I have thousands of pages of material to read."

Clearly, Berkshire Hathaway has done a really good job with this, with basically two guys doing all of the information processing—two really smart guys, but only two.

How do they do that?

Well, part of the answer is that Buffett and Munger are continuously learning about companies that do not change rapidly. They're learning about companies that change slowly. That in and of itself is a major advantage. They also are operating in industries in which they know the key variables of determining an organization's success or failure, and more importantly, ignoring the industries where they don't. It's a huge step to be able say to yourself "Look, I'm going to miss some enormous winners that were incredibly hard to see ahead of time. I'm OK with that." Buffett and Munger can do it, but most struggle. So they stretch and invest in things where they really cannot accurately predict the odds of success or failure, all forces considered.

Probabilities being what they are, if you consistently invest in things with middling odds, you'll have middling results. Again, how could it be otherwise? The key is knowing the difference between an obviously attractive situation and a difficult-to-predict one and being able to act on the former and sit on the latter. Of course, I'm over-simplifying a bit, but you can't get around the fact that reality is reality. You have to find a way. And this will help you solve your information flow problem, because you'll be tossing a lot of ideas out very quickly.

It seems like you would prefer the Buffett and Munger model over the approach of the average hedge fund with specialists?

If my job is being a neurosurgeon, I need to keep up-to-date with all the latest neurosurgery papers, academic articles, books, and talks because I'm very specialized in that one particular area and it's relevant to my job and relevant to my livelihood.

If you look at investing holistically you can't do that for every company in every industry. In my understanding, part of the reason Buffett and Munger have accumulated so much

knowledge is that they focus on learning things that change slowly. That makes it easier to identify potential outcomes and determine the relevant variables. David Foster Wallace had this great quote, “Bees have to move very fast to stay still.” And that’s what most of us do. We move a lot to stay in the same place. Buffett and Munger are getting further ahead each day.

Unless physics changes, for example, it’s unlikely that we’ll see the development of more efficient ways to move bulk freight. It doesn’t seem subject to technological disruption, but instead will likely be aided by technology. Technology helps improve the management of your rail network, but it’s not going to replace the entire network anytime soon. I think that Berkshire is actually moving away from uncertainty by pursuing companies like this. If you don’t know the range of outcomes, you will have a hard time assessing probabilities. One of the things that decision journals help identify is outcomes outside of what we expected. That’s a very humbling experience. After identifying possible outcomes and applying confidence levels, it’s humbling to get it so wrong

You have also studied an investment firm that’s probably as different from Berkshire Hathaway as possible with your most recent podcast with Chris Dixon of Andreessen Horowitz. What are your thoughts on good decision making as applied in the venture capital world and how is it different than Berkshire Hathaway?

Chris was an excellent guest to have on The Knowledge Project. He operates in Venture Capital—a world I don’t get much exposure to. He has insight on things I know very little about: venture funding, how to structure a venture capital firm so that you are adding value, etc. And they’ve been very successful.

I think we’re largely operating in unprecedented territory given the magnitude of private valuations. In past decades, companies IPO’d at much lower valuations so public market investors could more easily participate in their success. I don’t know how this plays out, but talking to Chris was fascinating.

Andreessen Horowitz has a very different operational approach as compared to Berkshire Hathaway. As I understood it, they are trying to add value to the entrepreneurs. Also, they’ve moved away from a business or idea based sourcing process to one that is almost exclusively focused on the entrepreneur. That directly contradicts some of Buffett’s thoughts on the relative importance of a management team versus the underlying business.

It makes sense that they would have different approaches. I think it’s important to understand that there are things that we want to have in our mental tool box. But part of being an effective craftsman is knowing when they work and when they don’t. You can’t just pull out random tools and expect them to work.

In 2013, I did some consulting work on improving innovation in organizations and the most common thing that people were doing at the time to solve the innovation problem was copying Google’s 20% of time spent on independent innovative ideas.

[quote]You need to understand how that fits with the company culture.[/quote]

I found this interesting for a number of reasons. It surprised me that every executive had it on the tip of their tongue, but there’s no large sample size for a successful innovation like this 20% idea. Google and, I think, 3M are the two most prominent examples. Google, at the time, I think they had only been around for 15 years. That’s a pretty small sample size for continuous innovation. Also, you need to understand how that fits with the company culture, and why it works even if you’re seeing it work. Why does it work at Google? Is it because of how it fits in the overall culture? The problem I see is that people are taking one piece of a large puzzle and thinking that it’s going to solve their problem. It might help. It might not. It’s just a tool. It reminds me of the group of blind people touching the different parts of the elephant.

Also, some of these innovation projects get done for the wrong reasons, and with the wrong incentives. If my boss asks me for ideas to help the company innovate and I give

him an idea that sounds good, one that subconsciously reminds him of an article he read in Fortune about innovation, isn't that basically good enough for me as an employee? Does it even matter if it works? In most organizations, am I really going to be held responsible for the success or failure of my innovation prescription? The organization might suffer, but will I suffer personally? Probably not. My lack of ability to think the problem through will probably be forgotten in time if the idea sounded good and relevant at the time. If it was defensible via Powerpoint. This is one reason hiring consultants rarely works as well as hoped.

So, we copy Google's twenty percent innovation time. They're an innovative company; they're hip; they're cool; we're going to copy them. Okay, well, we can do that. It's a good story. What gets lost is a potentially useful discussion like, "Maybe we should remove the things in our environment that take away from natural innovation, like all these meetings." That's a much tougher conversation, but just like taking away sugar works better than adding broccoli to your diet, taking things out of the corporate culture is often a better solution than adding new stuff. Munger has us paying attention to incentives because they really are driving the train. You have to get it right.

One big theme for you is the concept of life-long learning. What is your motivation to pursue it? Munger has called it a moral duty. Do you have similar feelings?

I wish I were as eloquent as him. I've always had to work harder. You just have to keep getting better every day. You have to keep learning. If you're going to accomplish what you want to accomplish, it's probably not through going home and watching Netflix every night, right? You have to learn how the world works. We have a huge statistical sample size of things that aren't changing. There is an excellent letter by Chris Begg at East Coast Asset Management that discusses Peter Kaufman's thoughts on this. Physics, math, and biology are things that change very, very slowly, if at all. Learning things in those disciplines is good. It's practical, because that's how the world works. Those are things that don't change over time.

I think that, for me, it's just become "How can I pass people that are smarter than me?" I think if I can get incrementally better every day, compounding will kick in and over a long enough time, I'm going to achieve the things that I want in life.

What could be better than constantly learning new things and discovering that you're still curious? Most of us forget what it's like to be six years old and asking "why?" all the time and trying to understand why things operate the way they do. It's hard to still do that, but you can still carry that wonder with you into life and try to understand why things are happening and why success or failure happens.

[quote]Avoiding stupidity is easier than seeking brilliance. But that by itself is suboptimal. You also want to copy models of success. [/quote]

We don't necessarily have to come up with all of this stuff ourselves. We can see a better model and adopt it or, the parts of it that will help us along. Giving up on holding on to our own ideas is really important.

I don't come up with almost anything that's original. I aggregate and synthesize other people's thoughts and put it into context for people. I think that those are things that I like to focus on, I have a passion for doing that. I'm doing it anyway because I get a lot of value out of reading, learning, and exploring the world, and I share that with people.

With regard to Mental Models, you spend a lot of time discussing their importance, but you also highlight their shortcomings. Can you discuss your view of the value of mental models?

It's important to understand how we are likely to fool ourselves. Aside from the psychological factors, which Munger and Bevelin talk about extensively, there are other ways.

For example, we run organizations based on dashboards and metrics and we make decisions based on these numbers. Investors look at financial reports to make investment decisions.

We think that those numbers tell a story and, to some extent, they do. However, they don't tell the full story. They are limited. For example, a strike-out can be a good thing in baseball. Players who suck statistically in one system can thrive as a part of another – the whole “Moneyball” idea lives here, and the Patriots have been extremely successful with a wide variety of talent. In business, reported depreciation can be widely off. The accounting could be gamed. A tailwind could be benefitting a business temporarily, soon to dissipate. Many companies look their absolute best, on historical figures, just before the big denouement.

“All models are false but some are useful.”

— George Box

There is a great quote by George Box who said “All models are false but some are useful.” Practically speaking, we have to work with reductions—like maps. A map with a scale of one foot to one foot wouldn't be useful, would it? Knowing that we're working with reductions of reality, not reality itself, should give us pause. We recently wrote a piece on Farnam Street called “The Map is Not the Territory,” which is a more in-depth exploration of the nuances behind this.

Knowing how to dig in and understand these maps and their limitations is important. A lot of models are core – they don't change very much. Social proof is real. Incentives do drive human behavior, financial and otherwise. The margin of safety approach from engineering works across many, many practical areas of life. Those are the types of huge, important models you want to focus on as a part of becoming a generally wise person. You need to learn them and learn how to synthesize with them. From there, you layer in the models that are specific to your job or your area of desired expertise. If you're a bank investor, you're going to look to attain a deep fluency in bank accounting that a neurosurgeon wouldn't need. But both the analyst and the surgeon can understand and use the margin of safety idea practically and profitably.

Essentially, they can be powerful if used correctly, but we can also over apply them in some ways?

They work sometimes and not other times. You need to be aware of limitations. The point here is just to be cautious—the map is not the terrain. It doesn't tell the full story.

Do you have any other investors or companies outside of Berkshire Hathaway that really have some profound thinking or you really love reading their shareholder letters or you've learned a lot from? Anything like that that we can talk about?

Berkshire has an incredibly unique model of writing to shareholders, and frankly no one else is as good. One that's slightly off the beaten path, although it's become a lot better known over the past few years, is a Canadian company called Constellation Software (CSU). The CEO there is truly doing God's work as far as how he reports to shareholders. Very clear presentation of the financial performance of the business, and a lucid and honest discussion of what's going on.

There are two key components to reporting to shareholders well, as I see it. One is presenting, in as clear a way as possible, the results in the prior periods. Presented consistently and honestly over time. The second is being extremely forthcoming about why these figures came out the way they did; good or bad, warts and all. When Blue Chip Stamps was still a reporting company, Munger would write about See's Candy. What did his summary table show every year? Pounds of candy sold, stores open, total revenue, total profits. The key variables. Then he explained in clear language why See's was a good business and what had occurred in the most recent period, and if possible, what he

foresaw in general for the following year. That's what we need more of: give investors an updated report of the major drivers and then tell us what happened. Leave out the fluff. You don't need to write essays like Buffett. Just help us understand the business and what's going on.

This has been great, Shane. Thanks so much for your time.

72. How Clever Leaders Overcome More Talented and Better Funded Competitors

Talent and resources aren't always enough to succeed. Doing incredible things requires true passion. Sometimes a driven, inspired team can succeed against one with more talent and funding.

In the early 1900s Samuel Pierpont Langley wanted to be the first man to fly an airplane. He stacked the odds in his favor, or so he thought, by arming himself with all the ingredients for success.

His friends included some of the most powerful men in government and business. He was given a \$50k grant from the War Department (an enormous sum at the time.) He brought together the best minds of the day – the most talented team imaginable. The team had access to the best technology and materials. They were treated like rockstars and followed everywhere by the press.

It was virtually impossible to fail. Or was it?

Not very far away Wilbur and Orville Wright were working on their own airplane. Only they didn't have a lot of money. They didn't have a team of world-class talent – not a single person on the team had a college education let alone an advanced degree. They didn't have the best materials. Heck, they were operating out of a bicycle shop. But they did have something that Pierpont didn't have. They had passion.

That passion was so intense, writes Simon Sinek in his book It Starts With Why, “that it inspired the enthusiasm and commitment of a dedicated group in their hometown of Dayton, Ohio.”

Like the Titanic, we know how this story ends.

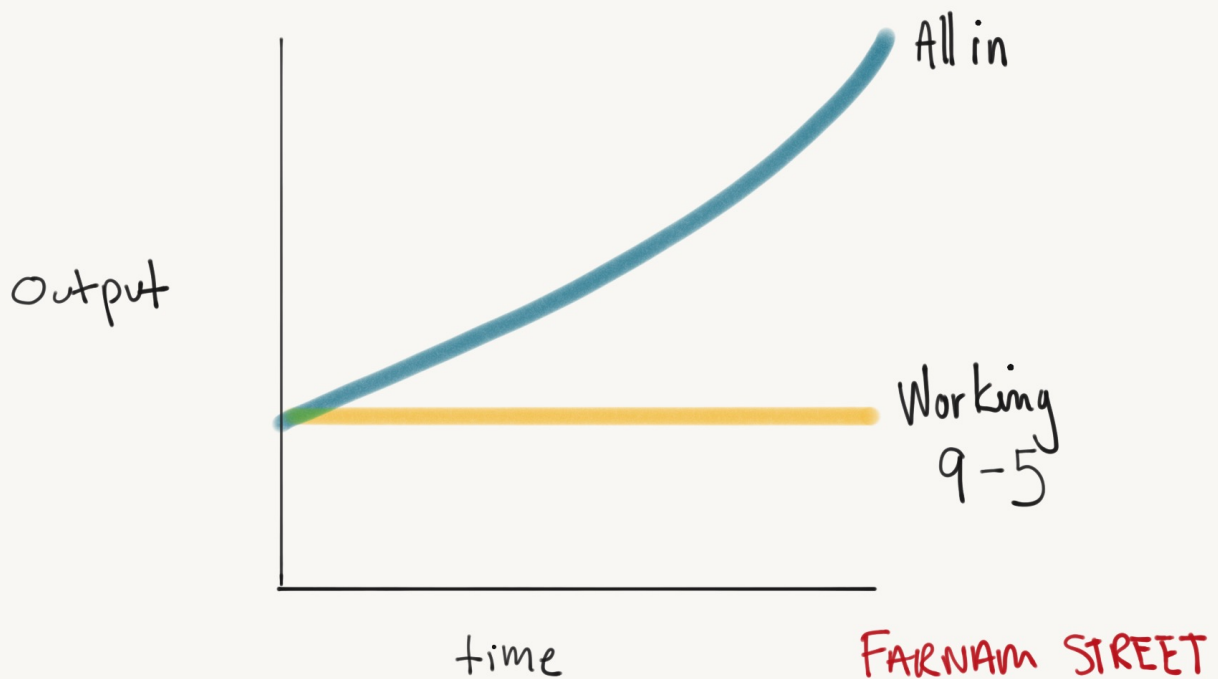
On December 17, 1903 the Wright brothers took man into flight for the first time.

Why did they succeed against a more talented and better funded team?

It wasn't luck. Both Langley and the Wright brothers were motivated, had scientific minds, and worked hard. It wasn't money, talent, or materials. Langley had more of these in spades. It wasn't systems or processes as these are easily replicated.

The difference was that the Wright brothers, according to Sinek, “were able to inspire those around them and truly lead their team to develop a technology that would change the world.”

Passion can trump talent



The difference between someone doing something because they want to and not because they have to is huge.

Have you ever worked for a boss you didn't like on a project you didn't like? You might be the most talented person in the organization but it doesn't matter because on that project and for that boss you're a 9 to 5 worker. You do your job and nothing more. You shut your brain off.

Compare that to a time you worked for a boss you loved on a project you loved. I bet you went all in. The hours flew by, you thought about the project in the shower in the morning, your passion and excitement about the project was hard to contain.

The difference between these two examples is not a few hours of a day. The difference is non-linear. (And anytime you get a non-linear result when you expected a linear one, you need to pay attention as the world is trying to teach you something.)

This is how team can trump talent and one of the main reasons that culture eats strategy. Sinek concludes that great leaders "are able to inspire people to act. Those who are able to inspire give people a sense of purpose or belonging that has little to do with any external incentive or benefit to be gained." In short, they inspire people to act because they want to, not because they were swayed with money or rewards. And people who are inspired to act have a deeply personal motivation for doing so and they endure inconveniences, personal suffering and setbacks.

Give me a team of people acting because they want to, not because they have to, and you can compete with anyone.

73. Second-Order Thinking: What Smart People Use to Outperform



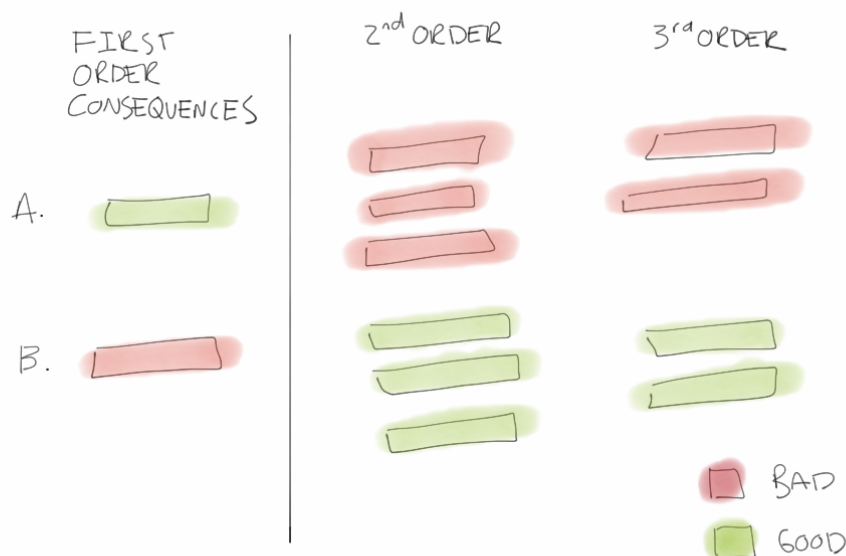
Understanding how to think things through – to push your mind past the first step – can help you solve problems, avoid problems, and take better actions.

The best way to examine the long-term consequences of our decisions is to think things through. This is called use second-order thinking.

It's often easier to identify when people don't adequately consider the second and subsequent-order impacts. For example, consider a country that, wanting to inspire regime change in another country, funds and provides weapons to a group of "moderate rebels." Only it turns out that those moderate rebels will become powerful and then go to war with the sponsoring country for decades. Whoops.

Failing to consider second- and third-order consequences is the cause of a lot of painfully bad decisions, and it is especially deadly when the first inferior option confirms your own biases. Never seize on the first available option, no matter how good it seems, before you've asked questions and explored.

The ability to think through problems to the second, third, and nth order—or what we will call second-order thinking for short—is a powerful thinking tool that not only solves problems but avoids them.



Second-Order Thinking

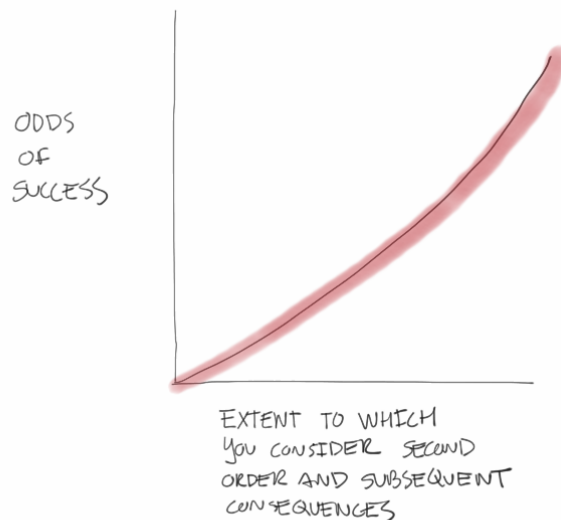
In his book, *The Most Important Thing*, Howard Marks explains the concept of second-order thinking, which he calls second-level thinking.

First-level thinking is simplistic and superficial, and just about everyone can do it (a bad sign for anything involving an attempt at superiority). All the first-level thinker needs is an opinion about the future, as in "The outlook for the company is favorable, meaning the stock will go up." Second-level thinking is deep, complex and convoluted.

First-order thinking is fast and easy. It happens when we look for something that only solves the immediate problem without considering the consequences. For example, you can think of this as I'm hungry, so let's eat a chocolate bar.

Second-order thinking is more deliberate. It is thinking in terms of interactions and time, understanding that despite our intentions our interventions often cause harm. Second order thinkers ask themselves the question "And then what?" This means thinking about the consequences of repeatedly eating a chocolate bar when you are hungry and using that to inform your decision. If you do this you're more likely to eat something healthy.

First-level thinking looks similar. Everyone reaches the same conclusions. This is where things get interesting. The road to out-thinking people can't come from first-order thinking. It must come from second-order thinking. Extraordinary performance comes from seeing things that other people can't see.



Improving Your Ability To Think

Here are some ways to put second-order thinking into practice today.

1. Always ask yourself, "And then what?"
2. Think across time — What do the consequences look like in 10 minutes? 10 months? 10 Years?
3. Create templates like the second image above with 1st, 2nd, and 3rd order consequences. Identify your decision, think it through, and write down the consequences. If you review these regularly you'll be able to help calibrate your thinking.
4. If you're using this to think about business decisions, ask yourself how important parts of the ecosystem are likely to respond. How will employees deal with this? What will my competitors likely do? What about my suppliers? What about the regulators? Often, the answer will be little to no impact, but you want to understand the immediate and second-order consequences before you make the decision.

A lot of extraordinary things in life are the result of things that are first-order negative, second order positive. So just because things look like they have no immediate payoff, doesn't mean that's the case. All it means is that you'll have less competition if the second and third order consequences are positive because everyone who thinks at the first order won't think things through.

Second-order thinking takes a lot of work. It's not easy to think in terms of systems, interactions, and time. However, doing so is a smart way to separate yourself from the masses.

74. Avoiding Falling Victim to The Narrative Fallacy

The narrative fallacy leads us to see events as stories, with logical chains of cause and effect. Stories help us make sense of the world. However, if we're not aware of the narrative fallacy it can lead us to believe we understand the world more than we really do.

A typical biography starts by describing the subject's young life, trying to show how the ultimate painting began as just a sketch. In Walter Isaacson's biography of Steve Jobs, for example, Isaacson illustrates that Jobs's success was determined to a great degree by the childhood influence of his father. Paul Jobs, a careful, detailed-oriented engineer and craftsman – would carefully craft the backs of fences and cabinets even if no one would see – who Jobs later found out was not his biological father. The combination of his adoption and his craftsman father planted the seeds of Steve's adult personality: his penchant for design detail, his need to prove himself, his messianic zeal. The recent movie starring Michael Fassbender especially plays up the latter cause; Jobs's feeling of abandonment drove his success. Fassbender's emotional portrayal earned him an Oscar nomination.

Nassim Taleb describes a memorable experience of a similar type in his book *The Black Swan*.

In Rome, Taleb is having an animated discussion with a professor who has read his first book *Fooled by Randomness*, parts of which promote the idea that our mind creates more cause-and-effect links than reality would support. The professor proceeds to congratulate Taleb on his great luck by being born in Lebanon:

... had you grown up in a Protestant society where people are told that efforts are linked to rewards and individual responsibility is emphasized, you would never have seen the world in such a manner. You were able to see luck and separate cause-and-effect because of your Eastern Orthodox Mediterranean heritage.

These types of stories strike a deep chord: They give us deep, affecting reasons on which to hang our understanding of reality. They help us make sense of our own lives. And, most importantly, they frequently cause us to believe we can predict the future. The problem is, most of them are a sham.

As flattered as he was by the professor's praise, Nassim Taleb knew instantly that attributing his success to his background was a fallacy:

How do I know that this attribution to the background is bogus? I did my own empirical test by checking how many traders with my background who experienced the same war become skeptical empiricists, and found none out of twenty-six.

The professor who had just praised the idea that we overestimate our ability to understand cause-and-effect couldn't stop himself from committing the very same error in conversation with Taleb himself.

Steve Jobs felt the same about the idea that his adoption had anything but a coincidental effect on his success:

There's some notion that because I was abandoned, I worked very hard so I could do well and make my parents wish they had me back, or some such nonsense, but that's ridiculous [...] Knowing I was adopted may have made me feel more independent, but I have never felt abandoned. I've always felt special. My parents made me feel special.

The Narrative Fallacy

Such is the power of the Narrative Fallacy — the backward-looking mental tripwire that causes us to attribute a linear and discernable cause-and-effect chain to our knowledge of the past. As Nassim points out, there is a deep biological basis to the problem: we are inundated with so much sensory information that our brains have no other choice; we must put things in order so we can process the world around us. It's implicit in how we understand the world. When the coffee cup falls, we need to know why it fell. (We knocked

it over.) If someone gets the job instead of us, we need to know why they were deemed better. (They had more experience, they were more likeable.) Without a deep search for reasons, we would go around with blinders on, one thing simply happening after another. The world does not make sense without cause-and-effect.

This necessary mental function serves us well, in general. But we also must come to terms with the types of situations where our broadly useful “ordering” function causes us to make errors.

What You Don't See

We fall for narrative regularly and in a wide variety of contexts. Sports are the most obvious example: Try to recall the last time you watched a profile of a famous athlete — the rise from obscurity, the rags-to-riches story, the dream-turned-reality. How did ESPN portray the success of the athlete?

If it was like most profiles, you'd most likely see some combination of the following:

Parents or a coach that pushed him/her to strive for excellence; a natural gift for the sport, or at the very least, a strong inborn athleticism; an impactful life event and/or some form of adversity; and a hard work ethic.

The copy might read as follows,

It was clear from a young age that Steven was destined for greatness. He was taller than his whole class, had skills that none of his peers had, and a mother who never let him indulge laziness or sloth. Losing his father at a young age pushed him to work harder than ever, knowing he'd have to support his family. And once he met someone willing to tutor him, someone like Central High basketball coach Ed Johnson, the future was all but assured — Steven was going to be an NBA player come hell or high-water.

If you were to read this story about how a tall, strong, fast, skilled young man with good coaching and a hard work ethic came to dominate the NBA, would you stop for even a second to question that those were the total causes of his success? If you're like most people, the answer is no. We hear about similar stories over and over again.

The problem is, these stories are subject to a deep narrative fallacy. Here's why: think again about the supposed causes of Steven's success — work ethic, great parents, strong coaching, a formative life event. How many young men in the United States alone have the exact same background and yet failed to achieve their dreams of NBA stardom? The question answers itself: there are probably thousands of them.

That's the problem with narrative: it lures us into believing that we can explain the past through cause-and-effect when we hear a story that supports our prior beliefs. To take the case of our fictitious basketball player, we have been conditioned to believe that hard work, pushy parents, and coaches, and natural gifts lead to fame and success.

To be clear, many of these factors are contributive in important ways. There aren't many short, slow guys with no work ethic and bad hand-eye coordination playing in the NBA. And passion goes a long way towards deserved success. But if it's true that there are a thousand times as many similarly qualified men who do not end up playing professional basketball, then our diagnosis must be massively incomplete. There is no other sensible explanation.

What might we be missing? The list is endless, but some combination of luck, opportunism, and timing must have played into Steven's and any other NBA player's success. It is very difficult to understand cause-and-effect chains, and this is a simple example compared to a complex case like a war or an economic crisis, which would have had multiple causes working in a variety of directions and enough red herrings to make a proper analysis difficult.

When it comes to understanding success in basketball, the problem might seem benign. (Although if you're an NBA executive, maybe not so benign.) But the rest of us deal with it in a practical way all the time. Taleb points out in his book that you could prove how narratives influence our decision making by giving a friend a great detective novel and

then, before they got to the final reveal, asking them to give the odds of each individual suspect being the culprit. It's almost certain that unless you allowed them to write down the odds as they went along, they'd add up to more than 100% — the better the novel, the higher the number. This would be nonsense from a probability standpoint, the odds must add to 100%, but each narrative is so strong that we lose our bearings.

Of course, the more salient the given reasons, the more likely we are to attribute them as causes. By salient, we mean evidence which is mentally vivid and seemingly relevant to the situation — as in the case of the young basketball prodigy losing his father, a common, Disney-made plot point. We cling to these highly available images and they cause us to make avoidable errors in judgment, as with those of us afraid to board an airplane because of the thought of a harrowing airplane crash, one that is statistically unlikely to occur in many thousands of lifetimes.

Less is More

Daniel Kahneman makes this point wonderfully in his book *Thinking: Fast, and Slow*, in a chapter titled “Linda: Less is More”.

The best-known and most controversial of our experiments involved a fictitious lady called Linda. Amos and I made up the Linda problem to provide conclusive evidence of the role of heuristics in judgment and of their incompatibility with logic. This is how we described Linda:

Linda is thirty-one years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.

[...]

In what we later described as an “increasingly desperate” attempt to eliminate the error, we introduced large groups of people to Linda and asked them this simple question:

Which alternative is more probable?

Linda is a bank teller.

Linda is a bank teller and is active in the feminist movement.

This stark version of the problem made Linda famous in some circles, and it earned us years of controversy. About 85% to 90% of undergraduates at several major universities chose the second option, contrary to logic.

This again demonstrates the power of narrative. We are so willing to take a description and mentally categorize the person it describes — in this case, feminist bank teller is much more salient than simply bank teller — that we will violate probabilities and logic in order to uphold our first conclusion. The extra description makes our mental picture much more vivid, and we conclude that the vivid picture must be the correct one. This error very likely contributes to our tendency to stereotype based on limited sample sizes; a remnant of our primate days which probably served us well in a very different environment.

The point is made again by Kahneman as he explains how the corporate performance of companies included in famous business books like *In Search of Excellence* and *Good to Great* regressed to the mean after the books were written, a now well-known phenomenon:

You are probably tempted to think of causal explanations for these observations: perhaps the successful firms became complacent, the less successful firms tried harder. But this is the wrong way to think about what happened. The average gap must shrink, because the original gap was due in good part to luck, which contributed both to the success of the top firms and to the lagging performance of the rest. We have already encountered this statistical fact of life: regression to the mean.

Stories of how businesses rise and fall strike a chord with readers by offering what the human mind needs: a simple message of triumph and failure that identifies clear causes and ignores the determinative power of luck and the inevitability of regression. These

stories induce and maintain an illusion of understanding, imparting lessons of enduring value to readers who are all too eager to believe them.

What's the harm, you say? Aren't we just making our lives a little more interesting with these stories? Very true. Stories serve many wonderful functions: teaching, motivating, inspiring. The problem though is that we too often believe our stories are predictive. We make them more real than they are. The writers of the business case-study books certainly believed that the explanations of success they put forth would be predictive of future success (the title *Built to Last* certainly implies as much), yet a good many of the companies soon became shells of their former selves – Citigroup, Hewlett Packard, Motorola, and Sony among them.

Is a good corporate culture helpful in generating success? Certainly! As it is with height and NBA success. But it's far more difficult to determine cause and effect than simply recognizing the no-brainers. Just as many tall, talented, hard-working basketball players have failed to make it, many corporate cultures which met all of the *Built to Last* structures have subsequently failed. The road to success was simply more complicated than the reductive narrative of the book would allow. Strategic choices, luck, circumstance, and the contributions of specific individual personalities may have all played a role. It's hard to say. And unless we recognize the Narrative Fallacy for what it is, a simplified and often incorrect view of past causality, we carry an arrogance about our knowledge of the past and its usefulness in predicting the future.

Reason-Respecting Tendency

A close cousin of the narrative fallacy is what Charlie Munger refers to as Reason-Respecting Tendency in *Poor Charlie's Almanack*. Here's how Charlie describes the tendency:

There is in man, particularly one in an advanced culture, a natural love of accurate cognition and a joy in its exercise. This accounts for the widespread popularity of crossword puzzles, other puzzles, and bridge and chess columns, as well as all games requiring mental skill.

This tendency has an obvious implication. It makes man especially prone to learn well when a would-be teacher gives correct reasons for what is being taught, instead of simply laying out the desired belief ex-cathedra with no reasons given. Few practices, therefore, are wiser than not only thinking through reasons before giving orders but also communicating these reasons to the recipient of the order.

[...]

Unfortunately, Reason-Respecting Tendency is so strong that even a person's giving of meaningless or incorrect reasons will increase compliance with his orders and requests. This has been demonstrated in psychology experiments wherein "compliance practitioners" successfully jump to the head of lines in front of copying machines by explaining their reason: "I have to make some copies." This sort of unfortunate byproduct of Reason-Respecting Tendency is a conditioned reflex, based on a widespread appreciation of the importance of reasons. And, naturally, the practice of laying out various claptrap reasons is much used by commercial and cult "compliance practitioners" to help them get what they don't deserve.

The deep structure of the mind is such that stories, reasons, and causes, things that point an arrow in the direction of *Why* are the ones that stick most deeply. Our need to look for cause-and-effect chains in anything we encounter is simply an extension of our inbuilt pattern recognition software, which can deepen and broaden as we learn new things. It has been shown, for example, that a master chess player cannot remember the pieces on a randomly assembled chessboard any better than a complete novice. But a master chess player can memorize the pieces on a board which represents an actual game in progress. If you take the pieces away, the master can replicate their positions with very high fidelity, whereas a novice cannot. The difference is that the pattern recognition software of the

chess player has been developed to a high degree through deliberate practice — they have been in a thousand game situations just like it in the past. And while most of us may not be able to memorize chess games, we all have brains that perform the same function in other contexts.

Taleb hits on the same idea in *The Black Swan*:

Consider a collection of words glued together to constitute a 500-page book. If the words are purely random, picked up from the dictionary in a totally unpredictable way, you will not be able to summarize, transfer, or reduce the dimensions of that book without losing something significant from it. You need 100,000 words to carry the exact message of a random 100,000 words with you on your next trip to Siberia. Now consider the opposite: a book filled with the repetition of the following sentence: “The chairman of [insert here your company’s name] is a lucky fellow who happened to be in the right place at the right time and claims credit for the company’s success, without making a single allowance for luck,” running ten times per page for 500 pages. The entire book can be accurately compressed, as I have just done, into 34 words (out of 100,000); you could reproduce it with total fidelity out of such a kernel.

If we combine the ideas of Reason-Respecting Tendency and the mind’s deep craving for order, the interesting truth is that the best teaching, learning, and storytelling methods — those involving reasons and narrative, on which our brain can store information in a more useful and efficient way — are also the ones that cause us to make some of the worst mistakes. Our craving for order betrays us.

What Can We Do?

The first step, clearly, is to become aware of the problem. Once we understand our brain’s craving for narrative, we begin to see narratives every day, all the time, especially as we consume news. The key question we must ask ourselves is “Of the population of X subject to the same initial conditions, how many turned out similarly to Y? What hard-to-measure causes might have played a role?” This is what we did when we unraveled Steven’s narrative above. How many kids just like him, with the same stated conditions — tall, skilled, good parents, good coaches, etc. — achieved the same result? We don’t have to run an empirical test to understand that our narrative sense is providing some misleading cause-and-effect. Common sense tells us there are likely to be many more failures than successes in that pool, leading us to understand that there must have been other unrealized factors at play; luck being a crucial one. Some identified factors were necessary but not sufficient — height, talent, and coaching among them — and some factors might have been negligible or even negative. (Would it have helped or hurt Steven’s NBA chances if he had not lost his father? Impossible to say.)

Modern scientific thought is built on just this sort of edifice to solve the cause-and-effect problem. A thousand years ago, much of what we thought we knew was based on naïve backward-looking causality. (Steve put leeches on his skin and then survived the plague = leeches cure the plague.) Only when we learned to take the concept of [leeches = cure for plague] and call it a hypothesis did we begin to understand the physical world. Only by downgrading our naïve assumptions to the status of a hypothesis, which needs to be tested with rigorous experiment – give 100 plague victims leeches and let 100 of them go leech-less and tally the results – did we find a method to parse actual cause and effect. And it is just as relevant to ask ourselves the inverse of the question posed above: “Of the population not subject to X, how many still ended up with the results of Y?” This is where we ask: which basketball players had intact families, easy childhoods, and, yet ended up in the NBA anyway? Which corporations lacked the traits described in Good to Great but achieved Greatness anyway? When we are willing to ask both types of questions and try our best to answer them, we can start to see which elements are simply part of the story rather than causal contributors.

A second way we can circumvent narrative is to simply avoid or reinterpret sources of information most subject to the bias. Turn the TV news off. Stop reading so many newspapers. Be skeptical of biographies, memoirs, and personal histories. Be careful of writers who are incredibly talented at painting a narrative, but claim to be writing facts. (I love Malcolm Gladwell's books, but he would be an excellent example here.) We learned above that narrative is so powerful it can overcome basic logic, so we must be rigorous to some extent about what kinds of information we allow to pass through our filters. Strong narrative flow is exactly why we enjoy a fictional story, but when we enter the non-fiction world of understanding and decision making, the power of narrative is not always on our side. We want to use narrative to our advantage — to teach ourselves or others useful concepts — but be wary of where it can mislead.

One way to assess how narrative affects your decision-making is to start keeping a journal of your decisions or predictions in any arena that you consider important. It's important to note the why behind your prediction or decision. If you're going to invest in your cousin's new social media startup — sure to succeed — explain to yourself exactly why you think it will work. Be detailed. Whether the venture succeeds or fails, you will now have a forward-looking document to refer to later, so that when you have the benefit of hindsight, you can evaluate your original assumptions instead of finding convenient reasons to justify the success or failure. The more you're able to do this exercise, the more you'll come to understand how complicated cause-and-effect factors are when we look ahead rather than behind.

Munger also gives us a few prescriptions in *Poor Charlie's Almanack* after describing the Availability Bias, another kissing cousin of the Narrative Fallacy and the Reason-Respecting Tendency. We are wise to take heed of them as we approach our fight with narrative:

The main antidote to miscues from the Availability-Misweighing Tendency often involves procedures, including use of checklists, which are almost always helpful.

Another antidote is to behave somewhat like Darwin did when he emphasized disconfirming evidence. What should be done is to especially emphasize factors that don't produce reams of easily available numbers, instead of drifting mostly or entirely into considering factors that do produce such numbers. Still another antidote is to find and hire some skeptical, articulate people with far-reaching minds to act as advocates for notions that are opposite to the incumbent notions. [Ed: Or simply ask a smart friend to do the same.]

One consequence of this tendency is that extra-vivid evidence, being so memorable and thus more available in cognition, should often consciously be under weighed while less vivid evidence should be overweighed.

Munger's prescriptions are almost certainly as applicable to solving the narrative problem as the close-related Availability problem, especially the issue we discussed earlier of vivid evidence.

Lastly, the final prescription comes from Taleb himself; the progenitor of the idea of our problem with narrative: when searching for real truth, favor experimentation over storytelling (data over anecdote), favor experience over history (which can be cherry-picked), and favor clinical knowledge over grand theories. Figure out what you know and what's a guess, and become humble about your understanding of the past.

This recognition and respect of the power of our minds to invent and love stories can help us reduce our misunderstanding of the world.

74. How (Supposedly) Rational People Make Decisions

There are four principles that Gregory Mankiw outlines in his multi-disciplinary economics textbook Principles of Economics.

I got the idea for reading an Economics textbook from Charlie Munger, the billionaire business partner of Warren Buffett. He said:

Economics was always more multidisciplinary than the rest of soft science. It just reached out and grabbed things as it needed to. And that tendency to just grab whatever you need from the rest of knowledge if you're an economist has reached a fairly high point in Mankiw's new textbook Principles of Economics. I checked out that textbook. I must have been one of the few businessmen in America that bought it immediately when it came out because it had gotten such a big advance. I wanted to figure out what the guy was doing where he could get an advance that great. So this is how I happened to riffle through Mankiw's freshman textbook. And there I found laid out as principles of economics: opportunity cost is a superpower, to be used by all people who have any hope of getting the right answer. Also, incentives are superpowers.

So we know that we can add Opportunity cost and incentives to our list of Mental Models. Let's dig in.

Principle 1: People Face Trade-offs

You have likely heard the old saying, "There is no such thing as a free lunch." There is much to this old adage and it's one we often forget when making decisions. To get more of something we like we almost always have to give up something else we like. A good heuristic in life is that if someone offers you something for nothing, turn it down.

Making decisions requires trading off one goal against another.

Consider a student who must decide how to allocate her most valuable resource—her time. She can spend all of her time studying economics, spend all of it studying psychology, or divide it between the two fields. For every hour she studies one subject, she gives up an hour she could have used studying the other. And for every hour she spends studying, she gives up an hour that she could have spent napping, bike riding, watching TV, or working at her part-time job for some extra spending money.

Or consider parents deciding how to spend their family income. They can buy food, clothing, or a family vacation. Or they can save some of the family income for retirement or for children's college education. When they choose to spend an extra dollar on one of these goods, they have one less dollar to spend on some other good.

These are rather simple examples but Mankiw offers some more complicated ones.

Consider the trade-off that society faces between efficiency and equality.

Efficiency means that society is getting the maximum benefits from its scarce resources.

Equality means that those benefits are distributed uniformly among society's members. In other words, efficiency refers to the size of the economic pie, and equality refers to how the pie is divided into individual slices.

When government policies are designed, these two goals often conflict. Consider, for instance, policies aimed at equalizing the distribution of economic well-being. Some of these policies, such as the welfare system or unemployment insurance, try to help the members of society who are most in need. Others, such as the individual income tax, ask the financially successful to contribute more than others to support the government. Though they achieve greater equality, these policies reduce efficiency. When the government redistributes income from the rich to the poor, it reduces the reward for working hard; as a result, people work less and produce fewer goods and services. In other words, when the government tries to cut the economic pie into more equal slices, the pie gets smaller.

Principle 2: The Cost of Something Is What You Give Up to Get It

Because of trade-offs, people face decisions between the costs and benefits of one course of action and the cost and benefits of another course. But costs are not as obvious as they might first appear — we need to apply some second-order thinking:

Consider the decision to go to college. The main benefits are intellectual enrichment and a lifetime of better job opportunities. But what are the costs? To answer this question, you might be tempted to add up the money you spend on tuition, books, room, and board. Yet this total does not truly represent what you give up to spend a year in college.

There are two problems with this calculation. First, it includes some things that are not really costs of going to college. Even if you quit school, you need a place to sleep and food to eat. Room and board are costs of going to college only to the extent that they are more expensive at college than elsewhere. Second, this calculation ignores the largest cost of going to college—your time. When you spend a year listening to lectures, reading textbooks, and writing papers, you cannot spend that time working at a job. For most students, the earnings they give up to attend school are the single largest cost of their education.

The opportunity cost of an item is what you give up to get that item. When making any decision, decision makers should be aware of the opportunity costs that accompany each possible action. In fact, they usually are. College athletes who can earn millions if they drop out of school and play professional sports are well aware that the opportunity cost of their attending college is very high. It is not surprising that they often decide that the benefit of a college education is not worth the cost.

Principle 3: Rational People Think at the Margin

For the sake of simplicity economists normally assume that people are rational. While this causes many problems, there is an undercurrent of truth to the fact that people systematically and purposefully “do the best they can to achieve their objectives, given opportunities.” There are two parts to rationality. The first is that your understanding of the world is correct. Second you maximize the use of your resources toward your goals.

Rational people know that decisions in life are rarely black and white but usually involve shades of gray. At dinnertime, the question you face is not “Should I fast or eat like a pig?” More likely, you will be asking yourself “Should I take that extra spoonful of mashed potatoes?” When exams roll around, your decision is not between blowing them off and studying twenty-four hours a day but whether to spend an extra hour reviewing your notes instead of watching TV. Economists use the term marginal change to describe a small incremental adjustment to an existing plan of action. Keep in mind that margin means “edge,” so marginal changes are adjustments around the edges of what you are doing. Rational people often make decisions by comparing marginal benefits and marginal costs. Thinking at the margin works for business decisions.

Consider an airline deciding how much to charge passengers who fly standby. Suppose that flying a 200-seat plane across the United States costs the airline \$100,000. In this case, the average cost of each seat is $\$100,000/200$, which is \$500. One might be tempted to conclude that the airline should never sell a ticket for less than \$500. But a rational airline can increase its profits by thinking at the margin. Imagine that a plane is about to take off with 10 empty seats and a standby passenger waiting at the gate is willing to pay \$300 for a seat. Should the airline sell the ticket? Of course, it should. If the plane has empty seats, the cost of adding one more passenger is tiny. The average cost of flying a passenger is \$500, but the marginal cost is merely the cost of the bag of peanuts and can of soda that the extra passenger will consume. As long as the standby passenger pays more than the marginal cost, selling the ticket is profitable.

This also helps answer the question of why diamonds are so expensive and water is so cheap.

Humans need water to survive, while diamonds are unnecessary; but for some reason, people are willing to pay much more for a diamond than for a cup of water. The reason is

that a person's willingness to pay for a good is based on the marginal benefit that an extra unit of the good would yield. The marginal benefit, in turn, depends on how many units a person already has. Water is essential, but the marginal benefit of an extra cup is small because water is plentiful. By contrast, no one needs diamonds to survive, but because diamonds are so rare, people consider the marginal benefit of an extra diamond to be large.

A rational decision maker takes an action if and only if the marginal benefit of the action exceeds the marginal cost.

Principle 4: People Respond to Incentives

Incentives induce people to act. If you use a rational approach to decision making that involves trade offs and comparing costs and benefits, you respond to incentives. Charlie Munger once said: "Never, ever, think about something else when you should be thinking about the power of incentives."

Incentives are crucial to analyzing how markets work. For example, when the price of an apple rises, people decide to eat fewer apples. At the same time, apple orchards decide to hire more workers and harvest more apples. In other words, a higher price in a market provides an incentive for buyers to consume less and an incentive for sellers to produce more. As we will see, the influence of prices on the behavior of consumers and producers is crucial for how a market economy allocates scarce resources.

Public policymakers should never forget about incentives: Many policies change the costs or benefits that people face and, as a result, alter their behavior. A tax on gasoline, for instance, encourages people to drive smaller, more fuel-efficient cars. That is one reason people drive smaller cars in Europe, where gasoline taxes are high, than in the United States, where gasoline taxes are low. A higher gasoline tax also encourages people to carpool, take public transportation, and live closer to where they work. If the tax were larger, more people would be driving hybrid cars, and if it were large enough, they would switch to electric cars.

75. A Few Useful Mental Tools from Richard Feynman

We've covered the brilliant physicist Richard Feynman (1918-1988) many times here before. He was a genius. A true genius. But there have been many geniuses — physics has been fortunate to attract some of them — and few of them are as well known as Feynman. Why is Feynman so well known? It's likely because he had tremendous range *outside* of pure science, and although he won a Nobel Prize for his work in quantum mechanics, he's probably best known for other things, primarily his wonderful ability to explain and teach.

This ability was on display in a series of non-technical lectures in 1963, memorialized in a short book called The Meaning of it All: Thoughts of a Citizen Scientist. The lectures are a wonderful example of how well Feynman's brain worked *outside* of physics, talking through basic reasoning and some of the problems of his day.

Particularly useful are a series of "tricks of the trade" he gives in a section called *This Unscientific Age*. These tricks show Feynman taking the method of thought he learned in pure science and applying it to the more mundane topics most of us have to deal with every day. They're wonderfully instructive. Let's check them out.

Before we start, it's worth noting that Feynman takes pains to mention that not everything needs to be considered with scientific accuracy. So don't waste your time unless it's a scientific matter. So let's start with a deep breath:

Now, that there are unscientific things is not my grief. That's a nice word. I mean, that is not what I am worrying about, that there are unscientific things. That something is unscientific is not bad; there is nothing the matter with it. It is just unscientific. And scientific is limited, of course, to those things that we can tell about by trial and error. For example, there is the absurdity of the young these days chanting things about purple people eaters and hound dogs, something that we cannot criticize at all if we belong to the old flat foot floogie and a floy floy or the music goes down and around. Sons of mothers who sang about "come, Josephine, in my flying machine," which sounds just about as modern as "I'd like to get you on a slow boat to China." So in life, in gaiety, in emotion, in human pleasures and pursuits, and in literature and so on, there is no need to be scientific, there is no reason to be scientific. One must relax and enjoy life. That is not the criticism. That is not the point.

As we enter the realm of "knowable" things in a scientific sense, the first trick has to do with deciding whether someone truly knows their stuff or is mimicking:

The first one has to do with whether a man knows what he is talking about, whether what he says has some basis or not. And my trick that I use is very easy. If you ask him intelligent questions—that is, penetrating, interested, honest, frank, direct questions on the subject, and no trick questions—then he quickly gets stuck. It is like a child asking naive questions. If you ask naive but relevant questions, then almost immediately the person doesn't know the answer, if he is an honest man. It is important to appreciate that.

And I think that I can illustrate one unscientific aspect of the world which would be probably very much better if it were more scientific. It has to do with politics. Suppose two politicians are running for president, and one goes through the farm section and is asked, "What are you going to do about the farm question?" And he knows right away— bang, bang, bang.

Now he goes to the next campaigner who comes through. "What are you going to do about the farm problem?" "Well, I don't know. I used to be a general, and I don't know anything about farming. But it seems to me it must be a very difficult problem, because for twelve, fifteen, twenty years people have been struggling with it, and people say that they know how to solve the farm problem. And it must be a hard problem. So the way that I intend to solve the farm problem is to gather around me a lot of people who know something about it, to look at all the experience that we have had with this problem before, to take a certain

amount of time at it, and then to come to some conclusion in a reasonable way about it. Now, I can't tell you ahead of time what conclusion, but I can give you some of the principles I'll try to use—not to make things difficult for individual farmers, if there are any special problems we will have to have some way to take care of them,” etc., etc., etc. That's a wonderfully useful way to figure out whether someone is Max Planck or the chauffeur.

The second trick regards how to deal with uncertainty:

People say to me, “Well, how can you teach your children what is right and wrong if you don't know?” Because I'm pretty sure of what's right and wrong. I'm not absolutely sure; some experiences may change my mind. But I know what I would expect to teach them. But, of course, a child won't learn what you teach him.

I would like to mention a somewhat technical idea, but it's the way, you see, we have to understand how to handle uncertainty. How does something move from being almost certainly false to being almost certainly true? How does experience change? How do you handle the changes of your certainty with experience? And it's rather complicated, technically, but I'll give a rather simple, idealized example.

You have, we suppose, two theories about the way something is going to happen, which I will call “Theory A” and “Theory B.” Now it gets complicated. Theory A and Theory B. Before you make any observations, for some reason or other, that is, your past experiences and other observations and intuition and so on, suppose that you are very much more certain of Theory A than of Theory B—much more sure. But suppose that the thing that you are going to observe is a test. According to Theory A, nothing should happen. According to Theory B, it should turn blue. Well, you make the observation, and it turns sort of a greenish. Then you look at Theory A, and you say, “It's very unlikely,” and you turn to Theory B, and you say, “Well, it should have turned sort of blue, but it wasn't impossible that it should turn sort of greenish color.” So the result of this observation, then, is that Theory A is getting weaker, and Theory B is getting stronger. And if you continue to make more tests, then the odds on Theory B increase. Incidentally, it is not right to simply repeat the same test over and over and over and over, no matter how many times you look and it still looks greenish, you haven't made up your mind yet. But if you find a whole lot of other things that distinguish Theory A from Theory B that are different, then by accumulating a large number of these, the odds on Theory B increase.

Feynman is talking about Grey Thinking here, the ability to put things on a gradient from “probably true” to “probably false” and how we deal with that uncertainty. He isn't proposing a method of figuring out absolute, doctrinaire truth.

Another term for what he's proposing is Bayesian updating — starting with a priori odds, based on earlier understanding, and “updating” the odds of something based on what you learn thereafter. An extremely useful tool.

Feynman's third trick is the realization that as we investigate whether something is true or not, new evidence and new methods of experimentation should show the effect of getting *stronger and stronger, not weaker*. He uses an excellent example here by analyzing mental telepathy:

I give an example. A professor, I think somewhere in Virginia, has done a lot of experiments for a number of years on the subject of mental telepathy, the same kind of stuff as mind reading. In his early experiments the game was to have a set of cards with various designs on them (you probably know all this, because they sold the cards and people used to play this game), and you would guess whether it's a circle or a triangle and so on while someone else was thinking about it. You would sit and not see the card, and he would see the card and think about the card and you'd guess what it was. And in the beginning of these researches, he found very remarkable effects. He found people who would guess ten to fifteen of the cards correctly, when it should be on the average only

five. More even than that. There were some who would come very close to a hundred percent in going through all the cards. Excellent mind readers.

A number of people pointed out a set of criticisms. One thing, for example, is that he didn't count all the cases that didn't work. And he just took the few that did, and then you can't do statistics anymore. And then there were a large number of apparent clues by which signals inadvertently, or advertently, were being transmitted from one to the other.

Various criticisms of the techniques and the statistical methods were made by people. The technique was therefore improved. The result was that, although five cards should be the average, it averaged about six and a half cards over a large number of tests. Never did he get anything like ten or fifteen or twenty-five cards. Therefore, the phenomenon is that the first experiments are wrong. The second experiments proved that the phenomenon observed in the first experiment was nonexistent. The fact that we have six and a half instead of five on the average now brings up a new possibility, that there is such a thing as mental telepathy, but at a much lower level. It's a different idea, because, if the thing was really there before, having improved the methods of experiment, the phenomenon would still be there. It would still be fifteen cards. Why is it down to six and a half? Because the technique improved. Now it still is that the six and a half is a little bit higher than the average of statistics, and various people criticized it more subtly and noticed a couple of other slight effects which might account for the results.

It turned out that people would get tired during the tests, according to the professor. The evidence showed that they were getting a little bit lower on the average number of agreements. Well, if you take out the cases that are low, the laws of statistics don't work, and the average is a little higher than the five, and so on. So if the man was tired, the last two or three were thrown away. Things of this nature were improved still further. The results were that mental telepathy still exists, but this time at 5.1 on the average, and therefore all the experiments which indicated 6.5 were false. Now what about the five? . . . Well, we can go on forever, but the point is that there are always errors in experiments that are subtle and unknown. But the reason that I do not believe that the researchers in mental telepathy have led to a demonstration of its existence is that as the techniques were improved, the phenomenon got weaker. In short, the later experiments in every case disproved all the results of the former experiments. If remembered that way, then you can appreciate the situation.

This echoes Feynman's dictum about not fooling oneself: We must refine our process for probing and experimenting if we're to get at real truth, always watching out for little troubles. Otherwise, we torture the world so that results fit our expectations. If we carefully refine and re-test and the effect gets weaker all the time, it's likely to not be true, or at least not to the magnitude originally hoped for.

The fourth trick is to ask *the right question*, which is not "Could this be the case?" but "Is this *actually* the case?" Many get so caught up with the former that they forget to ask the latter:

That brings me to the fourth kind of attitude toward ideas, and that is that the problem is not what is possible. That's not the problem. The problem is what is probable, what is happening. It does no good to demonstrate again and again that you can't disprove that this could be a flying saucer. We have to guess ahead of time whether we have to worry about the Martian invasion. We have to make a judgment about whether it is a flying saucer, whether it's reasonable, whether it's likely. And we do that on the basis of a lot more experience than whether it's just possible, because the number of things that are possible is not fully appreciated by the average individual. And it is also not clear, then, to them how many things that are possible must not be happening. That it's impossible that everything that is possible is happening. And there is too much variety, so most likely anything that you think of that is possible isn't true. In fact that's a general principle in physics theories: no matter what a guy thinks of, it's almost always false. So there have

been five or ten theories that have been right in the history of physics, and those are the ones we want. But that doesn't mean that everything's false. We'll find out.

The fifth trick is a very, very common one, even 50 years after Feynman pointed it out. You cannot judge the probability of something happening *after it's already happened*. That's cherry-picking. You have to run the experiment *forward* for it to mean anything:

I now turn to another kind of principle or idea, and that is that there is no sense in calculating the probability or the chance that something happens after it happens. A lot of scientists don't even appreciate this. In fact, the first time I got into an argument over this was when I was a graduate student at Princeton, and there was a guy in the psychology department who was running rat races. I mean, he has a T-shaped thing, and the rats go, and they go to the right, and the left, and so on. And it's a general principle of psychologists that in these tests they arrange so that the odds that the things that happen happen by chance is small, in fact, less than one in twenty. That means that one in twenty of their laws is probably wrong. But the statistical ways of calculating the odds, like coin flipping if the rats were to go randomly right and left, are easy to work out.

This man had designed an experiment which would show something which I do not remember, if the rats always went to the right, let's say. I can't remember exactly. He had to do a great number of tests, because, of course, they could go to the right accidentally, so to get it down to one in twenty by odds, he had to do a number of them. And it's hard to do, and he did his number. Then he found that it didn't work. They went to the right, and they went to the left, and so on. And then he noticed, most remarkably, that they alternated, first right, then left, then right, then left. And then he ran to me, and he said, "Calculate the probability for me that they should alternate, so that I can see if it is less than one in twenty." I said, "It probably is less than one in twenty, but it doesn't count." He said, "Why?" I said, "Because it doesn't make any sense to calculate after the event. You see, you found the peculiarity, and so you selected the peculiar case."

For example, I had the most remarkable experience this evening. While coming in here, I saw license plate ANZ 912. Calculate for me, please, the odds that of all the license plates in the state of Washington I should happen to see ANZ 912. Well, it's a ridiculous thing. And, in the same way, what he must do is this: The fact that the rat directions alternate suggests the possibility that rats alternate. If he wants to test this hypothesis, one in twenty, he cannot do it from the same data that gave him the clue. He must do another experiment all over again and then see if they alternate. He did, and it didn't work.

The sixth trick is one that's familiar to almost all of us, yet almost all of us forget about every day: *The plural of anecdote is not data*. We must use proper statistical sampling to know whether or not we know what we're talking about:

The next kind of technique that's involved is statistical sampling. I referred to that idea when I said they tried to arrange things so that they had one in twenty odds. The whole subject of statistical sampling is somewhat mathematical, and I won't go into the details. The general idea is kind of obvious. If you want to know how many people are taller than six feet tall, then you just pick people out at random, and you see that maybe forty of them are more than six feet so you guess that maybe everybody is. Sounds stupid.

Well, it is and it isn't. If you pick the hundred out by seeing which ones come through a low door, you're going to get it wrong. If you pick the hundred out by looking at your friends you'll get it wrong because they're all in one place in the country. But if you pick out a way that as far as anybody can figure out has no connection with their height at all, then if you find forty out of a hundred, then, in a hundred million there will be more or less forty million. How much more or how much less can be worked out quite accurately. In fact, it turns out that to be more or less correct to 1 percent, you have to have 10,000 samples. People don't realize how difficult it is to get the accuracy high. For only 1 or 2 percent you need 10,000 tries.

The last trick is to realize that many errors people make simply come from *lack of information*. They don't even know they're missing the tools they need. This can be a very tough one to guard against — it's hard to know when you're missing information that would change your mind — but Feynman gives the simple case of astrology to prove the point: *Now, looking at the troubles that we have with all the unscientific and peculiar things in the world, there are a number of them which cannot be associated with difficulties in how to think, I think, but are just due to some lack of information. In particular, there are believers in astrology, of which, no doubt, there are a number here. Astrologists say that there are days when it's better to go to the dentist than other days. There are days when it's better to fly in an airplane, for you, if you are born on such a day and such and such an hour. And it's all calculated by very careful rules in terms of the position of the stars. If it were true it would be very interesting. Insurance people would be very interested to change the insurance rates on people if they follow the astrological rules, because they have a better chance when they are in the airplane. Tests to determine whether people who go on the day that they are not supposed to go are worse off or not have never been made by the astrologers. The question of whether it's a good day for business or a bad day for business has never been established. Now what of it? Maybe it's still true, yes. On the other hand, there's an awful lot of information that indicates that it isn't true. Because we have a lot of knowledge about how things work, what people are, what the world is, what those stars are, what the planets are that you are looking at, what makes them go around more or less, where they're going to be in the next 2000 years is completely known. They don't have to look up to find out where it is. And furthermore, if you look very carefully at the different astrologers they don't agree with each other, so what are you going to do? Disbelieve it. There's no evidence at all for it. It's pure nonsense. The only way you can believe it is to have a general lack of information about the stars and the world and what the rest of the things look like. If such a phenomenon existed it would be most remarkable, in the face of all the other phenomena that exist, and unless someone can demonstrate it to you with a real experiment, with a real test, took people who believe and people who didn't believe and made a test, and so on, then there's no point in listening to them.*

76. Daniel Dennett's Most Useful Critical Thinking Tools

We recently discussed some wonderful mental tools from the great Richard Feynman.

Let's get some more good ones from another giant, Daniel Dennett.

Dennett is one of the great thinkers in the world; he's been at the forefront of cognitive science and evolutionary science for over 50 years, trying to figure out how the mind works and why we believe the things we believe. He's written a number of amazing books on evolution, religion, consciousness, and free will. (He's also subject to some extreme criticism due to his atheist bent, as with Dawkins.)

His most recent book is the wise and insightful Intuition Pumps and Other Tools for Critical Thinking, where he lays out a series of short essays (some very short — less than a page) with mental shortcuts, tools, analogies, and metaphors for thinking about a variety of topics, mostly those topics he is best known for.

Some people don't like the disconnected nature of the book, but that's precisely its usefulness: Like what we do here at Farnam Street, Dennett is simply trying to add tools to your toolkit. You are free to, in the words of Bruce Lee, "*Absorb what is useful, discard what is useless and add what is specifically your own.*"

The book opens with 12 of Dennett's best "tools for critical thinking" — a bag of mental tricks to improve your ability to engage critically and rationally with the world.

Let's go through a few of the best ones. You'll be familiar with some and unfamiliar with others, agree with some and not with others. But if you adopt Bruce Lee's advice, you should come away with something new and useful.

Making mistakes

Mistakes are not just opportunities for learning; they are, in an important sense, the only opportunity for learning or making something truly new. Before there can be learning, there must be learners. There are only two non-miraculous ways for learners to come into existence: they must either evolve or be designed and built by learners that evolved. Biological evolution proceeds by a grand, inexorable process of trial and error—and without the errors the trials wouldn't accomplish anything. As Gore Vidal once said, "It is not enough to succeed. Others must fail."

[...]

The chief trick to making good mistakes is not to hide them—especially not from yourself. Instead of turning away in denial when you make a mistake, you should become a connoisseur of your own mistakes, turning them over in your mind as if they were works of art, which in a way they are. The fundamental reaction to any mistake ought to be this: "Well, I won't do that again!"

Reductio ad absurdum

The crowbar of rational inquiry, the great lever that enforces consistency, is reductio ad absurdum—literally, reduction (of the argument) to absurdity. You take the assertion or conjecture at issue and see if you can pry any contradictions (or just preposterous implications) out of it. If you can, that proposition has to be discarded or sent back to the shop for retooling. We do this all the time without bothering to display the underlying logic: "If that's a bear, then bears have antlers!" or "He won't get here in time for supper unless he can fly like Superman."

Rapoport's Rules

Just how charitable are you supposed to be when criticizing the views of an opponent? [...] The best antidote I know for [the] tendency to caricature one's opponent is a list of rules promulgated by the social psychologist and game theorist Anatol Rapoport (creator of the winning Tit-for-Tat strategy in Robert Axelrod's legendary prisoner's dilemma tournament). How to compose a successful critical commentary:

1. You should attempt to re-express your target's position so clearly, vividly, and fairly that your target says, "Thanks, I wish I'd thought of putting it that way."
2. You should list any points of agreement (especially if they are not matters of general or widespread agreement).
3. You should mention anything that you have learned from your target.
4. Only then are you permitted to say so much as a word of rebuttal or criticism.

Sturgeon's Law

The science-fiction writer Ted Sturgeon, speaking at the World Science Fiction Convention in Philadelphia in September 1953, said,

When people talk about the mystery novel, they mentioned The Maltese Falcon and The Big Sleep. When they talk about the western, they say there's The Way West and Shane. But when they talk about science fiction, they call it "that Buck Rogers stuff," and they say "ninety percent of science fiction is crud." Well, they're right. Ninety percent of science fiction is crud. But then ninety percent of everything is crud, and it's the ten percent that isn't crud that's important, and the ten percent of science fiction that isn't crud is as good as or better than anything being written anywhere.

This advice is often ignored by ideologues intent on destroying the reputation of analytic philosophy, evolutionary psychology, sociology, cultural anthropology, macroeconomics, plastic surgery, improvisational theater, television sitcoms, philosophical theology, massage therapy, you name it. Let's stipulate at the outset that there is a great deal of deplorable, stupid, second-rate stuff out there, of all sorts.

Occam's Razor

*Attributed to William of Ockham (or Occam), the fourteenth century logician and philosopher, this thinking tool is actually a much older rule of thumb. A Latin name for it is *lex parsimoniae*, the law of parsimony. It is usually put into English as the maxim "Do not multiply entities beyond necessary." The idea is straightforward: Don't concoct a complicated, extravagant theory if you've got a simpler one (containing fewer ingredients, fewer entities) that handles the phenomenon just as well. If exposure to extremely cold air can account for all the symptoms of frostbite, don't postulate unobserved "snow germs" or "arctic microbes." Kepler's laws explain the orbit of the planets; we have no need to hypothesize pilots guiding the planets from control panels hidden under the surface.*

Occam's Broom

The molecular biologist Sidney Brenner recently invented a delicious play on Occam's Razor, introducing the new term Occam's Broom, to describe the process in which inconvenient facts are whisked under the rug by intellectually dishonest champions of one theory or another. This is our first boom crutch, an anti-thinking tool, and you should keep your eyes peeled for it. The practice is particularly insidious when used by propagandists who direct their efforts at the lay public, because like Sherlock Holmes' famous clue about the dog that didn't bark in the night, the absence of a fact that has been swept off the scene by Occam's Broom is unnoticeable except by experts.

Jootsing

...It is even harder to achieve what Doug Hofstadter calls jooisting, which stands for "jumping out of the system." This is an important tactic not just in science and philosophy, but also in the arts. Creativity, that ardently sought but only rarely found virtue, often is a heretofore unimagined violation of the rules of the system from which it springs. It might be the system of classical harmony in music, the rules for meter and rhyme in sonnets (or limericks, even), or the canons of good taste or good form in some genre of art. Or it might be the assumptions and principles of some theory or research program. Being creative is not just a matter of casting about for something novel—anybody can do that, since novelty can be found in any random juxtaposition of stuff—but of making the novelty jump out of some system, a system that has become somewhat established, for good reasons.

When an artistic tradition reaches the point where literally “anything goes,” those who want to be creative have a problem: there are no fixed rules to rebel against, no complacent expectations to shatter, nothing to subvert, no background against which to create something that is both surprising and yet meaningful. It helps to know the tradition if you want to subvert it. That’s why so few dabblers or novices succeed in coming up with anything truly creative.

Rathering (Anti-thinking tool)

Rathering is a way of sliding you swiftly and gently past a false dichotomy. The general form of a rathering is “It is not the case that blahblahblah, as orthodoxy would have you believe; it is rather that suchandsuchandsuch—which is radically different.” Some ratherings are just fine; you really must choose between the two alternatives on offer; in these cases, you are not being offered a false, but rather a genuine, inescapable dichotomy. But some ratherings are little more than sleight of hand, due to the fact that the word “rather” implies—without argument—that there is an important incompatibility between the claims flanking it.

The “Surely” Operator

When you’re reading or skimming argumentative essays, especially by philosophers, here is a quick trick that may save you much time and effort, especially in this age of simple searching by computer: look for “surely” in the document, and check each occurrence. Not always, not even most of the time, but often the word “surely” is as good as a blinking light in locating a weak point in the argument.... Why? Because it marks the very edge of what the author is actually sure about and hopes readers will also be sure about. (If the author were really sure all the readers would agree, it wouldn’t be worth mentioning.)

The Deepity

A “deepity” is a proposition that seems both important and true—and profound—but that achieves this effect by being ambiguous. On one reading it is manifestly false, but it would be earth-shaking if it were true; on the other reading it is true but trivial. The unwary listener picks up on the glimmer of truth from the second reading, and the devastating importance from the first reading, and thinks, Wow! That’s a deepity.

Here is an example. (Better sit down: this is heavy stuff.)

Love is just a word.

[...]

*Richard Dawkins recently alerted me to a fine deepity by Rowan Williams, the Archbishop of Canterbury, who described his faith as a
silent waiting on the truth, pure sitting and breathing in the presence of a question mark.*

77. Mental Models: Getting the World to Do the Work for You

People are working harder and harder to clean up otherwise avoidable messes they created by making poor initial decisions. There are many reasons we're making poor decisions and failing to learn from them.

Under the heading, Sources of Stupidity in an article entitled Smart Decisions we wrote about some of the factors that contribute to suboptimal decisions.

1. *We're (sometimes) stupid. Of course, I like to think that I'm rational and capable of interpreting all of the information in a non-biased way. Only I'm not. At least not always. There are situations that increase the odds of irrationality, for instance when we're tired, overly focused on a goal, rushing, distracted or interrupted, operating in a group, or are under the direction of an expert*².

2. *We have the wrong information. In this case, we're operating with the wrong facts or our assumptions are incorrect.*

3. *We use the wrong model. We use models to make decisions. The quality of those models often determines the quality of our thinking. There are a variety of reasons that we use false, incomplete, or incorrect models. For instance, we're prone to using less useful models when we are a novice or we operate in a domain outside of our area of expertise. The odds of the wrong model also increase as the pace of environmental change increases.*

4. *We fail to learn. We all know the person that has 20 years of experience but it's really the same year over and over. Well, that person is sometimes us. If we don't understand how we learn, we're likely to make the same mistakes over and over.*

5. *Doing what's easy over what's right. You can think of this as looking good over doing good. In this case, we make choices based on optics, explainability, politics, etc. Mostly this comes from not having a strong sense of self and seeking external validation or avoiding punishment.*

Simple But Not Easy

One of the metamodels that traverse all five of these sources of stupidity is understanding the world.

If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.

Understanding The World

How can we best understand the world as it is?

Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer.

If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models.

Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your

perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise?

Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right?

We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

2nd Order Thinking

One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question:

"And then what?"

A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it.

We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal.

For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place.

Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold.

Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins.

We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality.

Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and

becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise.

Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

78. Mental Model: Bias from Envy and Jealousy

*"It is not greed that drives the world,
but envy."*

— Warren Buffett

It is a fact of life that we are not equal. Not biologically, not culturally.

Some inequities come from flawed governing systems, but most are simply due to luck — the vagaries of life. Some of us are born healthier, prettier and smarter than others, some will encounter opportunities to become extremely wealthy, and some will simply be born at the right place and time. Just as many will be born without such good fortune.

It's difficult to imagine that these differences will not matter in our everyday interactions.

When you think of how natural the differences among us are, you should quickly come to realize the potential power and frequency that bias from envy and jealousy can have on world affairs. It's built deeply into the human condition, from birth.

The concept of jealousy is as old as modern humanity itself and has permeated our culture worldwide. We are advised not to brag too much, for it can evoke feelings of envy and jealousy in others. Christianity, Hinduism, Islam and other religions all have at least one cautionary tale about the destructive consequences of being captivated by these emotions as well as the dangers of being the one who is envied.

The stoics knew all about envy, and warned against its consequences

constantly. Seneca described a wise man as one who is *"Content with his lot, whatever it be, without wishing for what he has not ..."*

Tales of envy extend as far back as ancient times.

In one of the oldest recorded myths, the tall, slender and handsome Egyptian

God Osiris marries his beautiful sister and brings civilization and prosperity to Egypt and the world. However, Osiris also has an ugly younger brother Seth who hates him. Seth envies Osiris for his attractiveness, power and success. Seth's wife becomes so attracted to Osiris that she tricks him into sleeping with her and bears Osiris's child. Unable to deal with his envy and jealousy, Seth traps and kills Osiris.

Even though the myth is several thousand years old, the problems caused by envy and jealousy can be just as real and destructive today. To avoid these feelings and becoming a victim of them is an important reason to examine them a little closer.

The Two Types of Envy

It has been said that there are two types of envy – a good type and a bad type.

The first type is the feeling of inferiority that motivates a person to improve herself.

This bias exerts its influence by framing the success of others as a learning opportunity for ourselves. Think about watching an inspirational movie, or reading a book about an inspirational figure, someone who you feel dwarfs your own capabilities and accomplishments. Frequently, our envy leads us to imitate that hero in a quest for self-improvement.

The other type, though, is malicious envy, which motivates the envious to take good things away from others. For Aristotle, the evil of malicious envy lay in its desire to lessen the good in the world and experience joy at another's misfortune (also

called *Schadenfreude* which, mysteriously enough, has no equivalent word in English.)

To the malicious envier, ridding oneself of envy requires taking away from the other — the beautiful car or house should be stolen or damaged, the virtuous person corrupted or killed and the beautiful face of someone ruined or covered. The malicious envier believes that those things should be *his* rather than *theirs*. He, after all, deserves it more.

Lord Chesterfield once said: *"People hate those who make them feel their own inferiority."*

This can be true. While the envied need not cause the deprivation of the other, the envier may still experience anger or resentment, a sense of unfairness, which may lead to

feelings of hate. The relation between envy and hate is pretty close, if you observe the world closely.

“Envy is pain at the good fortune of others.

We envy those who are near us in time, place, age or reputation.”

— Aristotle

There are two basic determinants of the type of envy that will be experienced: *the degree of belief that one has been treated unfairly and the belief that one's disadvantage is one's own fault.*

Common sense, and data presented by Peter Salovey in his book The Psychology of Envy and Jealousy, suggest that the second determinant, one's belief in one's own shortcomings, plants the motivation for improvement.

The belief that one has been treated unfairly has the opposite effect – it results in feelings of anger and resentment. You become a negatively coiled spring.

Social Comparison

“Injustice is relatively easy to bear, it is justice that hurts.”

— Henry Louis Mencken

At the heart of envy is social comparison, which is a powerful influence in our self-concept. Think about it – much of our self-definition comes from comparison with others. We can't define ourselves as great singers, if there is no one else around who sings worse than we do. Qualities like intelligence, beauty and skills are relative and thus when we compare poorly in comparison to our peers, our self-esteem suffers. Judith Rich Harris argues that this is a core part of our personality development.

An inflamed self-esteem is a good first step towards envy. We experience envy when the quality we feel inferior about threatens our self-concept. We may not even be aware that we are lacking a particular quality, but the object of our envy heightens our awareness of our deprivation.

Think about it this way: Do you feel envy when you see a great javelin thrower at the Olympics? Probably not, because, for most of us, success at javelin throwing isn't a core part of our self-concept. But let's say you were a competitive javelin thrower — might you feel a little envy if you saw someone much better than you competing at the Olympics? Thus, envy of others is always a reflection of something we feel about *ourselves*. We're not rich enough, or smart enough, or beautiful enough; we don't have enough possessions, enough attention, enough success.

Jealousy

If there is a way to define jealousy in its most narrow scope, then it would probably be the feeling of anxious insecurity that follows the perception of threat to a relationship which provides important attention. Perceiving such a threat makes a person feel insecure about the status of the relationship and thus also about the aspects of the self that are sustained by it.

We do not become jealous when our partners die or move across the country or quit the relationship without getting into a new one. What is always true for jealousy, unlike envy, is that it involves a triangle of relationships between the self, the partner and the rival.

Therefore, when talking about jealousy it is important to realize its key characteristic — the threat of losing something to *someone else*.

There is the hypothesis that at the heart of feelings of jealousy lies our need to feel needed. This need exists because relationships define certain aspects of who we are.

We like to think of ourselves as sexually attractive, funny or otherwise worthy persons.

However, when there is no one to be funny with or no one who is attracted to us, our self-definition of *funny* or *attractive* dissipates. We need the others not only to reaffirm these aspects, but also to *create* them. Humans are deeply social creatures — how we feel about ourselves has to do with our interactions with others. There are no personality traits in a vacuum.

Jealousy is not limited to romantic relationships — jealousy exists between siblings, co-workers and even friends. Yet there is a reason why we get so caught up in romantic jealousy.

Someone stealing away our chess partner's time does not threaten our self-concept nearly as much someone stealing away our girlfriend's time. We have a biological need for a romantic other that eclipses our need for a chess partner; feelings of deprivation are intensified.

Children can also experience intense jealousy. The most important relationship for a child is that with his parents, which is why sibling rivalry can sometimes be so fierce. Naturally, as the child reaches adolescence and develops serious friendships and romantic relationships, the sibling jealousy tends to dissipate.

There are several notable commonalities and differences between *jealousy* and *envy*. With both envy and jealousy we experience loss of self-esteem stemming from social comparison. In the case of envy the loss comes from our self-appraisal, whereas in the case of jealousy it comes from the appraisal by others. Therefore, when experiencing jealousy we are often left wondering *what is it that the other person finds in our rival?* whereas in the case of envy we know exactly what we're missing.

Another common quality of both envy and jealousy is how extreme they can be in modern life. For instance, ongoing discussions about employee salaries and CEO salaries. In many workplaces this has resulted in a salary non-disclosure policy within the job contract. Still, when the compensation data is leaked, and some perceived inequality is discovered, there is often outrage.

These effects are observed in workplaces as diverse as universities, investment banks, corporates and law firms. In order to keep the air clear of envy and jealousy, numerous firms and government agencies have gone as far as opting for the same base compensation per seniority level, regardless of employee contribution. Berkshire Hathaway chooses not to disclose the compensation of most of its top people for fear of creating organization-wide envy, and CEO Warren Buffett credits his ridiculously low salary with keeping envy of his success to a minimum.

An important question remains: How should we deal with envy at a personal level?

There are three ways to overcome envy.

The first is to focus on the differences between you and the other person, rather than the similarities. Examine the situation — you are not as alike as you think you are.

The second is more difficult, but we certainly find we can do it in other contexts, as discussed above. Shape your malicious envy into a drive to improve and learn. From every person that we envy there is a virtue that we can learn from.

Thirdly, envy can be avoided (over time) with simple repetitive denial. Don't let yourself become envious of others' deserved success. Stop the feeling in its tracks, if you can. As for *undeserved* success, remind yourself that the world is not a fair place that owes us what we wish. Remind yourself that the success of others does not reflect on you and does not take away from you. Envy is a somewhat childish emotion, one that hurts us as we get older.

Jealousy is more difficult to overcome since we are not fully in control of the needs or perceptions of others. There is little we can do to make others appreciate us when they don't, but we can learn to accept that we will not always be everything for everyone. Just as with envy — jealousy can be an important trigger for increased self-awareness as well as positive change. After all, a little jealousy can be a good thing, for we may be reminded to appreciate what we have.

The sins of jealousy and envy drive huge swaths of human behavior, but if we work to understand it and see it in ourselves and others, it doesn't have to drive ours.

*“Man will do many things to get himself loved;
he will do all things to get himself envied.”*

— Mark Twain

Envy is a great cause of human suffering. Charlie Munger points out why: “Envy is a really stupid sin because it’s the only one you could never possibly have any fun at. There’s a lot of pain and no fun. Why would you want to get on that trolley?”

Why indeed.

While envy and jealousy are powerful drivers of behaviour on their own, they become more powerful when mixed with ego, greed, and fear. These emotions can weigh the mind down and dramatically diminish our ability to think with our full mental capacity. They can also hone our focus. These emotions have also motivated people to do great things.

And in case you’re wondering how you can avoid being the source of envy for others?

Aristotle had an answer: “The best way to avoid envy is to deserve the success you get.”

79. Multiplicative Systems: Understanding The Power of Multiplying by Zero

We all learned in math class that anything times zero is zero. But if you stop thinking about the idea here, you don't see all the practical applications that understanding multiplicative systems can give you in life.

Let's run through a little elementary algebra. Try to do it in your head: What's $1,506,789 \times 9,809 \times 5.56 \times 0$?

Hopefully, you didn't have to whip out the old TI-84 to solve that one. It's a zero.

This leads us to a mental model called Multiplicative Systems and understanding it can get to the heart of a lot of issues.

The Weakest Link in the Chain

Suppose you were trying to become the best basketball player in the world. You've got the following things going for you:

1. God-given talent. You're 6'9", quick, skillful, can leap out of the building, and have been the best player in a competitive city since you can remember.
2. Support. You live in a city that reveres basketball and you're raised by parents who care about your goals.
3. A proven track record. You were the player of the year in a very competitive Division 1 college conference.
4. A clear path forward. You're selected as the second overall pick in the NBA Draft by the Boston Celtics.

Sounds like you have a shot, right? As good as anyone could have, right? What would you put the odds at of this person becoming one of the better players in the world? Pretty high?

Let's add one more piece of information:

5. You've developed a cocaine habit.

What are your odds now?

This little exercise isn't an academic one, it's the sad case of Leonard "Len" Bias, a young basketball prodigy who died of a cocaine overdose after being selected to play in the NBA for the Boston Celtics in 1986. Many call Bias the best basketball player who never played professionally.

What the story of Len Bias illustrates so well is the truth that anything times zero must still be zero, no matter how large the string of numbers preceding it. In some facets of life, all of your hard work, dedication to improvement, and good fortune may still be worth nothing if there is a weak link in the chain.

Something all engineers learn very early on is that a system is no stronger than its weakest component. Take, for example, the case of a nuclear power plant. We have a very good understanding of how to make the nuclear power plant quite safe, nearly indestructible, which it must be considering the magnitude of a failure.

But in reality, what is the weakest link in the chain for most nuclear power plants? *The human beings running them.* We're part of the system! And since we've yet to perfect the human being, we have yet to perfect the nuclear power plant. How could it be otherwise?

An additive system does not work this way. In an additive system, each component adds on to one another to create the final outcome. Going back to algebra, let's say our equation was additive rather than

multiplicative: $1,506,789 \text{ plus } 9,809 \text{ plus } 5.56 \text{ plus } 0$. The answer is 1,516,603.56 — still a pretty big number!

Think of an additive system as something like a great Thanksgiving dinner. You've got a great turkey, some whipped potatoes, a mass of stuffing, and a lump of homemade cranberry sauce, and you're hanging with your family. Awesome!

Let's say the potatoes get burnt in the oven, and they're inedible. Problem? Sure, but dinner still works out just fine. Someone shows up with a pie for dessert? Great! But it won't change the dinner all that much.

The interaction of the parts makes the dinner range from good to great. Take some parts away or add new ones in, and you get a different outcome, but not a *binary*, win/lose one. The meal still happens. Additive systems and multiplicative systems react differently when components are added or taken away.

Most businesses, for example, operate in a multiplicative system. But they too often *think* they're operating in additive ones: Ever notice how some businesses will add one feature on top of another to their products but fail at basic customer service, so you leave, never to return? That's a business that thinks it's in an additive system when they really need to be resolving the big fat *zero* in the middle of the equation instead of adding more stuff.

Financial systems are, of course, multiplicative. General Motors, founded in 1908 by William Durant and C.S. Mott, came to dominate the American car market to the tune of 50% market share through a series of brilliant innovations and management practices and was for many years the dominant and most admirable corporation in America. Even today, after more than a century of competition, no American carmaker produces more automobiles than General Motors.

And yet, the original shareholders of GM ended up with a *zero* in 2008 as the company went into bankruptcy due to years of financial mismanagement. It didn't matter that they had several generations of leadership: All of that becomes naught in a multiplicative system.

On a smaller scale, take the case of a young corporate climber who feels they just can't get ahead. They seem to have all their ducks in a row: great resume, great background, great experience...the problem is that they suck at dealing with other people and treat others like stepping stones. That's a *zero* that can negate *all* of the big numbers preceding it. The rest doesn't matter.

And so we arrive at the "must be true" conclusion that understanding when you're in an additive system versus a multiplicative system, and which components need absolute reliability for the system to work, is a critical model to have in your head. Multiplicative thinking is a model related to the greater idea of systems thinking, another mental model well worth acquiring.

80. Commitment and Consistency Bias

We have an instinctual desire to remain consistent with our prior actions and beliefs. This can lead us to behave in irrational ways. Here's how the commitment and consistency fallacy can lead us to do things that aren't always in our best interest.

*"The difficulty lies not in the new ideas,
but in escaping the old ones, which ramify,
for those brought up as most of us have been,
into every corner of our minds."*

— John Maynard Keynes

Ben Franklin tells an interesting little story in his autobiography. Facing opposition to being reelected Clerk of the General Assembly, he sought to gain favor with the member so vocally opposing him:

Having heard that he had in his library a certain very scarce and curious book, I wrote a note to him, expressing my desire of perusing that book, and requesting he would do me the favour of lending it to me for a few days. He sent it immediately, and I return'd it in about a week with another note, expressing strongly my sense of the favour.

When we next met in the House, he spoke to me (which he had never done before), and with great civility; and he ever after manifested a readiness to serve me on all occasions, so that we became great friends, and our friendship continued to his death.

This is another instance of the truth of an old maxim I had learned, which says, "He that has once done you a kindness will be more ready to do you another, than he whom you yourself have obliged."

The man, having lent Franklin a rare and valuable book, sought to stay consistent with his past actions. He wouldn't, of course, lend a book to an unworthy man, would he?

Positive Self Image

Scottish philosopher and economist Adam Smith said in The Theory of Moral Sentiments: *The opinion which we entertain of our own character depends entirely on our judgments concerning our past conduct. It is so disagreeable to think ill of ourselves, that we often purposely turn away our view from those circumstances which might render that judgment unfavorable.*

Even when it acts against our best interest our tendency is to be consistent with our prior commitments, ideas, thoughts, words, and actions. As a byproduct of confirmation bias, we rarely seek disconfirming evidence of what we believe. This, after all, makes it easier to maintain our positive self-image.

Part of the reason this happens is our desire to appear and feel like we're right. We also want to show people our conviction. This shouldn't come as a surprise. Society values consistency and conviction even when it is *wrong*.

We associate consistency with intellectual and personal strength, rationality, honesty, and stability. On the other hand, the person who is perceived as inconsistent is also seen as confused, two-faced, even mentally ill in certain extreme circumstances.

A politician, for example, who wavers, gets labelled a flip flopper and can lose an election over it (John Kerry). A CEO who risks everything on a successful bet and holds a conviction that no one else holds is held to be a hero (Elon Musk).

But it's not just our words and actions that nudge our subconscious, but also how other people see us. There is a profound truth behind Eminem's lyrics: *I am, whatever you say I am. If I wasn't, then why would I say I am?*

If you think I'm talented, I *become* more talented in your eyes — in part because you labelling me as talented filters the way you see me. You start seeing more of my genius and less of my normal-ness, simply by way of staying consistent with your own words.

In his book Outliers, Malcolm Gladwell talks about how teachers simply identifying students as smart not only affected how the teachers saw their work but, more importantly, affected the opportunities teachers gave the students. Smarter students received better opportunities, which, we can reason, offers them better experiences. This in turn makes them better. It's almost a self-fulfilling prophecy.

And the more we invest in our beliefs of ourselves or others—think money, effort, or pain, the more sunk costs we have and the harder it becomes to change our mind. It doesn't matter if we're right. It doesn't matter if the Ikea bookshelf sucks, we're going to love it. In Too Much Invested to Quit, psychologist Allan Teger says something similar of the Vietnam War: “

The longer the war continued, the more difficult it was to justify the additional investments in terms of the value of possible victory. On the other hand, the longer the war continued, the more difficult it became to write off the tremendous losses without having anything to show for them.

As a consequence, there are few rules we abide by more than the “Don't make any promises that you can't keep.” This, generally speaking, is a great rule that keeps society together by ensuring that our commitments for the most part are real and reliable.

Aside from the benefits of preserving our public image, being consistent is simply easier and leads to a more predictable and consistent life. By being consistent in our habits and with previous decisions, we significantly reduce the need to think and can go on “auto-pilot” for most of our lives.

However beneficial these biases are, they too deserve deeper understanding and caution. Sometimes our drive to appear consistent can lure us into choices we otherwise would consider against our best interests. This is the essence of a harmful bias as opposed to a benign one: *We are hurting ourselves and others by committing it.*

A Slippery Slope

Part of why commitment can be so dangerous is because it is like a slippery slope – you only need a single slip to slide down completely. Therefore compliance to even tiny requests, which initially appear insignificant, have a good probability of leading to full commitment later.

People whose job it is to persuade us know this.

Among the more blunt techniques on the spectrum are those reported by a used-car sales manager in Robert Cialdini's book Influence. The dealer knows the power of commitment and that if we comply a little now, we are likely to comply fully later on. His advice to other sellers goes as follows:

“Put 'em on paper. Get the customer's OK on paper. Get the money up front. Control 'em. Control the deal. Ask 'em if they would buy the car right now if the price is right. Pin 'em down.”

This technique will be obvious to most of us. However, there are also more subtle ways to make us comply without us noticing.

A great example of a subtle compliance practitioner is Jo-ellen Demetrius, the woman currently reputed to be the best consultant in the business of jury selection.

Whenever screening potential jurors before a trial she asks an artful question:

“If you were the only person who believed in my client's innocence, could you withstand the pressure of the rest of the jury to change your mind?”

It's unlikely that any self-respecting prospective juror would answer negatively. And, now that the juror has made the implicit promise, it is unlikely that once selected he will give in to the pressure exerted by the rest of the jury.

Innocent questions and requests like this can be a great springboard for initiating a cycle of compliance.

The Lenient Policy

A great case study for compliance is the tactics that Chinese soldiers employed on American war captives during the Korean War. The Chinese were particularly effective in getting Americans to inform on one another. In fact, nearly all American prisoners in the Chinese camps are said to have collaborated with the enemy in one way or another. This was striking, since such behavior was rarely observed among American war prisoners during WWII. It raises the question of what secret trades led to the success of the Chinese?

Unlike the North Koreans, the Chinese did not treat the victims harshly. Instead they engaged in what they called “lenient policy” towards the captives, which was, in reality, a clever series of psychological assaults.

In their exploits the Chinese relied heavily on commitment and consistency tactics to receive the compliance they desired. At first, the Americans were not too collaborative, as they had been trained to provide only name, rank, and serial number, but the Chinese were patient.

They started with seemingly small but frequent requests to repeat statements like “The United States is not perfect” and “In a Communist country, unemployment is not a problem.” Once these requests had been complied with, the heaviness of the requests grew. Someone who had just agreed that United States was not perfect would be encouraged to expand on his thoughts about specific imperfections. Later he might be asked to write up and read out a list of these imperfections in a discussion group with other prisoners. “After all, it’s what you really believe, isn’t it?” The Chinese would then broadcast the essay readings not only to the whole camp, but to other camps and even the American forces in South Korea. Suddenly the soldier would find himself a “collaborator” of the enemy.

The awareness that the essays did not contradict his beliefs could even change his self-image to be consistent with the new “collaborator” label, often resulting in more cooperation with the enemy.

It is not surprising that very few American soldiers were able to avoid such “collaboration” altogether.

Foot in the Door

The small request growing into bigger requests as applied by the Chinese on American soldiers is also called the Foot-in-the-door Technique. It was first discovered by two scientists – Freedman and Fraser, who had worked on an experiment in which a fake volunteer worker asked home owners to allow a public-service billboard to be installed on their front lawns.

To get a better idea of how it would look, the home owners were even shown a photograph depicting an attractive house that was almost completely obscured by an ugly sign reading DRIVE CAREFULLY. While the request was quite understandably denied by 83 percent of residents, one particular group reacted favorably.

Two weeks earlier a different “volunteer worker” had come and asked the respondents of this group a similar request to display a much smaller sign that read BE A SAFE DRIVER. The request was so negligible that nearly all of them complied. However, the future effects of that request turned out to be so enormous that 76 percent of *this* group complied with the bigger, much less reasonable request (the big ugly sign).

At first, even the researchers themselves were baffled by the results and repeated the experiment on similar setups. The effect persisted. Finally, they proposed that the subjects must have distorted their own views about themselves as a result of their initial actions:

What may occur is a change in the person’s feelings about getting involved or taking action. Once he has agreed to a request, his attitude may change, he may become, in his own eyes, the kind of person who does this sort of thing, who agrees to requests made by strangers, who takes action on things he believes in, who cooperates with good causes.

The rule goes that once someone has instilled our self-image where they want it to be, we will comply naturally with the set of requests that adhere to the new self-view. Therefore we must be very careful about agreeing to even the smallest requests. Not only can it make us comply with larger requests later on, but it can make us even more willing to do favors that are only remotely connected to the earlier ones.

Even Cialdini, someone who knows this bias inside-out, admits to his fear that his behavior will be affected by consistency bias:

It scares me enough that I am rarely willing to sign a petition anymore, even for a position I support. Such an action has the potential to influence not only my future behavior but also my self-image in ways I may not want.

Further, once a person's self-image is altered, all sorts of subtle advantages become available to someone who wants to exploit that new image.

Give it, take it away later

Have you ever witnessed a deal that is a little too good to be true only to later be disappointed? You had already made up your mind, had gotten excited and were ready to pay or sign until a calculation error was discovered. Now with the adjusted price, the offer did not look all that great.

It is likely that the error was not an accident – this technique, also called low-balling, is often used by compliance professionals in sales. Cialdini, having observed the phenomenon among car dealers, tested its effects on his own students.

In an experiment with colleagues, he made two groups of students show up at 7:00 AM in the morning to do a study on “thinking processes”. When they called one group of students they immediately told them that the study starts at 7:00 AM. Unsurprisingly, only 24 percent wanted to participate.

However, for the other group of students, researchers threw a low-ball. The first question was whether they wanted to take part in a study of thinking processes. Fifty-six percent of them replied positively. Now, to those that agreed, the meeting time of 7:00 AM was revealed.

These students were given the opportunity to opt out, but none of them did. In fact, driven by their commitment, 95 percent of the low-balled students showed up to the Psychology Building at 7:00 AM as they had promised.

Do you recognize the similarities between the experiment and the sales situation?

The script of low-balling tends to be the same:

First, an advantage is offered that induces a favorable decision in the manipulator's direction. Then, *after* the decision has been made, but *before* the bargain is sealed, the original advantage is deftly removed (i.e., the price is raised, the time is changed, etc.). It would seem surprising that anyone would buy under these circumstances, yet many do. Often the self-created justifications provide so many new reasons for the decision that even when the dealer pulls away the original favorable rationale, like a low price, the decision is not changed. We stick with our old decision *even in the face of new information!*

Of course not *everyone* complies, but that's not the point. The effect is strong enough to hold for a good number of buyers, students or anyone else whose rate of compliance we may want to raise.

The Way Out

The first real defense to consistency bias is awareness about the phenomenon and the harm a certain rigidity in our decisions can cause us.

Robert Cialdini suggests two approaches to recognizing when consistency biases are unduly creeping into our decision making. The first one is to listen to our stomachs.

Stomach signs display themselves when we realize that the request being pushed is something we don't want to do.

He recalls a time when a beautiful young woman tried to sell him a membership he most certainly did not need by using the tactics displayed above. He writes:

I remember quite well feeling my stomach tighten as I stammered my agreement. It was a clear call to my brain, "Hey, you're being taken here!" But I couldn't see a way out. I had been cornered by my own words. To decline her offer at that point would have meant facing a pair of distasteful alternatives: If I tried to back out by protesting that I was not actually the man-about-town I had claimed to be during the interview, I would come off a liar; trying to refuse without that protest would make me come off a fool for not wanting to save \$1,200. I bought the entertainment package, even though I knew I had been set up. The need to be consistent with what I had already said snared me.

But then eventually he came up with the perfect counter-attack for later episodes, which allowed him to get out of the situation gracefully.

Whenever my stomach tells me I would be a sucker to comply with a request merely because doing so would be consistent with some prior commitment I was tricked into, I relay that message to the requester. I don't try to deny the importance of consistency; I just point out the absurdity of foolish consistency. Whether, in response, the requester shrinks away guiltily or retreats in bewilderment, I am content. I have won; an exploiter has lost.

The second approach concerns the signs that are felt within our heart and is best used when it is not really clear whether the initial commitment was wrongheaded.

Imagine you have recognized that your initial assumptions about a particular deal were not correct. The car is not extraordinarily cheap and the experiment is not as fun if you have to wake up at 6 AM to make it. Here it helps to ask one simple question:

"Knowing what I know, if I could go back in time, would I make the same commitment?"

Ask it frequently enough and the answer might surprise you.

81. Mental Model: Bias from Conjunction Fallacy

The bias from conjunction fallacy is a common reasoning error in which we believe that two events happening in conjunction is more probable than one of those events happening alone. Here's why this happens and how we can overcome the fallacy.

Daniel Kahneman and Amos Tversky spent decades in psychology research to disentangle patterns in errors of human reasoning. The duo discovered a variety of logical fallacies that we tend to make when facing information that appears vaguely familiar. These fallacies lead to bias — irrational behavior based on beliefs that are not always grounded in reality.

In his book *Thinking Fast and Slow*, which summarizes his and Tversky's life work, Kahneman introduces biases that stem from the conjunction fallacy – the false belief that a conjunction of two events is more probable than one of the events on its own.

What is Probability?

Probability can be a difficult concept. Most of us have an intuitive understanding of what probability is, but there is little consensus on what it actually means. It is just as vague and subjective a concept as *democracy*, *beauty* or *freedom*. However, this is not always troublesome – we can still easily discuss the notion with others. Kahneman reflects:

In all the years I spent asking questions about the probability of events, no one ever raised a hand to ask me, "Sir, what do you mean by probability?" as they would have done if I had asked them to assess a strange concept such as globability.

Everyone acted as if they knew how to answer my questions, although we all understood that it would be unfair to ask them for an explanation of what the word means.

While logicians and statisticians might disagree, to most of us probability is simply a tool that describes our degree of belief. For instance, we know that the sun will rise tomorrow and we consider it near impossible that there will be two suns up in the sky instead of one. In addition to the extremes, there are also events which lie somewhere in the middle of the probability spectrum, such as the degree of belief that it will rain tomorrow.

Despite its vagueness, probability has its virtues. Assigning probabilities helps us make the degree of belief actionable and also communicable to others. If we believe that the probability it will rain tomorrow is 90%, we are likely to carry an umbrella and suggest our family do so as well.

Probability, Base Rates, and Representativeness

Most of us are already familiar with representativeness and base rates. Consider the classic example of x number of black and y number of white-colored marbles in a jar. It is a simple exercise to tell what the probabilities of drawing each color are if you know their base rates (proportion). Using base rates is the obvious approach for estimations when no other information is provided.

However, Kahneman managed to prove that we have a tendency to ignore base rates in light of specific descriptions. He calls this phenomenon the Representativeness Bias. To illustrate representativeness bias, consider the example of seeing a person reading *The New York Times* on the New York subway. Which do you think would be a better bet about the reading stranger?

1) *She has a PhD.*

2) *She does not have a college degree.*

Representativeness would tell you to bet on the PhD, but this is not necessarily a good idea. You should seriously consider the second alternative because many more non-graduates than PhDs ride in New York subways. While a more significant proportion of PhDs may read *The New York Times*, the total number of *New York Times* readers with only high school degrees is likely to be much larger, even if the proportion itself is very slim.

In a series of similar experiments, Kahneman's subjects failed to recognize the base rates in light of individual information. This is unsurprising. Kahneman explains:

On most occasions, people who act friendly are in fact friendly. A professional athlete who is very tall and thin is much more likely to play basketball than football. People with a PhD are more likely to subscribe to The New York Times than people who ended their education after high school. Young men are more likely than elderly women to drive aggressively.

While following representativeness bias might improve your overall accuracy, it will not always be the statistically optimal approach.

In his bestseller *Moneyball*, Michael Lewis tells a story of Oakland A's baseball team coach, Billy Beane, who recognized this fallacy and used it to his advantage.

When recruiting new players for the team, instead of relying on scouts he relied heavily on statistics of past performance. This approach allowed him to build a team of great players that were passed up by other teams because they did not look the part. Needless to say, the team achieved excellent results at a low cost.

Conjunction Fallacy

While representativeness bias occurs when we fail to account for low base rates, conjunction fallacy occurs when we assign a higher probability to an event of higher specificity. This violates the laws of probability.

Consider the following study:

Participants were asked to rank four possible outcomes of the next Wimbledon tournament from most to least probable. Björn Borg was the dominant tennis player of the day when the study was conducted. These were the outcomes:

- A. Borg will win the match.*
- B. Borg will lose the first set.*
- C. Borg will lose the first set but win the match.*
- D. Borg will win the first set but lose the match.*

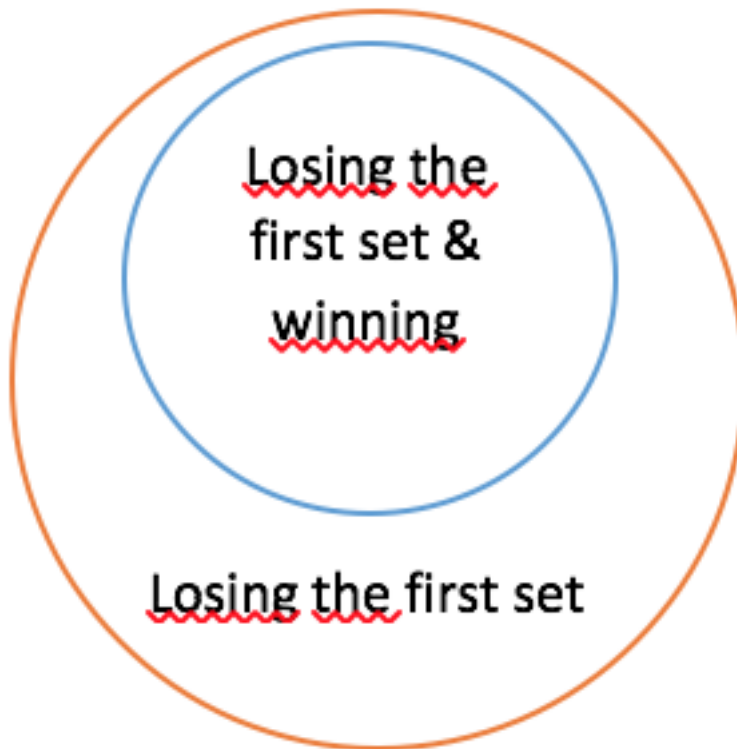
How would you order them?

Kahneman was surprised to see that most subjects ordered the chances by directly contradicting the laws of logic and probability. He explains:

The critical items are B and C. B is the more inclusive event and its probability must be higher than that of an event it includes. Contrary to logic, but not to representativeness or plausibility, 72% assigned B a lower probability than C.

If you thought about the problem carefully, you drew the following diagram in your head.

Losing the first set will always, by definition, be a more probable event than losing the first set and winning the match.



The Linda Problem

As discussed in [our piece on the Narrative Fallacy](#), the best-known and most controversial of Kahneman and Tversky's experiments involved a fictitious lady called Linda. The fictional character was created to illustrate the role heuristics play in our judgment and how it can be incompatible with logic. This is how they described Linda.

Linda is thirty-one years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.

Kahneman conducted a series of experiments, in which he showed that representativeness tends to cloud our judgments and that we ignore the base rates in light of stories. The Linda problem started off with the task to estimate the plausibility of 9 different scenarios that subjects were supposed to rank in order of likelihood.

Linda is a teacher in elementary school.

Linda works in a bookstore and takes yoga classes.

Linda is active in the feminist movement.

Linda is a psychiatric social worker.

Linda is a member of the League of Women Voters.

Linda is a bank teller.

Linda is an insurance salesperson.

Linda is a bank teller and is active in the feminist movement.

Kahneman was startled to see that his subjects judged the likelihood of Linda being a bank teller and a feminist more likely than her being just a bank teller. As explained earlier, doing so makes little sense. He went on to explore the phenomenon further:

In what we later described as "increasingly desperate" attempts to eliminate the error, we introduced large groups of people to Linda and asked them this simple question:

Which alternative is more probable?

Linda is a bank teller.

Linda is a bank teller and is active in the feminist movement.

This stark version of the problem made Linda famous in some circles, and it earned us years of controversy. About 85% to 90% of undergraduates at several major universities chose the second option, contrary to logic.

What is especially interesting about these results is that, even when aware of the biases in place, we do not discard them.

When I asked my large undergraduate class in some indignation, “Do you realize that you have violated an elementary logical rule?” someone in the back row shouted, “So what?” and a graduate student who made the same error explained herself by saying, “I thought you just asked for my opinion.”

The issue is not constrained to students and but also affects professionals.

The naturalist Stephen Jay Gould described his own struggle with the Linda problem. He knew the correct answer, of course, and yet, he wrote, “a little homunculus in my head continues to jump up and down, shouting at me—‘but she can’t just be a bank teller; read the description.’”

Our brains simply seem to prefer consistency over logic.

The Role of Plausibility

Representativeness and conjunction fallacy occurs because we make the mental shortcut from our perceived plausibility of a scenario to its probability.

The most coherent stories are not necessarily the most probable, but they are plausible, and the notions of coherence, plausibility, and probability are easily confused by the unwary. Representativeness belongs to a cluster of closely related assessments that are likely to be generated together. The most representative outcomes combine with the personality description to produce the most coherent stories.

Kahneman warns us about the effects of these biases on our perception of expert opinion and forecasting. He explains that we are more likely to believe scenarios that are illustrative rather than probable.

The uncritical substitution of plausibility for probability has pernicious effects on judgments when scenarios are used as tools of forecasting. Consider these two scenarios, which were presented to different groups, with a request to evaluate their probability:

A massive flood somewhere in North America next year, in which more than 1,000 people drown

An earthquake in California sometime next year, causing a flood in which more than 1,000 people drown

The California earthquake scenario is more plausible than the North America scenario, although its probability is certainly smaller. As expected, probability judgments were higher for the richer and more detailed scenario, contrary to logic. This is a trap for forecasters and their clients: adding detail to scenarios makes them more persuasive, but less likely to come true.

In order to appreciate the role of plausibility, he suggests we have a look at an example without an accompanying explanation.

Which alternative is more probable?

Jane is a teacher.

Jane is a teacher and walks to work.

In this case, when evaluating plausibility and coherence, there are no quick answers to the probability question, and we can easily conclude that the first one is more likely. The rule goes that in the absence of a competing intuition, logic prevails.

Taming our intuition

The first lesson to thinking clearly is to question how you think. We should not simply believe whatever comes to our mind – our beliefs must be constrained by logic. You don’t have to become an expert in probability to tame your intuition, but having a grasp of simple concepts will help. There are two main rules that are worth repeating in light of representativeness bias:

1) All probabilities add up to 100%.

This means that if you believe that there's a 90% chance it will rain tomorrow, there's a 10% chance that it will not rain tomorrow.

However, since you believe that there is only a 90% chance that it will rain tomorrow, you cannot be 95% certain that it will rain tomorrow morning.

We typically make this type of error, when we mean to say that, if it rains, there's a 95% probability it will happen in the morning. That's a different claim and the probability of raining tomorrow morning under such premises is $0.9 \times 0.95 = 85.5\%$.

This also means the odds that, if it rains, it will not rain in the morning, are $90.0\% - 85.5\% = 4.5\%$.

2) The second principle is called the Bayes rule.

It allows us to correctly adjust our beliefs with the diagnosticity of the evidence. Bayes rule follows the formula:

$$P(A|B) \propto P(A)P(B|A)$$

In essence, the formula states that the posterior odds are proportional to prior odds times the likelihood. Kahneman crystallizes two keys to disciplined Bayesian reasoning:

- Anchor your judgment of the probability of an outcome on a plausible base rate.
- Question the diagnosticity of your evidence.

Kahneman explains it with an example:

If you believe that 3% of graduate students are enrolled in computer science (the base rate), and you also believe that the description of Tom is 4 times more likely for a graduate student in computer science than in other fields, then Bayes's rule says you must believe that the probability that Tom is a computer science student is now 11%.

Four times as likely means that we expect roughly 80% of all computer science students to resemble Tom. We use this proportion to obtain the adjusted odds. (The calculation goes as follows: $0.03 \times 0.8 / (0.03 \times 0.8 + ((1 - 0.03) \times (1 - 0.8))) = 11\%$)

The easiest way to become better at making decisions is by making sure you question your assumptions and follow strong evidence. When evidence is anecdotal, adjust minimally, and trust the base rates. Odds are, you will be pleasantly surprised.

82. Bias from Liking/Loving: Why We Comply With Those We Love

The decisions that we make are rarely impartial. Most of us already know that we prefer to take advice from people that we like. We also tend to more easily *agree* with opinions formed by people we like. The tendency to judge in favor of people and symbols we like is called the bias from liking or loving.

We are more likely to ignore faults and comply with wishes of our friends or lovers rather than random strangers. We favor people, products, and actions associated with our favorite celebrities. Sometimes we even distort facts to facilitate love. The influence that our friends, parents, lovers, and idols exert on us can be enormous.

In general, this is a good thing, a bias that adds on balance rather than subtracts. It helps us form successful relationships, it helps us fall in love (and stay in love), it helps us form attachments with others that give us great happiness.

But we do want to be aware of where this tendency leads us awry.

For example, some people and companies have learned to use this influence to their advantage.

In his bestseller on social psychology Influence, Robert Cialdini tells a story about the successful strategy of Tupperware, which at the time reported sales of over \$2.5 million a day.

As many of us know, the company for a long time sold its kitchenware at parties thrown by friends of the potential customers. At each party, there was a Tupperware representative taking orders, but the hostess, the friend of the invitees, received a commission.

These potential customers are not blind to the incentives and social pressures involved.

Some of them don't mind it, others do, but all admit a certain degree of helplessness in their situation. Cialdini recalls a conversation with one of the frustrated guests:

It's gotten to the point now where I hate to be invited to Tupperware parties. I've got all the containers I need; and if I wanted any more, I could buy another brand cheaper in the store. But when a friend calls up, I feel like I have to go. And when I get there, I feel like I have to buy something. What can I do? It's for one of my friends.

We are more likely to buy in a familiar, friendly setting and under the obligation of friendship rather than from an unfamiliar store or a catalog. We simply find it much harder to say "no" or disagree when it's a friend. The possibility of ruining the friendship, or seeing our image altered in the eyes of someone we like, is a powerful motivator to comply.

The Tupperware example is a true "*lollapalooza*" in favor of manipulating people into buying things. Besides the liking tendency, there are several other factors at play: commitment/consistency bias, a bias from stress, an influence from authority, a reciprocation effect, and some direct incentives and disincentives, at least!

(Lollapaloozas, something we'll talk more about in the future, are when several powerful forces combine to create a non-linear outcome. A good way to think of this conceptually for now is that $1+1=3$.)

The liking tendency is so strong that it stretches beyond close friendships. It turns out we are also more likely to act in favor of certain types of strangers.

Can you recall meeting someone with whom you hit it off instantly, where it almost seemed like you'd known them for years after a 20-minute conversation? Developing such an instant bond with a stranger may seem like a mythical process, but it rarely is. There are several tactics that can be used to make us like something, or someone, more than we otherwise would.

Appearance and the Halo Effect

We all like engaging in activities with beautiful people. This is part of an automatic bias that falls into a category called The Halo Effect.

The Halo Effect occurs when a specific, positive characteristic determines the way a person is viewed by others on other, *unrelated* traits. In the case of beauty, it's been shown that we automatically assign favorable yet unrelated traits such as talent, kindness, honesty, and intelligence, with those we find physically attractive.

For the most part, this attribution happens unnoticed. For example, attractive candidates received more than twice as many votes as unattractive candidates in the 1974 Canadian federal elections. Despite the ample evidence of predisposition towards handsome politicians, follow-up research demonstrated that nearly three-quarters of Canadians surveyed strongly denied the influence of physical appearance in their voting decisions. The power of the Halo Effect is that it's mostly happening beneath the level of consciousness.

Similar forces are at play when it comes to hiring decisions and pay. While employers deny that they are strongly influenced by looks, studies show otherwise.

In one study evaluating hiring decisions based on simulated interviews, the applicants' grooming played a greater role in the outcome than job qualifications. Partly, this has a rational basis. We might assume that someone who shows up without the proper "look" for the job may be deficient in other areas. If they couldn't shave and put a tie on, how are we to expect them to perform with customers? Partly, though, it's happening subconsciously. Even if we never consciously say to ourselves that "Better grooming = better employee", we tend to act that way in our hiring.

These effects go even beyond the hiring phase — attractive individuals in the US and Canada have been estimated to earn an average of 12-14 percent more than their unattractive coworkers. Whether this is due to liking bias or perhaps the increased self-confidence that comes from above-average looks is hard to say.

Appearance is not the only quality that may skew our perceptions in favor of someone. The next one on the list is similarity.

Similarity

We like people who resemble us. Whether it's appearance, opinions, lifestyle or background, we tend to favor people who on some dimension are most similar to ourselves.

A great example of similarity bias is the case of dress. Have you ever been at an event where you felt out of place because you were either overdressed or underdressed? The uneasy feelings are not caused only by your imagination. Numerous studies suggest that we are more likely to do favors, such as giving a dime or signing a petition, to someone who looks like us.

Similarity bias can extend to even such ambiguous traits as interests and background. Many salesmen are trained to look for similarities to produce a favorable and trustworthy image in the eyes of their potential customers.

In Influence: The Psychology of Persuasion, Robert Cialdini explains:

If there is camping gear in the trunk, the salespeople might mention, later on, how they love to get away from the city whenever they can; if there are golf balls on the back seat, they might remark that they hope the rain will hold off until they can play the eighteen holes they scheduled for later in the day; if they notice that the car was purchased out of state, they might ask where a customer is from and report—with surprise—that they (or their spouse) were born there, too.

These are just a few of many examples which can be surprisingly effective in producing a sweet feeling of familiarity. Multiple studies illustrate the same pattern. We decide to fill out surveys from people with similar names, buy insurance from agents of similar age and smoking habits, and even decide that those who share our political views deserve their medical treatment sooner than the rest.

There is just one takeaway: even if the similarities are terribly superficial, we still may end up liking the other person more than we should.

“And what will a man naturally come to like and love, apart from his parent, spouse and child? Well, he will like and love being liked and loved.”

— Charlie Munger

Praise and Compliments

We are all phenomenal suckers for flattery. These are not my words, but words of Robert Cialdini and they ring a bell. Perhaps, more than anything else in this world we love to be loved and, consequently, we love those that love us.

Consider the technique of Joe Girard, who has been continuously called the world’s “greatest car salesman” and has made it to the Guinness World Record book.

Each month Joe prints and sends over 13,000 holiday cards to his former customers.

While the theme of the card varies depending on the season and celebration, the printed message always remains the same. On each of those cards Girard prints three simple words “I like you” and his name. He explains:

“There’s nothing else on the card, nothin’ but my name. I’m just telling ’em that I like ’em.”

“I like you.” It came in the mail every year, 12 times a year, like clockwork.

Joe understood a simple fact about humans – we love to be loved.

As numerous experiments show, regardless of whether the praise is deserved or not, we cannot help but develop warm feelings to those that provide it. Our reaction can be so automatic, that we develop liking even when the attempt to win our favor is an obvious one, as in the case of Joe.

Familiarity

In addition to liking those that like us and look like us, we also tend to like those who we know. That’s why repeated exposure can be a powerful tool in establishing liking.

There is a fun experiment you can do to understand the power of familiarity.

Take a picture of yourself and create a mirror image in one of the editing tools. Now with the two pictures at hand decide which one – the real or the mirror image you like better.

Show the two pictures to a friend and ask her to choose the better one as well.

If you and your friend are like the group on whom this trick was tried, you should notice something odd. Your friend will prefer the true print, whereas you will think you look better in the mirror image. This is because you both prefer the faces you are used to. Your friend always sees you from her perspective, whereas you have learned to recognize and love your mirror image.

The effect, of course, extends beyond faces into places, names, and even ideas.

For example, in elections, we might prefer candidates whose names sound more familiar.

The Ohio Attorney-General post was claimed by a man who, shortly before his candidacy, changed his last name to Brown – a family name of Ohio political tradition. Apart from his surname, there was little to nothing that separated him from other equally if not more capable candidates.

How could such a thing happen? The answer lies partly in the unconscious way that familiarity affects our liking. Often we don’t realize that our attitude toward something has been influenced by the number of times we have been exposed to it in the past.

Loving by Association and Referral

Charisma or attraction are not prerequisites for liking — a mere association with someone you like or trust can be enough.

The bias from association shows itself in many other domains and is especially strong when we associate with the person we like the most — ourselves. For example, the relationship between a sports fan and his local team can be highly personal even though the association is often based only on shared location. For the fan, however, the team is an important part of his self-identity. If the team or athlete wins, he wins as well, which is why sports can be so emotional. The most dedicated fans are ready to get into fights, burn

cars or even kill to defend the honor of their team. Such associated sense of pride and achievement is as true for celebrities as it is for sports.

When Kevin Costner delivered his acceptance speech after winning the best picture award for *Dances With Wolves*, he said:

"While it may not be as important as the rest of the world situation, it will always be important to us. My family will never forget what happened here; my Native American brothers and sisters, especially the Lakota Sioux, will never forget, and the people I went to high school with will never forget."

The interesting part of his words is the notion that his high school peers will remember, which is probably true. His former classmates are likely to tell people that they went to school with Costner, even though they themselves had no connection with the success of the movie.

Costner's words illustrate that even a trivial association with success may reap benefits and breed confidence.

Who else do we like besides ourselves, celebrities and our sports teams?

People we've met through those who are close to us – our neighbors, friends, and family. It is common sense that a referral from someone we trust is enough to trigger mild liking and favorable initial opinions.

There are a number of companies that use friend referral as a sales tactic. Network providers, insurers, and other subscription services offer a number of benefits for those of us who give away our friends' contact details.

The success of this method rests on the implicit idea that turning down the sales rep who says "your friend Jenny/Allan suggested I call you" feels nearly as bad as turning down Jenny or Allan themselves. This tactic, when well executed, leads to a never-ending chain of new customers.

Can We Avoid Liking?

Perhaps the right question to ask here is not "how can we avoid the bias from liking", but *when should we?*

Someone who is conditioned to like the right people and pick their idols carefully can greatly benefit from these biases. In his famous talk, *The Psychology of Human Misjudgment*, Charlie Munger recalls that both he and Warren Buffett benefitted from liking admirable persons:

One common, beneficial example for us both was Warren's uncle, Fred Buffett, who cheerfully did the endless grocery-store work that Warren and I ended up admiring from a safe distance. Even now, after I have known so many other people, I doubt if it is possible to be a nicer man than Fred Buffett was, and he changed me for the better.

The keywords here are "from a safe distance".

If dealing with salesmen and others who clearly benefit from your liking, it might be a good idea to check whether you have been influenced. In these unclear cases, Cialdini advises us to focus on our *feelings* rather than the other person's *actions* that may produce liking. Ask yourself how much of what you feel is due to liking versus the actual facts of the situation.

The time to call out the defense is when we feel ourselves liking the practitioner more than we *should* under the circumstances when we feel manipulated.

Once we have recognized that we like the requester more than we would expect under the given circumstances, we should take a step back and question ourselves. Are you doing the deal because you like someone or is it because it is indeed the best option out there?

83. Bias from Disliking/Hating

(This is a follow-up to our post on the Bias from Liking/Loving, which you can [find here](#).)

Think of a cat snarling and spitting, lashing with its tail and standing with its back curved. Her pulse is elevated, blood vessels constricted and muscles tense. This reaction may sound familiar, because everyone has experienced the same tensed-up feeling of rage at least once in their lives.

When rage is directed towards an external object, it becomes hate. Just as we learn to love certain things or people, we learn to hate others.

There are several cognitive processes that awaken the hate within us and most of them stem from our need for self-protection.

Reciprocation

We tend to dislike people who dislike us (and, true to Newton, with equal strength.) The more we perceive they hate us, the more we hate them.

Competition

A lot of hate comes from scarcity and competition. Whenever we compete for resources, our own mistakes can mean good fortune for others. In these cases, we affirm our own standing and preserve our self-esteem by blaming others.

Robert Cialdini explains that because of the competitive environment in American classrooms, school desegregation may increase the tension between children of different races instead of decreasing it. Imagine being a secondary school child:

If you knew the right answer and the teacher called on someone else, you probably hoped that he or she would make a mistake so that you would have a chance to display your knowledge. If you were called on and failed, or if you didn't even raise your hand to compete, you probably envied and resented your classmates who knew the answer.

At first we are merely annoyed. But then as the situation fails to improve and our frustration grows, we are slowly drawn into false attributions and hate. We keep blaming and associating “the others” who are doing better with the loss and scarcity we are experiencing (or perceive we are experiencing). That is one way our emotional frustration boils into hate.

Us vs. Them

The ability to separate friends from enemies has been critical for our safety and survival. Because mistaking the two can be deadly, our mental processes have evolved to quickly spot potential threats and react accordingly. We are constantly feeding information about others into our “people information lexicon” that forms not only our view of individuals, whom we must decide how to act around, but entire classes of people, as we average out that information.

To shortcut our reactions, we classify narrowly and think in dichotomies: right or wrong, good or bad, heroes or villains. (The type of Grey Thinking we espouse is almost certainly *unnatural*, but, then again, so is a good golf swing.) Since most of us are merely average at everything we do, even superficial and small differences, such as race or religious affiliation, can become an important source of identification. We are, after all, creatures who seek to belong to groups above all else.

Seeing ourselves as part of a special, different and, in its own way, superior group, decreases our willingness to empathize with the other side. This works both ways – the hostility towards the others also increases the solidarity of the group. In extreme cases, we are so drawn towards the inside view that we create a strong picture of the enemy that has little to do with reality or our initial perceptions.

From Compassion to Hate

We think of ourselves as compassionate, empathetic and cooperative. *So why do we learn to hate?*

Part of the answer lies in the fact that we think of ourselves in a specific way. If we cannot reach a consensus, then the other side, which is in some way different from us, must necessarily be uncooperative for our assumptions about our own qualities to hold true. Our inability to examine the situation from all sides and shake our beliefs, together with self-justifying behavior, can lead us to conclude that others are the problem. Such asymmetric views, amplified by strong perceived differences, often fuel hate.

What started off as odd or difficult to understand, has quickly turned into unholy.

If the situation is characterized by competition, we may also see ourselves as a *victim*. The others, who abuse our rights, take away our privileges or restrict our freedom are seen as bullies who deserve to be punished. We convince ourselves that we are doing good by doing harm to those who threaten to cross the line.

This is understandable. In critical times our survival indeed may depend on our ability to quickly spot and neutralize dangers. The cost of a false positive – mistaking a friend for a foe – is much lower than the potentially *fatal* false negative of mistaking our adversaries for innocent allies. As a result, it is safest to assume that anything we are not familiar with is dangerous by default. Natural selection, by its nature, “keeps what works,” and this tendency towards distrust of the unfamiliar probably survived in that way.

The Displays of Hate

Physical and psychological pain is very mobilizing. We despise foods that make us nauseous and people that have hurt us. Because we are scared to suffer, we end up either avoiding or destroying the “enemy”, which is why revenge can be pursued with such vengeance. In short, hate is a defense against enduring pain repeatedly.

There are several ways that the bias for disliking and hating display themselves to the outer world. The most obvious of them is war, which seems to have been more or less prevalent throughout the history of mankind.

This would lead us to think that war may well be unavoidable. In his famous talk, *The Psychology of Human Misjudgment*, Charlie Munger offers the more moderate opinion that while hatred and dislike cannot be avoided, the instances of war can be minimized by channeling our hate and fear into less destructive behaviors. (A good political system allows for dissent and disagreement without explosions of blood upheaval.)

Even with the spread of religion, and the advent of advanced civilization, modern war remains pretty savage. But we also get what we observe in present-day Switzerland and the United States, wherein the clever political arrangements of man “channel” the hatreds and dislikings of individuals and groups into nonlethal patterns including elections.

But these dislikings and hatreds that are arguably inherent to our nature never go away completely and transcend themselves into politics. Think of the dichotomies. There is the left versus the right wing, the nationalists versus the communists and libertarians vs. authoritarians. This might be the reason why there are maxims like: *“Politics is the art of marshaling hatreds.”*

Finally, as we move away from politics, arguably the most sophisticated and civilized way of channeling hatred is litigation. Charlie Munger attributes the following words to Warren Buffett:

“A major difference between rich and poor people is that the rich people can spend their lives suing their relatives.”

While most of us reflect on our memories of growing up with our siblings with fondness, there are cases where the competition for shared attention or resources breeds hatred. If the siblings can afford it, they will sometimes litigate endlessly to lay claims over their parents’ property or attention.

Under the Influence of Bias

There are several ways that bias from hating can interfere with our normal judgement and lead to suboptimal decisions.

Ignoring Virtues of The Other Side

Michael Faraday was once asked after a lecture whether he implied that a hated academic rival was always wrong. His reply was short and firm "He's not that consistent." Faraday must have recognized the bias from hating and corrected for it with the witty comment. What we should recognize here is that no situation is ever black or white. We all have our virtues and we all have our weaknesses. However, when possessed by the strong emotions of hate, our perceptions can be distorted to the extent that we fail to recognize any good in the opponent at all. This is driven by consistency bias, which motivates us to form a coherent ("she is all-round bad") opinion of ourselves and others.

Association Fueled Hate

The principle of association goes that the nature of the news tends to infect the teller. This means that the worse the experience, the worse the impression of anything *related* to it. Association is why we blame the messenger who tells us something that we don't want to hear even when they didn't cause the bad news. (Of course, this creates an incentive not to speak the truth and avoid giving bad news.)

A classic example is an unfortunate and confused weatherman, who receives hate mail, whenever it rains. One went so far as to seek advice from the Arizona State professor of psychology, Robert Cialdini, whose work we have discussed before.

Cialdini explained to him that in light of the destinies of other messengers, he was born lucky. Rain might ruin someone's holiday plans, but it will rarely change the destiny of a nation, which was the case of Persian war messengers. Delivering good news meant a feast, whereas delivering bad news resulted in their death.

The weatherman left Cialdini's office with a sense of privilege and relief.

"Doc," he said on his way out, "I feel a lot better about my job now. I mean, I'm in Phoenix where the sun shines 300 days a year, right? Thank God I don't do the weather in Buffalo."

Fact Distortion

Under the influence of liking or disliking bias, we tend to fill gaps in our knowledge by building our conclusions on assumptions, which are based on very little evidence.

Imagine you meet a woman at a party and find her to be a self-centered, unpleasant conversation partner. Now her name comes up as someone who could be asked to contribute to a charity. How likely do you feel it is that she will give to the charity?

In reality, you have no useful knowledge, because there is little to nothing that should make you believe that people who are self-centered are not also generous contributors to charity. The two are unrelated, yet because of the well-known fundamental attribution error, we often assume one is correlated to the other.

By association, you are likely to believe that this woman is not likely to be generous towards charities despite lack of any evidence. And because now you also believe she is stingy and ungenerous, you probably dislike her even more.

This is just an innocent example, but the larger effects of such distortions can be so extreme that they lead to a major miscognition. Each side literally believes that every single bad attribute or crime is attributable to the opponent.

Charlie Munger explains this with a relatively recent example:

When the World Trade Center was destroyed, many Pakistanis immediately concluded that the Hindus did it, while many Muslims concluded that the Jews did it. Such factual distortions often make mediation between opponents locked in hatred either difficult or impossible. Mediations between Israelis and Palestinians are difficult because facts in one side's history overlap very little with facts from the other side's. These distortions and the overarching mistrust might be why some conflicts seem to never end.

Avoiding Being Hated

To varying degrees, we value acceptance and affirmation from others. Very few of us wake up wanting to be disliked or rejected. Social approval, at its heart the cause of social influence, shapes behavior and contributes to conformity. Francois VI, Duc de La

Rochefoucauld wrote: "We only confess our little faults to persuade people that we have no big ones."

Remember the old adage, "The nail that sticks out gets hammered down." This is why we don't openly speak the truth or question people, we don't want to be the nail.

How do we resolve hate?

It is only normal that we can find more common ground with some people than with others. But are we really destined to fall into the traps of hate or is there a way to take hold of these biases?

That's a question worth over a hundred million lives. There are ways that psychologists think that we can minimize prejudice against others.

Firstly, we can engage with others in sustained close contact to breed our familiarity. The contact must not only be prolonged, but also positive and cooperative in nature – either working towards a common cause or against a common enemy.

Secondly, we also reduce prejudice by attaining equal status in all aspects, including education, income and legal rights. This effect is further reinforced, when equality is supported not only "on paper", but also ingrained within broader social norms.

And finally the obvious – we should practice awareness of our own emotions and ability to hold back on the temptations to dismiss others. Whenever confronted with strong feelings it might simply be best to sit back, breathe and do our best to eliminate the distorted thinking.

84. What Are You Doing About It? Reaching Deep Fluency with Mental Models

The mental models approach is very intellectually appealing, almost seductive to a certain type of person. (It certainly is for us.)

The whole idea is to take the world's greatest, most useful ideas and make them work for you!

How hard can it be?

Nearly all of the models *themselves* are perfectly well understandable by the average well-educated knowledge worker, including all of you reading this piece. Ideas like Bayesian updating, multiplicative thinking, hindsight bias, or the bias from envy and jealousy, are all obviously true and part of the reality we live in.

There's a bit of a problem we're seeing though: People are reading the stuff, enjoying it, agreeing with it...but not taking action. It's not becoming part of their standard repertoire. Let's say you followed up on Bayesian thinking after reading our post on it — you spent some time soaking in Thomas Bayes' great wisdom on updating your understanding of the world incrementally and probabilistically rather than changing your mind in black-and-white. Great!

But a week later, what have you done with that knowledge? How has it actually impacted your life? If the honest answer is "It hasn't," then haven't you *really* wasted your time? Ironically, it's this habit of "going halfway" instead of "going all the way," like Sisyphus constantly getting halfway up the mountain, which is the *biggest waste of time*!

See, the common reason why people don't truly "follow through" with all of this stuff is that they haven't raised their knowledge to a "deep fluency" — they're skimming the surface. They pick up bits and pieces — some heuristics or biases here, a little physics or biology there, and then call it a day and pull up Netflix. They get a little understanding, but not that much, and certainly no *doing*.

The better approach, if you actually care about making changes, is to imitate Charlie Munger, Charles Darwin, and Richard Feynman, and start raising your knowledge of the Big Ideas to a deep fluency, and then figuring out systems, processes, and mental tricks to implement them in your own life.

Let's work through an example.

Say you're just starting to explore all the wonderful literature on heuristics and biases and come across the idea of Confirmation Bias: The idea that once we've landed on an idea we really like, we tend to keep looking for further data to *confirm* our already-held notions rather than trying to *disprove* our idea.

This is common, widespread, and perfectly natural. We all do it. John Kenneth Galbraith put it best:

"In the choice between changing one's mind and proving there's no need to do so, most people get busy on the proof."

Now, what most people do, the ones you're trying to outperform, is say "Great idea! Thanks Galbraith." and then stop thinking about it.

Don't do that!

The next step would be to push a bit further, to get beyond the sound bite: *What's the process that leads to confirmation bias? Why do I seek confirmatory information and in which contexts am I particularly susceptible? What other models are related to the confirmation bias? How do I solve the problem?*

The answers are out there: They're in Daniel Kahneman and in Charlie Munger and in Elster. They're available by searching through Farnam Street.

The big question: How far do you go? A good question without a perfect answer. But the best test I can think of is to perform something like the Feynman technique, and to think about the chauffeur problem.

Can you explain it simply to an intelligent layperson, using vivid examples? Can you answer all the follow-ups? That's fluency. And you must be careful not to fool yourself, because in the wise words of Feynman, "...*you are the easiest person to fool.*"

While that's great work, you're not done yet. You have to make the rubber hit the road now. Something has to *happen* in your life and mind.

The way to do that is to come up with rules, systems, parables, and processes of your own, or to copy someone else's that are obviously sound.

In the case of Confirmation Bias, we have two wonderful models to copy, one from each of the Charlies — Darwin, and Munger.

Darwin had rule, one we have written about before but will restate here: *Make a note, immediately, if you come across a thought or idea that is contrary to something you currently believe.*

As for Munger, he implemented a rule in his own life: "*I never allow myself to have an opinion on anything that I don't know the other side's argument better than they do.*"

Now we're getting somewhere! With the implementation of those two habits and some well-earned deep fluency, you can immediately, *tomorrow*, start improving the quality of your decision-making.

Sometimes when we get outside the heuristic/biases stuff, it's less obvious how to make the "rubber hit the road" — and that will be a constant challenge for you as you take this path.

But that's also the fun part! With every new idea and model you pick up, you also pick up the opportunity to synthesize for yourself a useful little parable to make it stick or a new habit that will help you *use it*. Over time, you'll come up with hundreds of them, and people might even look to you when they're having problems doing it themselves!

Look at Buffett and Munger — both guys are absolute machines, chock full of pithy little rules and stories they use in order to *implement and recall* what they've learned.

For example, Buffett discovered early on the manipulative psychology behind open-outcry auctions. What did he do? *He made a rule to never go to one! That's how it's done.*

Even if you can't come up with a great rule like that, you *can* figure out a way to use any new model or idea you learn. It just takes some creative thinking.

Sometimes it's just a little mental rule or story that *sticks* particularly well. (Recall one of the prime lessons from our series on memory: Salient, often used, well-associated, and important information sticks best.)

We did this very thing recently with Lee Kuan Yew's Rule. What a *trite* way to refer to the simple idea of asking if something actually works...attributing it to a Singaporean political leader!

But that's exactly the point. Give the thing a name and a life and, like clockwork, you'll start recalling it. The phrase "*Lee Kuan Yew's Rule*" actually appears in my head when I'm approaching some new system or ideology, and as soon as it does, I find myself backing away from ideology and towards pragmatism. Exactly as I'd hoped.

Your goal should be to create about a thousand of those little tools in your head, attached to a deep fluency in the material from which it came.

I can hear the objection coming. Who has time for this stuff?

You do. It's about making time for the things that really matter. *And what could possibly matter more than upgrading your whole mental operating system?* I solemnly promise that you're spending way more time right now making sub-optimal decisions and trying to deal with the fallout.

If you need help learning to manage your time right this second, check out the resources in our [learning community](#) including our productivity seminar, which changed thousands people's lives for the better. The central idea is to become more thoughtful and deliberate with how you spend your hours. When you start doing that, you'll notice you *do* have an hour a day to spend on this Big Ideas stuff.

Once you find that solid hour (or more), start using it in the way outlined above, and let the world's great knowledge *actually* start making an impact. Just do a little every day.

What you'll notice, over the weeks and months and years of doing this, is that your mind will *really change!* It has to! And with that, your life will change too. The only way to fail at improving your brain is by imitating Sisyphus, pushing the boulder halfway up, over and over.

Unless and until you really understand this, you'll continue spinning your wheels. So here's your call to action. Go get to it!

85. The Need for Biological Thinking to Solve Complex Problems

“Biological thinking and physics thinking are distinct, and often complementary, approaches to the world, and ones that are appropriate for different kinds of systems.”

How should we think about complexity? Should we use a biological or physics system? The answer, of course, is that it depends. It's important to have both tools available at your disposal.

These are the questions that Samuel Arbesman explores in his fascinating book Overcomplicated: Technology at the Limits of Comprehension.

[B]iological systems are generally more complicated than those in physics. In physics, the components are often identical—think of a system of nothing but gas particles, for example, or a single monolithic material, like a diamond. Beyond that, the types of interactions can often be uniform throughout an entire system, such as satellites orbiting a planet.

Biology is different, and there is something meaningful to be learned from a biological approach to thinking.

In biology, there are a huge number of types of components, such as the diversity of proteins in a cell or the distinct types of tissues within a single creature; when studying, say, the mating behavior of blue whales, marine biologists may have to consider everything from their DNA to the temperature of the oceans. Not only is each component in a biological system distinctive, but it is also a lot harder to disentangle from the whole. For example, you can look at the nucleus of an amoeba and try to understand it on its own, but you generally need the rest of the organism to have a sense of how the nucleus fits into the operation of the amoeba, how it provides the core genetic information involved in the many functions of the entire cell.

Arbesman makes an interesting point here when it comes to how we should look at technology. As the interconnections and complexity of technology increases, it increasingly resembles a biological system rather than a physics one. There is another difference.

[B]iological systems are distinct from many physical systems in that they have a history. Living things evolve over time. While the objects of physics clearly do not emerge from thin air—astrophysicists even talk about the evolution of stars—biological systems are especially subject to evolutionary pressures; in fact, that is one of their defining features. The complicated structures of biology have the forms they do because of these complex historical paths, ones that have been affected by numerous factors over huge amounts of time. And often, because of the complex forms of living things, where any small change can create unexpected effects, the changes that have happened over time have been through tinkering: modifying a system in small ways to adapt to a new environment.

Biological systems are generally hacks that evolved to be good enough for a certain environment. They are far from pretty top-down designed systems. And to accommodate an ever-changing environment, they are rarely the most optimal system on a micro-level, preferring to optimize for survival over any one particular attribute. And it's not the survival of the individual that's optimized, it's the survival of the species.

Technologies can appear robust until they are confronted with some minor disturbance, causing a catastrophe. The same thing can happen to living things. For example, humans can adapt incredibly well to a large array of environments, but a tiny change in a person's genome can cause dwarfism, and two copies of that mutation invariably cause death. We are of a different scale and material from a particle accelerator or a computer network, and yet these systems have profound similarities in their complexity and fragility.

Biological thinking, with a focus on details and diversity, is a necessary tool to deal with complexity.

The way biologists, particularly field biologists, study the massively complex diversity of organisms, taking into account their evolutionary trajectories, is therefore particularly appropriate for understanding our technologies. Field biologists often act as naturalists—collecting, recording, and cataloging what they find around them—but even more than that, when confronted with an enormously complex ecosystem, they don't immediately try to understand it all in its totality. Instead, they recognize that they can study only a tiny part of such a system at a time, even if imperfectly. They'll look at the interactions of a handful of species, for example, rather than examine the complete web of species within a single region. Field biologists are supremely aware of the assumptions they are making, and know they are looking at only a sliver of the complexity around them at any one moment. [...]

When we're dealing with different interacting levels of a system, seemingly minor details can rise to the top and become important to the system as a whole. We need "Field biologists" to catalog and study details and portions of our complex systems, including their failures and bugs. This kind of biological thinking not only leads to new insights, but might also be the primary way forward in a world of increasingly interconnected and incomprehensible technologies.

Waiting and observing isn't enough.

Biologists will often be proactive, and inject the unexpected into a system to see how it reacts. For example, when biologists are trying to grow a specific type of bacteria, such as a variant that might produce a particular chemical, they will resort to a process known as mutagenesis. Mutagenesis is what it sounds like: actively trying to generate mutations, for example by irradiating the organisms or exposing them to toxic chemicals.

When systems are too complex for human understanding, often we need to insert randomness to discover the tolerances and limits of the system. One plus one doesn't always equal two when you're dealing with non-linear systems. For biologists, tinkering is the way to go.

As Stewart Brand noted about legacy systems, "Teasing a new function out of a legacy system is not done by command but by conducting a series of cautious experiments that with luck might converge toward the desired outcome."

When Physics and Biology Meet

This doesn't mean we should abandon the physics approach, searching for underlying regularities in complexity. The two systems complement one another rather than compete. Arbesman recommends asking the following questions:

When attempting to understand a complex system, we must determine the proper resolution, or level of detail, at which to look at it. How fine-grained a level of detail are we focusing on? Do we focus on the individual enzyme molecules in a cell of a large organism, or do we focus on the organs and blood vessels? Do we focus on the binary signals winding their way through circuitry, or do we examine the overall shape and function of a computer program? At a larger scale, do we look at the general properties of a computer network, and ignore the individual machines and decisions that make up this structure?

When we need to abstract away a lot of the details and lean on physics thinking more.

Think about it from an organizational perspective. The new employee at the lowest level is focused on the specific details of their job, whereas the executive is focused on systems, strategy, culture, and flow — how things interact and reinforce one another. The details of the new employee's job are lost on them.

We can't use one system, whether biological or physics, exclusively. That's fragile thinking. Instead, we need to combine both systems.

In Cryptonomicon, a novel by Neal Stephenson, he makes exactly this point talking about the structure of the pantheon of Greek gods:

And yet there is something about the motley asymmetry of this pantheon that makes it more credible. Like the Periodic Table of the Elements or the family tree of the elementary particles, or just about any anatomical structure that you might pull up out of a cadaver, it has enough of a pattern to give our minds something to work on and yet an irregularity that indicates some kind of organic provenance—you have a sun god and a moon goddess, for example, which is all clean and symmetrical, and yet over here is Hera, who has no role whatsoever except to be a literal bitch goddess, and then there is Dionysus who isn't even fully a god—he's half human—but gets to be in the Pantheon anyway and sit on Olympus with the Gods, as if you went to the Supreme Court and found Bozo the Clown planted among the justices.

86. Peter Bevelin on Seeking Wisdom, Mental Models, Learning, and a Lot More

One of the most impactful books we've ever come across is the wonderful Seeking Wisdom: From Darwin to Munger, written by the Swedish investor Peter Bevelin. In the spirit of multidisciplinary learning, *Seeking Wisdom* is a compendium of ideas from biology, psychology, statistics, physics, economics, and human behavior.

Mr. Bevelin is out with a new book full of wisdom from Warren Buffett & Charlie Munger: All I Want to Know is Where I'm Going to Die So I Never Go There. We were fortunate enough to have a chance to interview Peter recently, and the result is the wonderful discussion below.

What was the original impetus for writing these books?

The short answer: To improve my thinking. And when I started writing on what later became Seeking Wisdom I can express it even simpler: *"I was dumb and wanted to be less dumb."* As Munger says: *"It's ignorance removal...It's dishonorable to stay stupider than you have to be."* And I had done some stupid things and I had seen a lot of stupidity being done by people in life and in business.

A seed was first planted when I read Charlie Munger's talk, A Lesson on Worldly Wisdom, and another one where he referred to Darwin as a great thinker. So I said to myself: I am 42 now. Why not take some time off business and spend a year learning, reflecting and write about the subject Munger introduced to me – human behavior and judgments.

None of my writings started out as a book project. I wrote my first book – *Seeking Wisdom* – as a memorandum for myself with the expectation that I could transfer some of its essentials to my children. I learn and write because I want to be a little wiser day by day. I don't want to be a great-problem-solver. I want to avoid problems – prevent them from happening and doing right from the beginning. And I focus on consequential decisions. To paraphrase Buffett and Munger – decision-making is not about making brilliant decisions, but avoiding terrible ones. Mistakes and dumb decisions are a fact of life and I'm going to make more, but as long as I can avoid the big or "fatal" ones I'm fine.

So I started to read and write to learn what works and not and why. And I liked Munger's *"All I want to know is where I'm going to die so I'll never go there"* approach. And as he said, *"You understand it better if you go at it the way we do, which is to identify the main stupidities that do bright people in and then organize your patterns for thinking and developments, so you don't stumble into those stupidities."* Then I "only" had to a) understand the central "concept" and its derivatives and describe it in as simple way as possible for me and b) organize what I learnt in a way that was logical and useful for me. And what better way was there to learn this from those who already knew this?

After I learnt some things about our brain, I understood that thinking doesn't come naturally to us humans – most is just unconscious automatic reactions. Therefore I needed to set up the environment and design a system that helped me make it easier to know what to do and prevent and avoid harm. Things like simple rules of thumbs, tricks and filters. Of course, I could only do that if I first had the foundation. And as the years have passed, I've found that filters are a great way to save time and misery. As Buffett says, "I process information very quickly since I have filters in my mind." And they have to be simple – as the proverb says, "Beware of the door that has too many keys." The more complicated a process is, the less effective it is.

Why do I write? Because it helps me understand and learn better. And if I can't write something down clearly, then I have not really understood it. As Buffett says, *"I learn while I think when I write it out. Some of the things, I think I think, I find don't make any sense when I start trying to write them down and explain them to people ... And if it can't stand applying pencil to paper, you'd better think it through some more."*

My own test is one that a physicist friend of mine told me many years ago, 'You haven't really understood an idea if you can't in a simple way describe it to almost anyone.' Luckily, I don't have to understand zillion of things to function well.

And even if some of mine and others thoughts ended up as books, they are all living documents and new starting points for further, learning, un-learning and simplifying/clarifying. To quote Feynman, *"A great deal of formulation work is done in writing the paper, organizational work, organization. I think of a better way, a better way, a better way of getting there, of proving it. I never do much — I mean, it's just cleaner, cleaner and cleaner. It's like polishing a rough-cut vase. The shape, you know what you want and you know what it is. It's just polishing it. Get it shined, get it clean, and everything else."*

Which book did you learn the most from the experience of writing/collecting?

Seeking Wisdom because I had to do a lot of research – reading, talking to people etc. Especially in the field of biology and brain science since I wanted to first understand what influences our behavior. I also spent some time at a Neurosciences Institute to get a better understanding of how our anatomy, physiology and biochemistry constrained our behavior. And I had to work it out my own way and write it down in my own words so I really could understand it. It took a lot of time but it was a lot of fun to figure it out and I learnt much more and it stuck better than if I just had tried to memorize what somebody else had already written. I may not have gotten everything letter perfect but good enough to be useful for me.

As I said, the expectation wasn't to create a book. In fact, that would have removed a lot of my motivation. I did it because I had an interest in becoming better. It goes back to the importance of intrinsic motivation. As I wrote in Seeking Wisdom: *"If we reward people for doing what they like to do anyway, we sometimes turn what they enjoy doing into work. The reward changes their perception. Instead of doing something because they enjoy doing it, they now do it because they are being paid. The key is what a reward implies. A reward for our achievements makes us feel that we are good at something thereby increasing our motivation. But a reward that feels controlling and makes us feel that we are only doing it because we're paid to do it, decreases the appeal."*

It may sound like a cliché but the joy was in the journey – reading, learning and writing – not the destination – the finished book. Has the book made a difference for some people? Yes, I hope so but often people revert to their old behavior. Some of them are the same people who – to paraphrase something that is attributed to Churchill – occasionally should check their intentions and strategies against their results. But reality is what Munger once said, *"Everyone's experience is that you teach only what a reader almost knows, and that seldom."* But I am happy that my books had an impact and made a difference to a few people. That's enough.

Why did the new book (All I Want To Know Is Where I'm Going To Die So I'll Never Go There) have a vastly different format?

It was more fun to write about what works and not in a dialogue format. But also because vivid and hopefully entertaining "lessons" are easier to remember and recall. And you will find a lot of quotes in there that most people haven't read before.

I wanted to write a book like this to reinforce a couple of concepts in my head. So even if some of the text sometimes comes out like advice to the reader, I always think about what the mathematician Gian-Carlo Rota once said, *"The advice we give others is the advice that we ourselves need."*

How do you define Mental Models?

Some kind of representation that describes how reality is (as it is known today) – a principle, an idea, basic concepts, something that works or not – that I have in my head that helps me know what to do or not. Something that has stood the test of time.

For example, some timeless truths are:

- Reality is that complete competitors – same product/niche/territory – cannot coexist (Competitive exclusion principle). What works is going where there is no or very weak competition + differentiation/advantages that others can't copy (assuming of course we have something that is needed/wanted now and in the future)
- Reality is that we get what we reward for. What works is making sure we reward for what we want to achieve.

I favor underlying principles and notions that I can apply broadly to different and relevant situations. Since some models don't resemble reality, the word "model" for me is more of an illustration/story of an underlying concept, trick, method, what works etc. that agrees with reality (as Munger once said, *"Models which underlie reality"*) and help me remember and more easily make associations.

But I don't judge or care how others label it or do it – models, concepts, default positions ... The important thing is that whatever we use, it reflects and agrees with reality and that it works for us to help us understand or explain a situation or know what to do or not do.

Useful and good enough guide me. I am pretty pragmatic – whatever works is fine. I follow Deng Xiaoping, *"I don't care whether the cat is black or white as long as it catches mice."* As Feynman said, *"What is the best method to obtain the solution to a problem? The answer is, any way that works."*

I'll tell you about a thing Feynman said on education which I remind myself of from time to time in order not to complicate things (from Richard P. Feynman, Michael A. Gottlieb, Ralph Leighton, Feynman's Tips on Physics: A Problem-Solving Supplement to the Feynman Lectures on Physics):

"There's a round table on three legs. Where should you lean on it, so the table will be the most unstable?"

The student's solution was, "Probably on top of one of the legs, but let me see: I'll calculate how much force will produce what lift, and so on, at different places."

Then I said, "Never mind calculating. Can you imagine a real table?"

"But that's not the way you're supposed to do it!"

"Never mind how you're supposed to do it; you've got a real table here with the various legs, you see? Now, where do you think you'd lean? What would happen if you pushed down directly over a leg?"

"Nothin'!"

I say, "That's right; and what happens if you push down near the edge, halfway between two of the legs?"

"It flips over!"

I say, "OK! That's better!"

The point is that the student had not realized that these were not just mathematical problems; they described a real table with legs. Actually, it wasn't a real table, because it was perfectly circular, the legs were straight up and down, and so on. But it nearly described, roughly speaking, a real table, and from knowing what a real table does, you can get a very good idea of what this table does without having to calculate anything – you know darn well where you have to lean to make the table flip over. So, how to explain that, I don't know! But once you get the idea that the problems are not mathematical problems but physical problems, it helps a lot.

Anyway, that's just two ways of solving this problem. There's no unique way of doing any specific problem. By greater and greater ingenuity, you can find ways that require less and less work, but that takes experience.

Which mental models "carry the most freight?" (Related follow up: Which concepts from Buffett/Munger/Mental Models do you find yourself referring to or appreciating most frequently?)

Ideas from biology and psychology since many stupidities are caused by not understanding human nature (and you get illustrations of this nearly every day). And most of our tendencies were already known by the classic writers (Publius Syrus, Seneca, Aesop, Cicero etc.)

Others that I find very useful both in business and private is the ideas of Quantification (without the fancy math), Margin of safety, Backups, Trust, Constraints/Weakest link, Good or Bad Economics slash Competitive advantage, Opportunity cost, Scale effects. I also think Keynes idea of changing your mind when you get new facts or information is very useful.

But since reality isn't divided into different categories but involves a lot of factors interacting, I need to synthesize many ideas and concepts.

Are there any areas of the mental models approach you feel are misunderstood or misapplied?

I don't know about that but what I often see among many smart people agrees with Munger's comment: "All this stuff is really quite obvious and yet most people don't really know it in a way where they can use it."

Anyway, I believe if you really understand an idea and what it means – not only memorizing it – you should be able to work out its different applications and functional equivalents. Take a simple big idea – think on it – and after a while you see its wider applications. To use Feynman's advice, "It is therefore of first-rate importance that you know how to "triangulate" – that is, to know how to figure something out from what you already know." As a good friend says, "Learn the basic ideas, and the rest will fill itself in. Either you get it or you don't."

Most of us learn and memorize a specific concept or method etc. and learn about its application in one situation. But when the circumstances change we don't know what to do and we don't see that the concept may have a wider application and can be used in many situations.

Take for example one big and useful idea – Scale effects. That the scale of size, time and outcomes changes things – characteristics, proportions, effects, behavior...and what is good or not must be tied to scale. This is a very fundamental idea from math. Munger described some of this idea's usefulness in his worldly wisdom speech. One effect from this idea I often see people miss and I believe is important is group size and behavior. That trust, feeling of affection and altruistic actions breaks down as group size increases, which of course is important to know in business settings. I wrote about this in Seeking Wisdom (you can read more if you type in Dunbar Number on Google search). I know of some businesses that understand the importance of this and split up companies into smaller ones when they get too big (one example is Semco).

Another general idea is "Gresham's Law" that can be generalized to any process or system where the bad drives out the good. Like natural selection or "We get what we select for" (and as Garrett Hardin writes, "The more general principle is: We get whatever we reward for).

While we are on the subject of mental models etc., let me bring up another thing that distinguishes the great thinkers from us ordinary mortals. Their ability to quickly assess and see the essence of a situation – the critical things that really matter and what can be ignored. They have a clear notion of what they want to achieve or avoid and then they have this ability to zoom in on the key factor(s) involved.

One reason to why they can do that is because they have a large repertoire of stored personal and vicarious experiences and concepts in their heads. They are masters at pattern recognition and connection. Some call it intuition but as Herbert Simon once said, "*The situation has provided a cue; this cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition.*"

It is about making associations. For example, roughly like this:

Situation X Association (what does this remind me of?) to experience, concept, metaphor, analogy, trick, filter... (Assuming of course we are able to see the essence of the situation) What counts and what doesn't? What works/not? What to do or what to explain?

Let's take employing someone as an example (or looking at a business proposal). This reminds me of one key factor – trustworthiness and Buffett's story, "If you're looking for a manager, find someone who is intelligent, energetic and has integrity. If he doesn't have the last, make sure he lacks the first two."

I believe Buffett and Munger excel at this – they have seen and experienced so much about what works and not in business and behavior.

Buffett referred to the issue of trust, chain letters and pattern recognition at the latest annual meeting:

You can get into a lot of trouble with management that lacks integrity... If you've got an intelligent, energetic guy or woman who is pursuing a course of action, which gets put on the front page it could make you very unhappy. You can get into a lot of trouble. ..We've seen patterns...Pattern recognition is very important in evaluating humans and businesses. Pattern recognition isn't one hundred percent and none of the patterns exactly repeat themselves, but there are certain things in business and securities markets that we've seen over and over and frequently come to a bad end but frequently look extremely good in the short run. One which I talked about last year was the chain letter scheme. You're going to see chain letters for the rest of your life. Nobody calls them chain letters because that's a connotation that will scare you off but they're disguised as chain letters and many of the schemes on Wall Street, which are designed to fool people, have that particular aspect to it...There were patterns at Valeant certainly...if you go and watch the Senate hearings, you will see there are patterns that should have been picked up on.

This is what he wrote on chain letters in the 2014 annual report:

In the late 1960s, I attended a meeting at which an acquisitive CEO bragged of his "bold, imaginative accounting." Most of the analysts listening responded with approving nods, seeing themselves as having found a manager whose forecasts were certain to be met, whatever the business results might be. Eventually, however, the clock struck twelve, and everything turned to pumpkins and mice. Once again, it became evident that business models based on the serial issuances of overpriced shares – just like chain-letter models – most assuredly redistribute wealth, but in no way create it. Both phenomena, nevertheless, periodically blossom in our country – they are every promoter's dream – though often they appear in a carefully-crafted disguise. The ending is always the same: Money flows from the gullible to the fraudster. And with stocks, unlike chain letters, the sums hijacked can be staggering.

And of course, the more prepared we are or the more relevant concepts and "experiences" we have in our heads, the better we all will be at this. How do we get there? Reading, learning and practice so we know it "fluently." There are no shortcuts. We have to work at it and apply it to the real world.

As a reminder to myself so I understand my limitation and "circle", I keep a paragraph from Munger's USC Gould School of Law Commencement Address handy so when I deal with certain issues, I don't fool myself into believing I am Max Planck when I'm really the Chauffeur:

In this world I think we have two kinds of knowledge: One is Planck knowledge, that of the people who really know. They've paid the dues, they have the aptitude. Then we've got chauffeur knowledge. They have learned to prattle the talk. They may have a big head of hair. They often have fine timbre in their voices. They make a big impression. But in the end what they've got is chauffeur knowledge masquerading as real knowledge.

Which concepts from Buffett/Munger/Mental Models do you find most counterintuitive?

One trick or notion I see many of us struggling with because it goes against our intuition is the concept of inversion – to learn to think “in negatives” which goes against our normal tendency to concentrate on for example, what we want to achieve or confirmations instead of what we want to avoid and disconfirmations. Another example of this is the importance of missing confirming evidence (I call it the “Sherlock trick”) – that negative evidence and events that don’t happen, matter when something implies they should be present or happen.

Another example that is counterintuitive is Newton’s 3d law that forces work in pairs. One object exerts a force on a second object, but the second object also exerts a force equal and opposite in direction to the force acting on it – the first object. As Newton wrote, “If you press a stone with your finger, the finger is also pressed by the stone.” Same as revenge (reciprocation).

Who are some of the non-obvious, or under-the-radar thinkers that you greatly admire?

One that immediately comes to mind is one I have mentioned in the introduction in two of my books is someone I am fortunate to have as a friend – Peter Kaufman. An outstanding thinker and a great businessman and human being. On a scale of 1 to 10, he is a 15.

What have you come to appreciate more with Buffett/Munger’s lessons as you’ve studied them over the years?

Their ethics and their ethos of clarity, simplicity and common sense. These two gentlemen are outstanding in their instant ability to exclude bad ideas, what doesn’t work, bad people, scenarios that don’t matter, etc. so they can focus on what matters. Also my amazement that their ethics and ideas haven’t been more replicated. But I assume the answer lies in what Munger once said, “The reason our ideas haven’t spread faster is they’re too simple.” This reminds me something my father-in-law once told me (a man I learnt a lot from) – the curse of knowledge and the curse of academic title. My now deceased father-in-law was an inventor and manager. He did not have any formal education but was largely self-taught. Once a big corporation asked for his services to solve a problem their 60 highly educated engineers could not solve. He solved the problem. The engineers said, “It can’t be that simple.” It was like they were saying that, “Here we have 6 years of school, an academic title, lots of follow up education. Therefore an engineering problem must be complicated”. Like Buffett once said of Ben Graham’s ideas, “I think that it comes down to those ideas – although they sound so simple and commonplace that it kind of seems like a waste to go to school and get a PhD in Economics and have it all come back to that. It’s a little like spending eight years in divinity school and having somebody tell you that the 10 commandments were all that counted. There is a certain natural tendency to overlook anything that simple and important.”

(I must admit that in the past I had a tendency to be extra drawn to elegant concepts and distracting me from the simple truths.)

What things have you come to understand more deeply in the past few years?

- That I don’t need hundreds of concepts, methods or tricks in my head – there are a few basic, time-filtered fundamental ones that are good enough. As Munger says, “The more basic knowledge you have the less new knowledge you have to get.” And when I look at something “new”, I try to connect it to something I already understand and if possible get a wider application of an already existing basic concept that I already have in my head.
- Neither do I have to learn everything to cover every single possibility – not only is it impossible but the big reason is well explained by the British statistician George Box. He said that we shouldn’t be preoccupied with optimal or best procedures but good enough over a range of possibilities likely to happen in practice – circumstances which the world really present to us.

- The importance of “Picking my battles” and focus on the long-term consequences of my actions. As Munger said, “A majority of life’s errors are caused by forgetting what one is really trying to do.”
- How quick most of us are in drawing conclusions. For example, I am often too quick in being judgmental and forget how I myself behaved or would have behaved if put in another person’s shoes (and the importance of seeing things from many views).
- That I have to “pick my poison” since there is always a set of problems attached with any system or approach – it can’t be perfect. The key is try to move to a better set of problems one can accept after comparing what appear to be the consequences of each.
- How efficient and simplified life is when you deal with people you can trust. This includes the importance of the right culture.
- The extreme importance of the right CEO – a good operator, business person and investor.
- That luck plays a big role in life.
- That most predictions are wrong and that prevention, robustness and adaptability is way more important. I can’t help myself – I have to add one thing about the people who give out predictions on all kinds of things. Often these are the people who live in a world where their actions have no consequences and where their ideas and theories don’t have to agree with reality.
- That people or businesses that are foolish in one setting often are foolish in another one (“The way you do anything, is the way you do everything”).
- Buffett’s advice that “A checklist is no substitute for thinking.” And that sometimes it is easy to overestimate one’s competency in a) identifying or picking what the dominant or key factors are and b) evaluating them including their predictability. That I believe I need to know factor A when I really need to know B – the critical knowledge that counts in the situation with regards to what I want to achieve.
- Close to this is that I sometimes get too involved in details and can’t see the forest for the trees and I get sent up too many blind alleys. Just as in medicine where a whole body scan sees too much and sends the doctor up blind alleys.
- The wisdom in Buffett’s advice that “You only have to be right on a very, very few things in your lifetime as long as you never make any big mistakes...An investor needs to do very few things right as long as he or she avoids big mistakes.”

What’s the best investment of time/effort/money that you’ve ever made?

The best thing I have done is marrying my wife. As Buffett says and it is so so true, “Choosing a spouse is the most important decision in your life...You need everything to be stable, and if that decision isn’t good, it may affect every other decision in life, including your business decisions...If you are lucky on health and...on your spouse, you are a long way home.”

A good “investment” is taking the time to continuously improve. It just takes curiosity and a desire to know and understand – real interest. And for me this is fun.

What does your typical day look like? (How much time do you spend reading... and when?)

Every day is a little different but I read every day.

What book has most impacted your life?

There is not one single book or one single idea that has done it. I have picked up things from different books (still do). And there are different books and articles that made a difference during different periods of my life. Meeting and learning from certain people and my own practical experiences has been more important in my development. As an example – When I was in my 30s a good friend told me something that has been very useful in looking at products and businesses. He said I should always ask who the real customer is: *“Who ultimately decides what to buy and what are their decision criteria and how are they measured and rewarded and who pays?”*

But looking back, if I have had a book like Poor Charlie’s Almanack when I was younger I would have saved myself some misery. And of course, when it comes to business, managing and investing, nothing beats learning from Warren Buffett’s Letters to Berkshire Hathaway Shareholders.

Another thing I have found is that it is way better to read and reread fewer books but good and timeless ones and then think. Unfortunately many people absorb too many new books and information without thinking.

Let me finish this with some quotes from my new book that I believe we all can learn from:

- “There’s no magic to it...We haven’t succeeded because we have some great, complicated systems or magic formulas we apply or anything of the sort. What we have is just simplicity itself.” – Buffett
- “Our ideas are so simple that people keep asking us for mysteries when all we have are the most elementary ideas...There’s nothing remarkable about it. I don’t have any wonderful insights that other people don’t have. Just slightly more consistently than others, I’ve avoided idiocy...It is remarkable how much long-term advantage people like us have gotten by trying to be consistently not stupid, instead of trying to be very intelligent.” – Munger
- “It really is simple – just avoid doing the dumb things. Avoiding the dumb things is the most important.” – Buffett

Finally, I wish you and your readers an excellent day – Everyday!

88. Using Multidisciplinary Thinking to Approach Problems in a Complex World

Complex outcomes in human systems are a tough nut to crack when it comes to deciding what's really true. Any phenomena we might try to explain will have a host of competing theories, many of them seemingly plausible.

So how do we know what to go with?

One idea is to take a nod from the best. One of the most successful “explainers” of human behavior has been the cognitive psychologist Steven Pinker. His books have been massively influential, in part because they combine scientific rigor, explanatory power, and plainly excellent writing.

What's unique about Pinker is the range of sources he draws on. His book The Better Angels of Our Nature, a cogitation on the decline in relative violence in recent human history, draws on ideas from evolutionary psychology, forensic anthropology, statistics, social history, criminology, and a host of other fields. Pinker, like Vaclav Smil and Jared Diamond, is the opposite of the man with a hammer, ranging over much material to come to his conclusions.

In fact, when asked about the progress of social science as an explanatory arena over time, Pinker credited this cross-disciplinary focus:

Because of the unification with the sciences, there are more genuinely explanatory theories, and there's a sense of progress, with more non-obvious things being discovered that have profound implications.

But, even better, Pinker gives out an outline for how a multidisciplinary thinker should approach problems in a complex world.

Here's the issue at stake: When we're viewing a complex phenomena—say, the decline in certain forms of violence in human history—it can be hard to come up with a rigorous explanation. We can't just set up repeated lab experiments and vary the conditions of human history to see what pops out, as with physics or chemistry.

So out of necessity, we must approach the problem in a different way.

In the above referenced interview, Pinker gives a wonderful example how to do it:

Note how he carefully “cross-checks” from a variety of sources of data, developing a 3D view of the landscape he's trying to assess:

Pinker: Absolutely, I think most philosophers of science would say that all scientific generalizations are probabilistic rather than logically certain, more so for the social sciences because the systems you are studying are more complex than, say, molecules, and because there are fewer opportunities to intervene experimentally and to control every variable. But the existence of the social sciences, including psychology, to the extent that they have discovered anything, shows that, despite the uncontrollability of human behavior, you can make some progress: you can do your best to control the nuisance variables that are not literally in your control; you can have analogues in a laboratory that simulate what you're interested in and impose an experimental manipulation.

You can be clever about squeezing the last drop of causal information out of a correlational data set, and you can use converging evidence, the qualitative narratives of traditional history in combination with quantitative data sets and regression analyses that try to find patterns in them. But I also go to traditional historical narratives, partly as a sanity check. If you're just manipulating numbers, you never know whether you've wandered into some preposterous conclusion by taking numbers too seriously that couldn't possibly reflect reality. Also, it's the narrative history that provides hypotheses that can then be tested. Very often a historian comes up with some plausible causal story, and that gives the social scientists something to do in squeezing a story out of the numbers.

Warburton: I wonder if you've got an example of just that, where you've combined the history and the social science?

Pinker: One example is the hypothesis that the Humanitarian Revolution during the Enlightenment, that is, the abolition of slavery, torture, cruel punishments, religious persecution, and so on, was a product of an expansion of empathy, which in turn was fueled by literacy and the consumption of novels and journalistic accounts. People read what life was like in other times and places, and then applied their sense of empathy more broadly, which gave them second thoughts about whether it's a good idea to disembowel someone as a form of criminal punishment. So that's a historical hypothesis. Lynn Hunt, a historian at the University of California–Berkeley, proposed it, and there are some psychological studies that show that, indeed, if people read a first-person account by someone unlike them, they will become more sympathetic to that individual, and also to the category of people that that individual represents.

So now we have a bit of experimental psychology supporting the historical qualitative narrative. And, in addition, one can go to economic historians and see that, indeed, there was first a massive increase in the economic efficiency of manufacturing a book, then there was a massive increase in the number of books published, and finally there was a massive increase in the rate of literacy. So you've got a story that has at least three vertices: the historian's hypothesis; the economic historians identifying exogenous variables that changed prior to the phenomenon we're trying to explain, so the putative cause occurs before the putative effect; and then you have the experimental manipulation in a laboratory, showing that the intervening link is indeed plausible.

Pinker is saying, Look we can't just rely on "plausible narratives" generated by folks like the historians. There are too many possibilities that could be correct.

*Nor can we rely purely on correlations (i.e., the rise in literacy statistically tracking the decline in violence) — they don't necessarily offer us a causative explanation. (Does the rise in literacy *cause* less violence, or is it vice versa? Or, does a third factor cause both?) However, if we layer in some other known facts from areas we can experiment on — say, psychology or cognitive neuroscience — we can sometimes establish the causal link we need or, at worst, a better hypothesis of reality.*

In this case, it would be the finding from psychology that certain forms of literacy do indeed increase empathy (for logical reasons).

*Does this method give us absolute proof? No. However, it does allow us to *propose* and then test, re-test, alter, and strengthen or ultimately reject a hypothesis. (In other words, rigorous thinking.)*

We can't stop here though. We have to take time to examine competing hypotheses — there may be a better fit. The interviewer continues on asking Pinker about this methodology:

Warburton: And so you conclude that the de-centering that occurs through novel-reading and first-person accounts probably did have a causal impact on the willingness of people to be violent to their peers?

Pinker: That's right. And, of course, one has to rule out alternative hypotheses. One of them could be the growth of affluence: perhaps it's simply a question of how pleasant your life is. If you live a longer and healthier and more enjoyable life, maybe you place a higher value on life in general, and, by extension, the lives of others. That would be an alternative hypothesis to the idea that there was an expansion of empathy fueled by greater literacy. But that can be ruled out by data from economic historians that show there was little increase in affluence during the time of the Humanitarian Revolution. The increase in affluence really came later, in the 19th century, with the advent of the Industrial Revolution.

Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

1. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.

2. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
3. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; “Demonstrable” aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.

What we end up with is not necessarily a bulletproof explanation, but probably the best we can do if we think carefully. A good cross-disciplinary examination with quantitative and qualitative sources coming into equal play, and a good dose of judgment, can be far more rigorous than the gut instinct or plausible nonsense type stories that many of us lazily spout.

A Word of Caution

Although Pinker’s “multiple vertices” approach to problem solving in complex domains can be powerful, we always have to be on guard for phenomena that we simply cannot explain at our current level of competence: We must have a “too hard” pile when competing explanations come out “too close to call” or we otherwise feel we’re outside of our circle of competence. Always tread carefully and be sure to follow Darwin’s Golden Rule: Contrary facts are more important than confirming ones. Be ready to change your mind, like Darwin, when the facts don’t go your way.

89. The Green Lumber Fallacy: The Difference between Talking and Doing

“Clearly, it is unrigorous to equate skills at doing with skills at talking..”

— Nassim Taleb

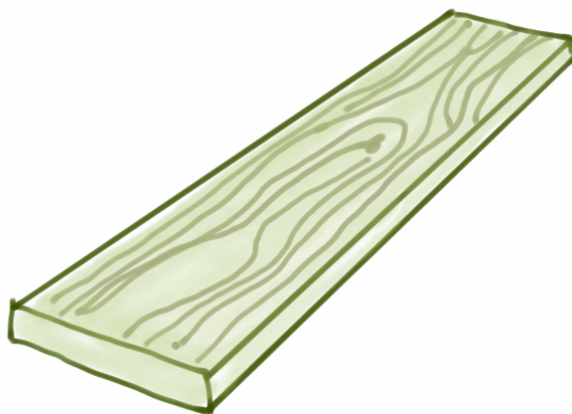
“All that glitters is not gold,” the saying goes. The aesthetics of things often fool us. People we call ignorant might not be ignorant. People we call smart might not be smart. The Green Lumber Fallacy teaches us that the real world doesn’t always match our stories. The real causative factors of success are often hidden from us.

If you’re familiar with evolutionary theory, you know that populations of organisms are constantly subjected to “selection pressures” — the rigors of their environment which lead to certain traits being favored and passed down to their offspring and others being thrown into the evolutionary dustbin.

Biologists dub these advantages in reproduction “*fitness*” — as in, the famously lengthening of giraffe necks gave them greater “fitness” in their environment because it helped them reach high up, untouched leaves. Fitness is generally a relative concept: Since organisms must compete for scarce resources, their fitnesses is measured in the sense of giving a reproductive advantage over one another.

A trait that might provide great fitness in one environment may be useless or even disadvantageous in another. (Imagine draining a pond: Any fitness advantages held by a really incredible fish becomes instantly worthless without water.) Traits also relate to circumstance. An advantage at one time could be a disadvantage at another and vice versa. Nature doesn’t argue, it just tests over and over.

This makes fitness an all-important concept in biology: Traits are selected for if they provide fitness to the organism within a given environment.



The Black Swan author Nassim Taleb has an interesting take on fitness and selection in the real world that boils down to: People who are good “doers” and people who are good “talkers” are often selected for different traits. Be careful not to mix them up.

In his book Antifragile, Taleb uses this idea to invoke a heuristic he’d once used when hiring traders on Wall Street:

The more interesting their conversation, the more cultured they are, the more they will be trapped into thinking that they are effective at what they are doing in real business (something psychologists call the halo effect, the mistake of thinking that skills in, say, skiing translate unfailingly into skills in managing a pottery workshop or a bank department, or that a good chess player would be a good strategist in real life). Clearly, it is unrigorous to equate skills at doing with skills at talking. My experience of good practitioners is that they can be totally incomprehensible—they do not have to put much energy into turning their insights and internal coherence into elegant style and narratives. Entrepreneurs are selected to be doers, not thinkers, and doers do, they don't talk, and it would be unfair, wrong, and downright insulting to measure them in the talk department.

The selection pressures for an entrepreneur are very different from those on a corporate manager or bureaucrat. Entrepreneurs and risk-takers succeed or fail not so much on their ability to talk, explain, and rationalize as their ability to advantageously diverge from the crowd and get things done. While talking and doing can go together, they frequently don't. When you think about it, there's no reason great intellectualizing and great doing must go together: Being able to hack together an incredible piece of code gives you great fitness in the world of software development while doing great theoretical computer science probably gives you better fitness in academia. The two skills don't have to be connected. Great economists don't usually make great investors. But we often confuse the two realms.

We're tempted to think that a great investor must be fluent in behavioral economics or a great CEO fluent in McKinsey-esque management narratives, but in the real world, we see this intuition is constantly proved incorrect.

The investor Walter Schloss worked from 9-5, barely left his office, and wasn't considered an entirely high IQ man, but he compiled one of the great investment records of all time. A young Mark Zuckerberg could hardly be described as a prototypical manager or businessperson, yet somehow built one of the most profitable companies in the world by finding others that complemented his weaknesses.

Our narratives about the type of knowledge or experience we must have or the type of people we must be in order to become successful are often quite wrong; in fact, they border on naive. We think people who *talk well* can *do well*, and vice versa. This is simply not always so.

We won't claim that great doers *cannot be* great talkers, rationalizers, or intellectuals. Sometimes they are. But if you're seeking to understand the world properly, it's good to understand that the two traits are not always co-located.

Success, especially in some "narrow" area like plumbing, programming, trading, or marketing, is often achieved by rather non-intellectual folks. Their evolutionary fitness doesn't come from the ability to talk but do.

The Green Lumber Fallacy

Taleb calls this divergence the Green Lumber Fallacy, after a story in the book *What I Learned Losing a Million Dollars*.

As Taleb describes it in *Antifragile*:

*In one of the rare noncharlatanic books in finance, descriptively called *What I Learned Losing a Million Dollars*, the protagonist makes a big discovery. He remarks that a fellow named Joe Siegel, one of the most successful traders in a commodity called "green lumber," actually thought it was lumber painted green (rather than freshly cut lumber, called green because it had not been dried). And he made it his profession to trade the stuff! Meanwhile the narrator was into grand intellectual theories and narratives of what caused the price of commodities to move, and went bust.*

It is not just that the successful expert on lumber was ignorant of central matters like the designation “green.” He also knew things about lumber that nonexperts think are unimportant. People we call ignorant might not be ignorant.

The fact that predicting the order flow in lumber and the usual narrative had little to do with the details one would assume from the outside are important. People who do things in the field are not subjected to a set exam; they are selected in the most non-narrative manner — nice arguments don’t make much difference. Evolution does not rely on narratives, humans do. Evolution does not need a word for the color blue.

So let us call the green lumber fallacy the situation in which one mistakes a source of visible knowledge — the greenness of lumber — for another, less visible from the outside, less tractable, less narratable.

The main takeaway is that the real causative factors of success are often hidden from us. We think that knowing the intricacies of green lumber are more important than keeping a close eye on the order flow. We seduce ourselves into overestimating the impact of our intellectualism and then wonder why “idiots” are getting ahead.

But for “skin in the game” operations, selection and evolution don’t care about great talk and ideas unless they translate into results. They care what you do with the thing more than that you *know* the thing. They care about actually avoiding risk rather than your extensive knowledge of risk management theories. (Of course, in many areas of modernity *there is no skin in the game*, so talking and rationalizing can be and frequently are selected for.)

As Taleb did with his hiring heuristic, this should teach us to be a little skeptical of taking good talkers at face value, and to be a little skeptical when we see “unexplainable” success in someone we consider “not as smart.” There might be a disconnect we’re not seeing because we’re seduced by a narrative. (A problem someone like Lee Kuan Yew avoided by focusing exclusively on what worked.)

We don’t have to give up our intellectual pursuits in order to appreciate this nugget of wisdom; Taleb is right, but it’s also true that combining the rigorous, skeptical knowledge of “what actually works” with an ever-improving theory structure of the world might be the best combination of all — selected for in many more environments than simple *git-er-done* ability, which can be extremely domain and environment dependent. (The green lumber guy might not have been much good outside the trading room.)

90. Batesian Mimicry: Why Copycats Are Successful

One of our first interview guests for The Knowledge Project was the former NFL executive Michael Lombardi. In our interview, we discussed topics ranging from the nature of leadership to decision making in a football context. Mike is one of the wisest thinkers associated with the game.

We heard Mike on an NFL podcast recently, and in a brief clip you can listen to here, Mike makes a fascinating comment on differentiating between a Mimic and the Real Thing:

“There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”

Mike got the idea from my friend and CEO of Glenair, Peter Kaufman. Following Mike’s lead, we chose to dig in a little further.

Turns out there are a *host* of Coral Snake Mimics, all designed to look exactly as fierce as the true bad guys. Besides the Mexican Milk Snake, there is the Scarlet King Snake, the Florida Scarlet Snake, and the California Mountain Kingsnake. (At least.)

For an example, here are the Texas Coral Snake on the left and the Mexican Milk Snake on the right. Pretty damn close!



According to Wikipedia, the Texas Coral Snake's venom is a "powerful neurotoxin, causing neuromuscular dysfunction", and terrifyingly describes its bite as coming from "a pair of hollow, small, fixed fangs in the front of its upper jaw, through which the venom is injected and encouraged via a chewing motion. Due to this method of venom delivery, a coral snake must bite and hold on for a brief time to deliver a significant amount of venom..." The Milk Snake, on the other hand, is described as a pretty ideal pet: "The Mexican Milk Snake adapts well to captive care, and its smaller size and striking colorations can make it an attractive choice for a pet snake. They are normally docile, and not typically apt to bite or expel musk."

So, how is it that these two look alike? It's due to a phenomenon called Batesian Mimicry. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched!

In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.

This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs.

We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffetts. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit.

It seems almost a law of nature that success will be copied, sometimes in a very disgraceful way. (Charlie Munger thinks that the fundamental algorithm of life is "Repeat what works.")

Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry — even in ourselves.

This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself.

The real thing knows a fake. Charlie Munger once commented on this in relation to the field of money management:

"It's very hard to tell the difference between a good money manager and someone who just has the patter down. If you aren't a good money manager yourself, rather than trying to pick one, you're probably better off with a low cost index fund. 'It takes one to know one'."

An insight this good is only possible through continued study across the largest and most relevant fields of study. Peter got this idea by studying biology, a field full of incredible insight but, strangely underappreciated by most "non-biologists". It's not just ideas about predators and prey, but niches, competition, co-evolutionary arms races and a whole host of others which give us massive insight into the human world.

Peter realized that studying across fields like biology and physics is something like buying an index fund: It works because you capture *all* the important companies traded on the public exchange, not just a select few. That means you capture the massive winners, which tend to greatly outweigh the failures.

Studying across *all* of the important fields gives you the same advantage, except it's even better: If an index fund buys a new position, it must sell something to do so; consequently, the "big winners" can only impact your portfolio in a limited way. But if you come to understand a new Great Idea, you don't have to give up the ones you already know! This is a great advantage.

And so it's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

91. Immigration, Extinction, and Island Equilibrium

Equilibrium is an important concept that permeates many disciplines. In chemistry we think about the point where the rate of *forward reaction* is equal to the rate of *backward reaction*. In economics we think of the point where *supply* equals *demand*. In physics we can see how *gravity* is balanced by *forward velocity* to create things like planetary orbits.

No matter which discipline we are examining, the core idea remains the same: Equilibrium is a state where opposing forces are balanced.

In biology, equilibrium is so important that it can mean the difference between life or death; for a species, it can decide whether they will thrive or become extinct.

In The Song of the Dodo, David Quammen dives into how equilibrium affects a species' ability to survive, and how it impacts our ability to save animals on the brink of extinction.

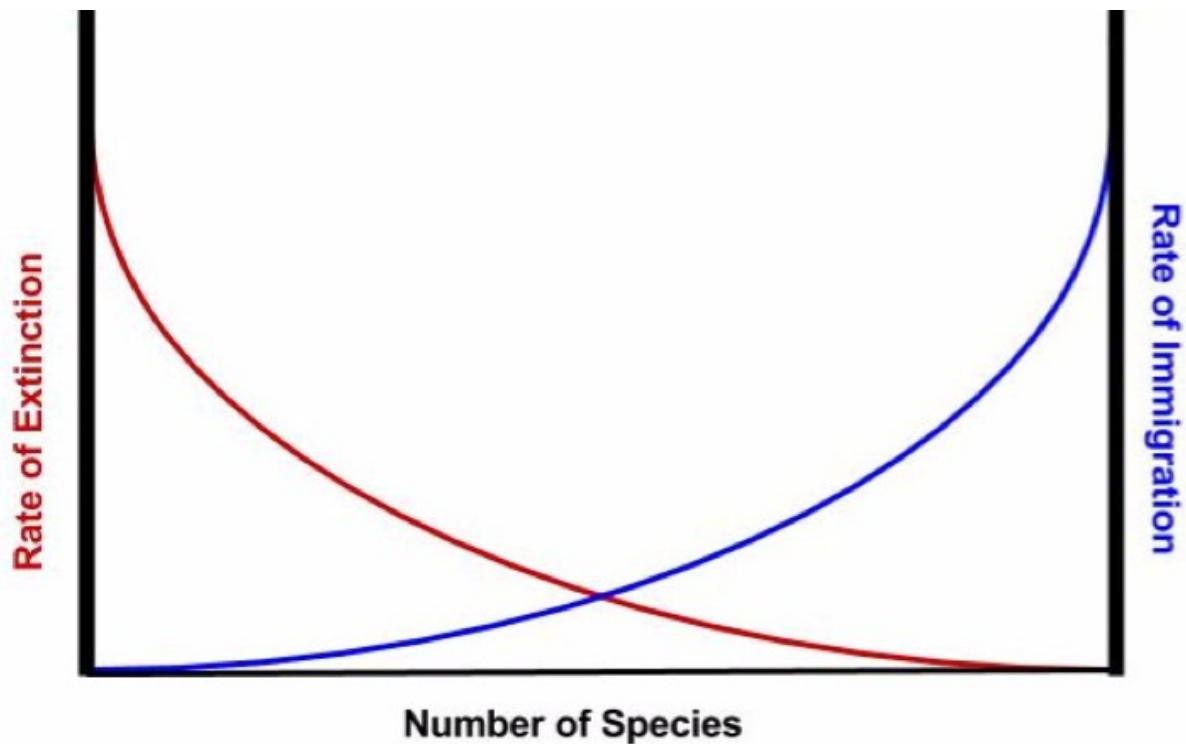
Historically, the concept of island equilibrium was studied with a focus on the interplay between evolution (as the additive) and extinction (as the subtractive). It was believed that speciation, the process where one species becomes two or more species, caused any increase in the number of inhabitants on an island. In this view, the insularity of islands created a remoteness that could only be overcome by the long processes of evolution. However, Robert MacArthur and E.O. Wilson, the co-authors of the influential Theory of Island Biogeography, realized that habitats would show a tendency towards equilibrium much sooner than could be accounted for by speciation. They argued the ongoing processes that most influenced this balance were immigration and extinction.

The type of extinctions we're referring to in this case are local extinctions, specific to the island in question. A species can go extinct on a particular island and yet be thriving elsewhere; it depends on local conditions.

As for immigration, it's just what you'd expect: The movement of species from one place to another. Island immigration describes the many ingenious ways in which plants, animals, and insects travel to islands. For instance, not only will insects hitch rides on birds and debris (man made or natural, think garbage and sticks/uprooted seaweed), animals will do the same if the debris is massive enough.

Seeds, meanwhile, make the trip in the feces of birds, which helps to introduce new plant species to the island, while highly motivated swimmers (escapees of natural disasters/predators/famine) and hitchhikers on human ships (think rats) make it over in their own unusual ways.

We can plot this process of immigration and extinction *graphically*, in a way you're probably familiar with. Quammen explains:



The decrease in immigration rate and the increase in extinction rate are graphed not against elapsed time but against the number of species present on a given island. As an island fills up with species, immigration declines and extinction increases, until they offset each other at an equilibrium level. At that level, the rate of continuing immigration is just canceled by the rate of continuing extinction, and there is no net gain or loss of species. The phenomenon of offsetting increase and decrease – the change of identities on the roster of species – is known as turnover. One species of butterfly arrives, another species of butterfly dies out, and in the aftermath the island has the same number of butterfly species as before. Equilibrium with turnover.

So while the specific species inhabiting the island will change over time, the numbers will tend to roll towards a balanced point where the two curves intersect.

Of course, not all equilibrium graphs will look the like one above. Indeed, MacArthur and Wilson hoped this theory would be used not just to explain equilibriums, but to also help predict potential issues.

When either curve is especially steep – reflecting the fact that immigration decreases especially sharply or extinction increases especially sharply – their crossing point shifts leftward, toward zero. The shift means that, at equilibrium, in this particular set of circumstances, there will be relatively few resident species.

In other words, high extinction and low immigration yield an impoverished ecosystem. To you and me it's a dot in Cartesian space, but to an island it represents destiny.

There are two key ideas that can help us understand the equilibrium point on a given island.

First, the concept of species-area relationship: We see a larger number of a given species on larger islands and a smaller number of a given species on smaller islands.

Second, the concept of species quantity on remote islands: Immigration is much more difficult the further away an island is from either a mainland or a cluster of other islands, meaning that fewer species will make it there.

In other words, size and remoteness are directly correlated to the fragility of any given species inhabiting an island.

Equilibrium, immigration, evolution, extinction – these are all ideas that bleed into so many more areas than biogeography. What happens to groups when they are isolated? Jared Diamond had some interesting thoughts on that. What happens to products or businesses which don't keep up with co-evolution? They go extinct due to the Red Queen Effect. What happens to our mind and body when we feel off balance? Our life is impoverished. Reading a book like The Song of the Dodo helps us to better understand these key concepts which, in turn, helps us more fundamentally understand the world.

92. Principles for an Age of Acceleration

We live in an age where technology is developing at a rate faster than what any individual can keep up with. To survive in an age of acceleration, we need a new way of thinking about technology.

MIT Media Lab is a creative nerve center where great ideas like One Laptop per Child, LEGO Mindstorms, and Scratch programming language have emerged.

Its director, Joi Ito, has done a lot of thinking about how prevailing systems of thought will not be the ones to see us through the coming decades. In his book Whiplash: How to Survive our Faster Future, he notes that sometime late in the last century, technology began to outpace our ability to understand it.

We are blessed (or cursed) to live in interesting times, where high school students regularly use gene editing techniques to invent new life forms, and where advancements in artificial intelligence force policymakers to contemplate widespread, permanent unemployment. Small wonder our old habits of mind—forged in an era of coal, steel, and easy prosperity—fall short. The strong no longer necessarily survive; not all risk needs to be mitigated; and the firm is no longer the optimum organizational unit for our scarce resources.

Ito's ideas are not specific to our moment in history, but adaptive responses to a world with certain characteristics:

1. Asymmetry

In our era, effects are no longer proportional to the size of their source. The biggest change-makers of the future are the small players: “start-ups and rogues, breakaways and indie labs.”

2. Complexity

The level of complexity is shaped by four inputs, all of which are extraordinarily high in today's world: heterogeneity, interconnection, interdependency and adaptation.

3. Uncertainty

“Not knowing is okay. In fact, we've entered an age where the admission of ignorance offers strategic advantages over expending resources—subcommittees and think tanks and sales forecasts—toward the increasingly futile goal of forecasting future events.”

When these three conditions are in place, certain guiding principles serve us best. In his book, Ito shares some of the maxims that organize his “anti-disciplinary” Media Lab in a complex and uncertain world.

Emergence over Authority

Complex systems show properties that their individual parts don't possess, and we call this process “emergence”. For example, life is an emergent property of chemistry. Groups of people also produce a wondrous variety of emergent behaviors—languages, economies, scientific revolutions—when each intellect contributes to a whole that is beyond the abilities of any one person.

Some organizational structures encourage this kind of creativity more than others.

Authoritarian systems only allow for incremental changes, whereas nonlinear innovation emerges from decentralized networks with a low barrier to entry. As Stephen Johnson describes in Emergence, when you plug more minds into the system, “isolated hunches and private obsessions coalesce into a new way of looking at the world, shared by thousands of individuals.”

Synthetic biology best exemplifies the type of new field that can arise from emergence. Not to be confused with genetic engineering, which modifies existing organisms, synthetic biology aims to create entirely new forms of life.

Having emerged in the era of open-source software, synthetic biology is becoming an exercise in radical collaboration between students, professors, and a legion of citizen scientists who call themselves biohackers. Emergence has made its way into the lab. As a result, the cost of sequencing DNA is plummeting at six times the rate of Moore's Law, and a large Registry of Standard Biological Parts, or BioBricks, now offers genetic components that perform well-understood functions in whatever organism is being created, like a block of Lego.

There is still a place for leaders in an organization that fosters emergence, but the role may feel unfamiliar to a manager from a traditional hierarchy. The new leader spends less time leading and more time “gardening”—pruning the hedges, watering the flowers, and otherwise getting out of the way. (As biologist Lewis Thomas puts it, a great leader must get the air right.)

Pull over Push

“Push” strategies involve directing resources from a central source to sites where, in the leader’s estimation, they are likely to be needed or useful. In contrast, projects that use “pull” strategies attract intellectual, financial and physical resources to themselves just as they are needed, rather than stockpiling them.

Ito is a proponent of the sharing economy, through which a startup might tap into the global community of freelancers and volunteers for a custom-made task force instead of hiring permanent teams of designers, programmers or engineers.

Here’s a great example:

When the Fukushima nuclear meltdown happened, Ito was living just outside of Tokyo. The Japanese government took a command-and-control (“push”) approach to the disaster, in which information would slowly climb up the hierarchy, and decisions would then be passed down stepwise to the ground-level workers.

It soon became clear that the government was not equipped to assess or communicate the radioactivity levels of each neighborhood, so Ito and his friends took the problem into their own hands. Pulling in expertise and money from far-flung scientists and entrepreneurs, they formed a citizen science group called Safecast, which built its own GPS-equipped Geiger counters and strapped them to cars for faster monitoring. They launched a website that continues to share data – more than 50 million data points so far – about local environments.

To benefit from these kinds of “pull” strategies, it pays to foster an environment that is rich with weak ties – a wide network of acquaintances from which to draw just-in-time knowledge and resources, as Ito did with Safecast.

Compasses over Maps

Detailed maps can be more misleading than useful in a fast-changing world, where a compass is the tool of choice. In the same way, organizations that plan exhaustively will be outpaced in an accelerating world by ones that are guided by a more encompassing mission.

A map implies a straightforward knowledge of the terrain, and the existence of an optimum route; the compass is a far more flexible tool and requires the user to employ creativity and autonomy in discovering his or her own path.

One advantage to the compass approach is that when a roadblock inevitably crops up, there is no need to go back to the beginning to form another plan or draw up multiple plans for each contingency. You simply navigate around the obstacle and continue in your chosen direction.

It is impossible, in any case, to make detailed plans for a complex and creative organization. The way to set a compass direction for a company is by creating a culture—or set of mythologies—that animates the parts in a common worldview.

In the case of the MIT Media Lab, that compass heading is described in three values: “Uniqueness, Impact, and Magic”. *Uniqueness* means that if someone is working on a similar project elsewhere, the lab moves on.

Rather than working to discover knowledge for its own sake, the lab works in the service of *Impact*, through start-ups and physical creations. It was expressed in the lab’s motto “Deploy or die”, but Barack Obama suggested they work on their messaging, and Ito shortened it to “Deploy.”

The *Magic* element, though hard to define, speaks to the delight that playful originality so often awakens.

Both students and faculty at the lab are there to learn, but not necessarily to be “educated”. Learning is something you pursue for yourself, after all, whereas education is something that’s done to you. The result is “agile, scrappy, permissionless innovation”.

The new job landscape requires more creativity from everybody. The people who will be most successful in this environment will be the ones who ask questions, trust their instincts, and refuse to follow the rules when the rules get in their way.

Other principles discussed in Whiplash include Risk over Safety, Disobedience over Compliance, Practice over Theory, Diversity over Ability, Resilience over Strength, and Systems over Objects.

93. Tribal Leadership: The Key To Building Great Teams

Have you ever wondered about internal organization dynamics and why some groups of people (who aren't on the same team) are more successful than others? Why different "tribes" inside the organization seem to be at war with one another lowering performance in increasing politics? Why certain groups of people never seem to do anything? Or why its hard to move into the next level? Read on.

Tribal Leadership

Organizations are a collection of small towns wrapped into a bigger city. Each small town is full of people from slackers to sherifs. While the people in the towns are different, the roles are similar. In their book, Tribal Leadership: Leveraging Natural Groups to Build a Thriving Organization, Dave Logan, John King, and Halee Fischer-Wright, call these small towns tribes.

Tribes consist of groups of people from 20-150. (You can think of the test to identify whether someone is in your tribe as stopping to say "hello" and have a brief chat when you pass them on the street.) When the tribe approaches 150, a number that comes from Robin Dunbar's research that was popularized in The Tipping Point, it naturally splits into two.

Importantly, tribes are not (necessarily) teams. Yet tribes are how work gets done in organizations. They have the ability to render the latest corporate culture efforts from CEOs useless. "In companies," Logan and his co-authors write, "tribes decide whether the new leader is going to flourish or get taken out. They determine how much work is going to get done, and of what quality."

As you can imagine some tribes want to change the world while others are content to take a lot of coffee breaks. What compels one tribe of people to constantly evolve and move forward and another to stagnate (succumbing to the Red Queen Effect)? The leaders of the tribe.

More than others, tribal leaders influence the culture of their respective tribes. Ambitious leaders focus on growing, adapting, and upgrading the tribal culture to improve the tribes standing in the organization. If they are successful, the tribe members reward them with "cult like loyalty." (This explains the phenomenon of promotions in a lot of organizations: When the tribe leader is promoted, a lot of the tribe members follow suit.)

Organizations are the sum of the tribes. Some are moving in the same direction while others veer in another. Some tribes propel while yet others add friction. Some tribes attract talent and others eject it. Performance is set not by the individual tribe leader but by the aggregation of them.

Tribal leadership is a process not an outcome and most people are blind to the dynamics of their tribes. Like all of our mental models, when you learn to see your company as a tribe, you can't unsee it. Things just click.

Logan and his co-authors simplify the dynamics of tribal leadership into 5 stages and they arrange the tools accordingly. Each stage has different "leverage points" to move to the next stage. "Each stage," they write, "gets more done and has more fun than the one before it."

Companies are never fully in one stage. They may have various tribes in Stage Two all the way to (hopefully) Stage Five. The more tribes you have operating at higher levels the better the company's performance, at least in theory.

Every tribe has a dominant culture, which we can peg on a one-to-five scale, with the goal being stability at Stage Four, and on occasion leaps to Stage Five.

The leverage points to move from Stage Two to Stage Three is not the same as those you need at Stage Three to move to Stage Four. (A lot of business and self-help books fail to realize this point. Perspective advice is more contextual than people realize.)

Let's look at the Five Stages before looking at the leverage points.

The Five Tribal Stages

Stage One (2%): This is the "life sucks" camp. Logan and his co-authors likely this to street gangs and people that come to work with hostility and despair.

Stage Two (25%): In this stage, life doesn't suck, only your life. In this stage, Logan et al. write, people are "passively antagonistic; they cross their arms in judgment yet never really get interested enough to spark any passion. Their laughter is quietly sarcastic and resigned. The Stage Two talk is that they've seen in all before and watched it all fail. A person at Stage Two will often try to protect his or her people from the intrusion of management." This tribe is largely a collection of victims. This is what we see in Government Departments or The Office. Innovation is almost non-existent. Urgency is reserved for the coffee break. Accountability is rare.

Stage Three (49%): Moving along the continuum from "my life sucks" (Stage Two) we arrive at "I'm great (and you're not)". "Within the Stage Three culture," Logan and his coauthors write, "knowledge is power, so people hoard it, from client contacts to gossip about the company." At this Stage people need to win, especially if that means you lose. On an individual basis, these people are generally competent but form a collection of "lone warriors," who want to help but experience near continuous disappointment when "others don't have their ambition of skill." These people, however, are willing to do the work. The most common complaints for people at this level is that they are too busy, they have no time, and they have crappy support.

Stage Four (22%): This is the progress from *I'm great* (Stage Three) to *we're great* (Stage Four). The journey is not measured in equidistant miles between each stage and the gulf between Three and Four is much larger than from Two to Three. In this Stage if you take the tribe away, "the person's sense of self suffers a loss." Leaders in this Stage feel "pulled by the group." Stage Four tribes have an outside adversary (whereas those operating in Stages Two and Three often have internal ones.) "The rule for Stage Four," writes Logan et al., is "the bigger the foe, the more powerful the tribe." These tribes have little patience for the politics, personal agendas, and Office-style performance that dominate Stage Three. Like a transplant that doesn't take, the group rejects these people.

Stage Five (2%): "Stage Five's T-shirt," write Logan et al., "would read life is great." The language here is one of potential and making history. "Teams at Stage Five have produced miraculous innovations. The team that produced the first Macintosh was at Stage Five. ... This stage is pure leadership, vision, and inspiration." These teams often revert back to Stage Four to regroup before attempting to summit again.

Stage	Mood	Theme
5	Innocent Wonderment	"Life is great"
4	Tribal Pride	"We're great (and they're not)"
3	Lone Warrior	"I'm great (and you're not)"
2	Apathetic Victim	"My life sucks"
1	Despairing Hostility	"Life sucks"

(Source: Tribal Leadership)

“Tribal leadership,” argues Logan and his co-authors, “focuses on two things: the words people use and the types of relationships they form.” Moving from Stage to Stage means using different leverage points.

Leverage Points And Success Indicators to Upgrade Tribal Culture

For a person at Stage One:

- Go where the action is.
- Start hanging around people at Stage Two.
- “Cut ties with people who share the “life sucks” language.

The success indicators here are:

- A move away from “life sucks” language to “my life sucks.”
- Passive apathy replaces despairing hostility.
- Cuts ties with people at Stage One.

For a person at Stage Two:

- Start building one-on-one relationships especially with people at Stage Three.
- “In one-on-one sessions, show her how her work makes an impact.”
- Assign short duration projects that require little nagging (as that might reinforce the “my life sucks” language that dominates this Stage.)

The success indicators here are:

- A move away from “my life sucks” to “I’m great.”
- Name-dropping and bragging.
- Lone warrior fighting the good fight.

For a person at Stage Three:

- Encourage them to form three person relationships.
- Encourage them to work on projects bigger than something they could tackle by themselves.
- The way they’ve worked to achieve the success they’ve had up to this point won’t get them where they need to go. Focus on bigger goals and inviting people in to help them.
- Point to role models who use the “we” language and the success they’ve achieved.

The success indicators here are:

- They will use “we” instead of “I.”
- Their network expands from a few dozen to several hundred.
- Working less but getting more done.

For a Person at Stage Four:

- “Stabilize by ensuring (relationships) are based on values, advantages, and opportunity.”
- Encourage opportunistic behaviour to accomplish greatness.

- Recruiting others to the tribe who share values.
- “Perform regular oil changes with the team. In this process, she should lead a discussion about (1) what is working well, (2) what is not working well, and (3) what the team can do to make things that are not working well, work.”

Success indicators here are:

- A switch from “we’re great” to “life is great”
- Networks include a “stunning amount of diversity.”
- Time allocations are based on values and noble missions.
- Exemplar of the tribes values.

Tribal Leadership is a fascinating book that goes on to offer more strategies for leading others (and ourselves) through the stages. For members, we dive into some of the strategies the book offers for growing your network.

94. Charlie Munger on Getting Rich, Wisdom, Focus, Fake Knowledge and More

"In the chronicles of American financial history," writes David Clark in *The Tao of Charlie Munger: A Compilation of Quotes from Berkshire Hathaway's Vice Chairman on Life, Business, and the Pursuit of Wealth*, "Charlie Munger will be seen as the proverbial enigma wrapped in a paradox—he is both a mystery and a contradiction at the same time." On one hand, Munger received an elite education and it shows: He went to Cal Tech to train as a meteorologist for the Second World War and then attended Harvard Law School and eventually opened his own law firm. That part of his success makes sense.

Yet here's a man who never took a single course in economics, business, marketing, finance, psychology, or accounting, and managed to become one of the greatest, most admired, and most honorable businessmen of our age. He was noted by essentially all observers for the originality of his thoughts, especially about business and human behavior. You don't learn that in law school, at Harvard or anywhere else.

Bill Gates said of him: "He is truly the broadest thinker I have ever encountered." His business partner Warren Buffett put it another way: "He comes equipped for rationality... I would say that to try and typecast Charlie in terms of any other human that I can think of, no one would fit. He's got his own mold."

How does such an extreme result happen? How is such an original and unduly capable mind formed? In the case of Munger, it's clearly a combination of unusual genetics and an unusual approach to learning and life.

While we can't have his genetics, we can try to steal his approach to rationality. There's almost no limit to the amount one could learn from studying the Munger mind, so let's at least start with a rundown of some of his best ideas.

Wisdom and Circles of Competence

"Knowing what you don't know is more useful than being brilliant."

"Acknowledging what you don't know is the dawning of wisdom."

Identify your circle of competence and use your knowledge, when possible, to stay away from things you don't understand. There are no points for difficulty at work or in life.

Avoiding stupidity is easier than seeking brilliance.

Of course this principle relates to another of Munger's sayings: "People are trying to be smart—all I am trying to do is not to be idiotic, but it's harder than most people think."

And this reminds me of perhaps my favorite Mungerism of all time, the very quote that sits right beside my desk:

"It is remarkable how much long-term advantage people like us have gotten by trying to be consistently not stupid, instead of trying to be very intelligent."

Divergence

"Mimicking the herd invites regression to the mean."

Here's a simple axiom to live by: If you do what everyone else does, you're going to get the same results that everyone else gets. This means that, taking out luck (good or bad), if you act average, you're going to *be* average. If you want to move away from average, you must diverge. You must be different. And if you want to outperform others, you must be different and correct. As Munger would say, "How could it be otherwise?"

Know When to Fold 'Em

"Life, in part, is like a poker game, wherein you have to learn to quit sometimes when holding a much-loved hand—you must learn to handle mistakes and new facts that change the odds."

Mistakes are an opportunity to grow. How we handle adversity is up to us. This is how we become personally antifragile.

False Models

Echoing Einstein, who said that “Not everything that counts can be counted, and not everything that can be counted counts,” Munger said this about his and Buffett’s shift to acquiring high-quality businesses for Berkshire Hathaway:

“Once we’d gotten over the hurdle of recognizing that a thing could be a bargain based on quantitative measures that would have horrified Graham, we started thinking about better businesses.”

Being Lazy

“Sit on your ass. You’re paying less to brokers, you’re listening to less nonsense, and if it works, the tax system gives you an extra one, two, or three percentage points per annum.”

Time is a friend to a good business and the enemy of the poor business. It’s also the friend of knowledge and the enemy of the new and novel. As Seneca said, “Time discovers truth.”

Investing Is a Perimutuel System

“You’re looking for a mispriced gamble,” says Munger. “That’s what investing is. And you have to know enough to know whether the gamble is mispriced. That’s value investing.” At another time, he added: “You should remember that good ideas are rare— when the odds are greatly in your favor, bet heavily.”

May the odds forever be in your favor. Actually, learning properly is one way you can tilt the odds in your favor.

Focus

When asked about his success, Munger says, “I succeeded because I have a long attention span.”

Long attention spans allow for a deep understanding of subjects. When combined with deliberate practice, focus allows you to increase your skills and get out of your rut. The Art of Focus is a divergent and correct strategy that can help you identify where the leverage points are and apply your efforts toward them.

Fake Knowledge

“Smart people aren’t exempt from professional disasters from overconfidence.”

We’re so used to outsourcing our thinking to others that we’ve forgotten what it’s like to really understand something from all perspectives. We’ve forgotten just how much work that takes. The path of least resistance, however, is just a click away. Fake knowledge, which comes from reading headlines and skimming the news, seems harmless, but it’s not. It makes us overconfident. It’s better to remember a simple trick: anything you’re getting easily through Google or Twitter is likely to be widely known and should not be given undue weight.

However, Munger adds, “If people weren’t wrong so often, we wouldn’t be so rich.”

Sit Quietly

Echoing Pascal, who said some version of “All of humanity’s problems stem from man’s inability to sit quietly in a room alone,” Munger adds an investing twist: “It’s waiting that helps you as an investor, and a lot of people just can’t stand to wait.”

The ability to be alone with your thoughts and turn ideas over and over, without giving in to Do Something syndrome, affects so many of us. A perfectly reasonable option is to hold your ground and await more information.

Deal With Reality

"I think that one should recognize reality even when one doesn't like it; indeed, especially when one doesn't like it."

Munger clearly learned from Joseph Tussman's wisdom. This means facing harsh truths that you might prefer to ignore. It means meeting the world on the world's terms, not according to how you wish it would be. If this causes temporary pain, so be it. "Your pain," writes Kahil Gibran in The Prophet, "is the breaking of the shell that encloses your understanding."

There Is No Free Lunch

We like quick solutions that don't require a lot of effort. We're drawn to the modern equivalent of an old hustler selling an all-curing tonic. However, the world does not work that way. Munger expands:

"There isn't a single formula. You need to know a lot about business and human nature and the numbers... It is unreasonable to expect that there is a magic system that will do it for you."

Acquiring knowledge is hard work. It's reading and adding to your knowledge so it compounds. It's going deep and developing fluency, something Darwin knew well.

Maximization/Minimization

"In business we often find that the winning system goes almost ridiculously far in maximizing and or minimizing one or a few variables—like the discount warehouses of Costco."

When everything is a priority, nothing is a priority. Attempting to maximize competing variables is a recipe for disaster. Picking one variable and relentlessly focusing on it, which is an effective strategy, diverges from the norm. It's hard to compete with businesses that have correctly identified the right variables to maximize or minimize. When you focus on one variable, you'll increase the odds that you're quick and nimble — and can respond to changes in the terrain.

Map and Terrain

"At Berkshire there has never been a master plan. Anyone who wanted to do it, we fired because it takes on a life of its own and doesn't cover new reality. We want people taking into account new information."

Plans are maps that we become attached to. Once we've told everyone there is a plan and what that plan is, especially multi-year plans, we're psychologically more likely to stick to it because coming out and changing it would be admitting we were wrong. This makes it harder for us to change our strategies when we need to, so we're stacking the odds against ourselves. Detailed five-year plans (that will clearly be wrong) are as disastrous as overly general five-year plans (which can never be wrong).

Scrap the plan, isolate the key variables that you need to maximize and minimize, and follow the agile path blazed by Henry Singleton and followed by Buffett and Munger.

The Keys to Good Government

There are three keys: honesty, effectiveness, and efficiency. Munger says:

"In a democracy, everyone takes turns. But if you really want a lot of wisdom, it's better to concentrate decisions and process in one person. It's no accident that Singapore has a much better record, given where it started, than the United States. There, power was concentrated in an enormously talented person, Lee Kuan Yew, who was the Warren Buffett of Singapore."

Lee Kuan Yew put it this way: “With few exceptions, democracy has not brought good government to new developing countries. ... What Asians value may not necessarily be what Americans or Europeans value. Westerners value the freedoms and liberties of the individual. As an Asian of Chinese cultural background, my values are for a government which is honest, effective, and efficient.”

One Step At a Time

“Spend each day trying to be a little wiser than you were when you woke up. Discharge your duties faithfully and well. Slug it out one inch at a time, day by day. At the end of the day—if you live long enough—most people get what they deserve.”

An incremental approach to life reminds one of the nature of compounding. There will always be someone going faster than you, but you can learn from the Darwinian guide to overachieving your natural IQ. In order for this approach to be effective, you need a long axis of time as well as continuous incremental progress.

Getting Rich

“The desire to get rich fast is pretty dangerous.”

Getting rich is a function of being happy with what you have, spending less than you make, and time.

Mental Models

“Know the big ideas in the big disciplines and use them routinely—all of them, not just a few.”

Mental models are the big ideas from multiple disciplines. While most people agree that these are worth knowing, they often think they can identify which models will add the most value, and in so doing they miss something important. There is a reason that the “know-nothing” index fund almost always beats the investors who think they know.

Understanding this idea in greater detail will change a lot of things, including how you read. Acquiring the big ideas — without selectivity — is the way to mimic a know-nothing index fund.

Know-it-alls

“I try to get rid of people who always confidently answer questions about which they don’t have any real knowledge.”

Few things have made as much of a difference in my life as systemically removing (and when that’s not possible, reducing the importance of) people who think they know the answer to everything.

Stoic Resolve

“There’s no way that you can live an adequate life without many mistakes. In fact, one trick in life is to get so you can handle mistakes. Failure to handle psychological denial is a common way for people to go broke.”

While we all make mistakes, it’s how we respond to failure that defines us.

Thinking

“We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side.”

“It’s bad to have an opinion you’re proud of if you can’t state the arguments for the other side better than your opponents. This is a great mental discipline.”

Thinking is a lot of work. “My first thought,” William Deresiewicz said in one of my favorite speeches, “is never my best thought. My first thought is always someone else’s; it’s always what I’ve already heard about the subject, always the conventional wisdom.”

Choose Your Associates Wisely

“Oh, it’s just so useful dealing with people you can trust and getting all the others the hell out of your life. It ought to be taught as a catechism. ... [W]ise people want to avoid other people who are just total rat poison, and there are a lot of them.”

No comment needed there.

95. Let Go of Self-Justification

Our desire to justify our actions and believe we've always done the right thing can lead us to distort our view of reality. We prefer preserving our self-image to seeing the truth. Here's how to let go of self-justification.

It can be startling and unsettling to confront how bad humans are at describing reality with any objective accuracy. Because of the way our brains work, how perceptions are distorted, the ambiguity of language, we seem forever destined to never really know this world we are living in. What are we to do?

One answer is to accept that there is no one objective truth so stop searching for it. Instead, we can put our efforts into understanding ourselves a little better, allowing for navigation between the many truths that exist for people, to achieve success.

In Mistakes Were Made (But Not by Me), Carol Tavris and Elliot Aronson explore the role of self-justification in our creation of reality. We make assertions about the world as if they are facts while being completely blind to the subjectivity inherent in knowing anything. Essentially we create a narrative about the world that reflects our beliefs about the kind of person we are and assign to this narrative a 'truth' which does not, in fact, exist.

What is self-justification?

It is not the same thing as lying or making excuses. ... [It] is more powerful and more dangerous than the explicit lie. It allows people to convince themselves that what they did was the best thing they could have done. In fact, come to think of it, it was the right thing.

Self-justification is a portrayal of the brain that, despite its stated goals or desires, is not interested in truth, but rather self-preservation. Admitting you were wrong may save relationships and lives, it may prevent distress and war, but it will also force you to admit that the narrative you have constructed about yourself is wrong. And depending on how committed you are to that narrative, you may be unable to even see that you made a mistake, let alone confront it.

Self-justification has costs and benefits. By itself, it's not necessarily a bad thing. It lets us sleep at night. Without it, we would prolong the awful pangs of embarrassment. We would torture ourselves with regret over the road not taken or over how badly we navigated the road we did take. ... Yet mindless self-justification, like quicksand, can draw us deeper into disaster. It blocks our ability to even see our errors, let alone correct them. It distorts reality, keeping us from getting all the information we need and assessing issues clearly. It prolongs and widens rifts between lovers, friends, and nations. It keeps us from letting go of unhealthy habits. It permits the guilty to avoid taking responsibility for their deeds. And it keeps many professionals from changing outdated attitudes and procedures that can harm the public.

The book contains many unsettling examples from politics and law enforcement. Research based stories of officials who refused to admit their mistakes even when confronted with irrefutable evidence they were wrong. The more invested you are in a situation, the more extensive your narrative, the more likely that narrative has become intertwined with your self-worth and self-esteem, and therefore the harder to rewrite it in light of your errors.

Perhaps the most startling examples of the descent into irreversible self-justification is the research conducted on what the authors call 'the closed loop of clinical judgment'. They discuss the total lack of evidence to support the theory that traumatic events are suppressed by the brain and contrast this with the amount of clinical practitioners who will enter into therapeutic relationships with the pre-supposition that the client's current troubles are being caused by traumatic events that they don't remember.

It becomes a no-win situation for the person seeking therapy – either they spontaneously remember past trauma (which, actually, is the one thing they were not likely to forget in the first place) or they say that they have no memory of being traumatized (in which case the

therapist assumes the memories are still being repressed). Either outcome reinforces the self-justified narrative that the therapist has created.

As evidence accumulated on the fallibility of memory and the many confabulations of recovered-memory cases the promoters of this notion did not admit error; they simply changed their view of the mechanism by which traumatic memories are allegedly lost. It's not repression at work anymore, but dissociation; the mind somehow splits off the traumatic memory and banishes it to the suburbs. This shift allowed them to keep testifying, without batting an eye or ruffling a feather, as scientific experts in cases of recovered memories.

This speaks to investment in the narrative. This is not about admitting that yelling at your spouse about forgetting to buy ice cream was a mistaken over-reaction. In the case of these practitioners, this is their career. It is also the many lives they may have destroyed by unintentionally encouraging false memories of trauma. It would not be easy for any of us to admit mistakes when the consequences of those mistakes are so devastating. How can we remember things that didn't happen? Because self-justification has an effect on our memories.

Between the conscious lie to fool others and unconscious self-justification to fool ourselves, there's a fascinating gray area patrolled by an unreliable, self-serving historian – memory. Memories are often pruned and shaped with an ego-enhancing bias that blurs the edges of past events, softens culpability, and distorts what really happened.

We remember our past in a way that confirms what we believe of ourselves in the present. When we do misremember, our mistakes aren't random. The everyday, dissonance-reducing distortions of memory help us make sense of the world and our place in it, protecting our decisions and beliefs. The distortion is even more powerful when it is motivated by the need to keep our self-concept consistent.

The authors present many fascinating examples of totally fabricated 'memories'. Not ones that are intentional, but situations in which the memories were believed to be genuine and turned out to be false. In all cases the memories had been unconsciously altered or created to support a self-justifying narrative. For example, believing you are an independent free-spirit, you remember your actions as always having been so, or conversely you remember the past as more awful than it was in order to support your narrative of strength and change.

If a memory is a central part of your identity, a self-serving distortion is even more likely." How many of us have come across our old journals or diaries, and felt like they were reading the life story of someone else? We will frequently look at the entries and say 'wow, I don't remember being like this at all'.

Okay, so our memories are unreliable. Hardly a surprise. For the millions of people who frantically search for their car keys every morning, it will not be shocking that your fourth year birthday cake wasn't the bad-ass Batman you remember, but a cute puppy with giant eyes. So why worry about memory?

The self-justifying mechanisms of memory would be just another charming and often exasperating aspect of human nature were it not for the fact that we live our lives, make decisions about people, form guiding philosophies, and construct entire narratives on the basis of memories that are often dead wrong.

When we use our memories to strengthen our narratives, it causes huge dissonance when those memories are revealed to be false. It often requires a rewriting of the entire narrative. This is incredibly hard for humans, provoking what can be thought of as an existential crisis. If I am who I am because of my experiences, what happens when those experiences cease to exist? Do I, in a sense, cease to exist as well?

Admitting Mistakes

In order to be able to admit mistakes, to correct the spiraling self-justification that can have devastating consequences for ourselves and others, we need to accept that "something

we did can be separated from who we are, and who we want to be. Our past selves need not be a blueprint for our future selves. The road to redemption starts with the understanding that who we are includes what we have done but also transcends it, and the vehicle for transcending it is self-compassion.”

This clears the path. It allows us to let go of the past and focus on building the future. More of this would result in an inevitable boon to society.

What is needed is a deep understanding not only of what went wrong then but also of what is going wrong right now, the better to prepare for what could go wrong with current decisions.

The authors argue that is a problem, particularly endemic to North America, that we associate mistakes with failure. We need to shift the thinking, to see mistakes as part of the learning process, necessary steps on the road to making things better.

The amazing thing is, most of us find it refreshing and positive when people admit mistakes. We long to hear our politicians or intellectual leaders or even our relatives say ‘yeah, I messed up. No excuses, I own it, and now I want to fix it’. Hearing this frees us and allows us to do the same.

So try it out. Right now. Think about a mistake you’ve made recently. We all have; with our kids, our partners, our colleagues. Pick one. Think about the narrative you told yourself in the aftermath. Now kick that narrative to the curb and leave it there. You don’t need it anymore. Then find a mirror. Admit to yourself you made a mistake.

Last step. Go find the person you hurt and own up to your mistake. I know this sounds scary, but the more we do this the more authentic and rewarding our relationships will be.

96. Hanlon's Razor: Not Everyone is Out to Get You

Hanlon's Razor teaches us not to assume the worst intention in the actions of others. Understanding Hanlon's Razor helps us see the world in a more positive light, stop negative assumptions, and improve relationships. Let's take a look at some examples.

If you ever feel that the world is against you, you are not alone.

We all have a tendency to assume that when anything goes wrong, the fault lies within some great conspiracy against us. A co-worker fails to give you a report in time? They must be trying to derail your career and beat you to a promotion. Your child drops and breaks an expensive plate? They must be trying to annoy you and waste your time. WiFi in a coffee shop not working? The staff must be lying about having it to lure you in and sample their crappy espresso.

But the simple fact is that these explanations, which we tend to jump to, are rarely true. Maybe your co-worker thought today was Tuesday, not Wednesday. Maybe your child had sticky hands from playing with Play-Doh. Maybe the WiFi router was just broken. This is where Hanlon's razor comes in.

What is Hanlon's Razor?

Hanlon's Razor is a useful mental model which can be best summarized as:

'Never attribute to malice that which can be adequately explained by neglect.'

Like Occam's razor, this heuristic is a useful tool for rapid decision-making and intelligent cognition.

Applying Hanlon's razor in our day-to-day lives allows us to better develop relationships, become less judgmental, and improve rationality. Hanlon's razor allows us to give people the benefit of the doubt and have more empathy. The value of Hanlon's razor is most pronounced in relationships, business matters, and personal happiness.

We all lead complex lives wherein (as Murphy's law states) things are constantly going wrong. When this occurs, a common response is to blame the nearest person and assume they have malicious intent.

People are quick to accuse corporations, politicians, their bosses, employees, coffee shop workers, and even family of trying to derail them. When someone messes up around us, we forget how many times we, too, have done the same. We forget how many times we have elbowed someone in the street, knocked over a drink at a relative's house, or forgotten to meet a friend at the right time. Instead, the perpetrator becomes a source of intense irritation.

To assume intent in such a situation is likely to worsen the problem. None of us can ever know what someone else wants to happen. The smartest people make a lot of mistakes. Inability or neglect is far more likely to be the cause than malice. When a situation causes us to become angry or frustrated, it can be valuable to consider if those emotions are justified. Often, the best way to react to other people causing us problems is by seeking to educate them, not to disdain them. In this way, we can avoid repeats of the same situation.

Origins of Hanlon's Razor

The phrase 'Hanlon's razor' was coined by Robert J. Hanlon, but it has been voiced by many people throughout history, as far back as 1774.

Napoleon Bonaparte famously declared:

'Never ascribe to malice that which is adequately explained by incompetence.'

Goethe wrote similarly in The Sorrows of Young Werther in 1774:

Misunderstandings and neglect create more confusion in this world than trickery and malice. At any rate, the last two are certainly much less frequent.

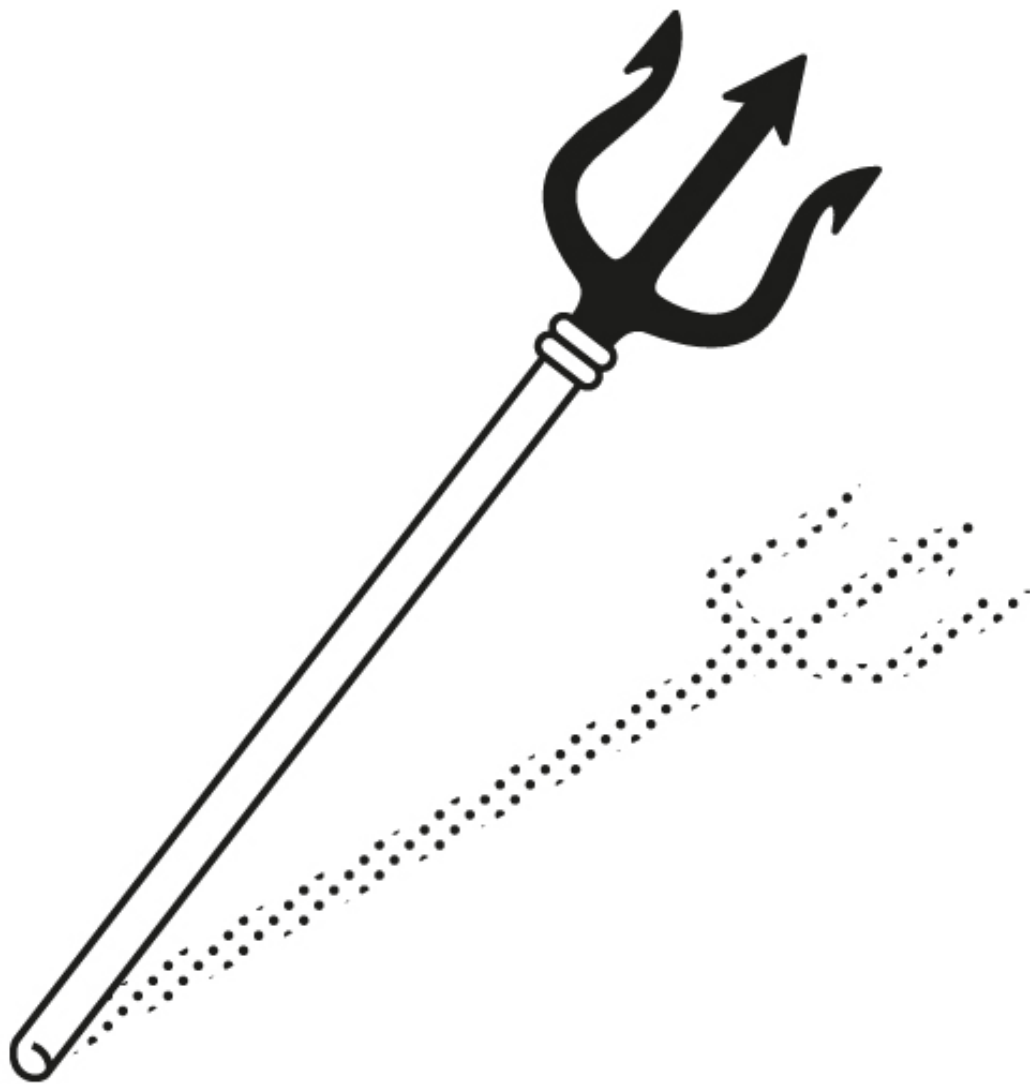
The German general Kurt von Hammerstein-Equord used Hanlon's razor to assess his men, saying:

I divide my officers into four groups. There are clever, diligent, stupid, and lazy officers. Usually two characteristics are combined. Some are clever and diligent – their place is the General Staff. The next lot are stupid and lazy – they make up 90 percent of every army and are suited to routine duties. Anyone who is both clever and lazy is qualified for the highest leadership duties, because he possesses the intellectual clarity and the composure necessary for difficult decisions. One must beware of anyone who is stupid and diligent – he must not be entrusted with any responsibility because he will always cause only mischief.

The Place of Hanlon's Razor in a Latticework of Knowledge

Hanlon's razor works best when combined and contrasted with other mental models in our latticework of knowledge. Here are some examples of the useful interactions:

- The availability heuristic. This mental model states we misjudge the frequency of recent events. In particular, this occurs if they are vivid and memorable. Many people have a tendency to keep an internal scorecard of other people's mistakes. For example, imagine that a taxi driver takes a wrong turn and makes a journey more expensive. A month later, the same thing occurs with a different driver. We are likely to recall the previous event and react by seeing all taxi drivers as malicious. Instead of accepting both as simple mistakes, the availability of the memory makes us imagine malicious intent. By combining these two mental models, we can understand why certain situations provoke such strong emotions. When memory is vivid and easy to recall, we may ignore Hanlon's razor.
- Confirmation bias. We all have a tendency to look for information that confirms preexisting beliefs. When cognitive dissonance arises, we aim to realign our worldviews. Overcoming confirmation bias is a huge step towards making better choices motivated by logic, not emotions. Hanlon's razor assists with this. If we expect malicious intent, we are likely to attribute it wherever possible. For example, if someone sees a certain politician as corrupt, they will look for information that confirms that. They become unable to identify when mistakes are the result of incompetence or accident.
- Bias from disliking/hating. Hanlon's razor can provide insights when we deal with people, institutions, or entities which we dislike. The more we dislike someone or something, the more likely we are to attribute their actions to malice. When someone we dislike makes a mistake, reacting with empathy and understanding tends to be the last response. Acting in an emotional way is natural, yet immature. It can only worsen the situation. The smartest solution is, no matter how much we dislike someone, to assume neglect or incompetence.
- We also like to attribute our own flaws and failures to someone else, which is a cheap psychological protective mechanism called projection. This allows us to maintain a positive self-image and view friction as someone else's fault rather than our own. It's best to run a reality check before blaming others.



The Uses of Hanlon's Razor

The Media

Modern media treats outrage as a profitable commodity. This often takes the form of articles which often attribute to malice that which could be easily be explained by incompetence or ignorance.

We see examples of this play out in the media multiple times a day. People rush to take offense at anything which contradicts their worldview or which they imagine to do so.

Media outlets are becoming increasingly skilled at generating assumptions of malicious intent. When looking at newspapers, websites, and social media, it can be beneficial to apply Hanlon's razor to what we see.

For example, when Apple's Siri voice search launched, people noticed that it could not search for abortion clinics. This was immediately taken up as proof of misogyny within the company when in fact, a programming error caused the problem.

A similar issue has occurred a number of times with YouTube content policies. When videos discussing LGBTQ matters were filtered on the restrictive viewing mode, many people took extreme offense at this. The reality is that again, this was an algorithm error and not a case of homophobia on the part of their programmers. Countless videos which

do not discuss anything related to LGBTQ issues have also been filtered. This shows it to be a case of confirmation bias, wherein people see the malice they expect to see.

Communication and Relationships

One of the most valuable uses of Hanlon's razor is in relationships and communication. It is common for people to damage relationships by believing other people are intentionally trying to cause problems for them, or behaving in a way intended to be annoying. In most cases, these situations are the result of inability or accidental mistakes.

Douglas Hubbard expanded upon the idea in Failure of Risk Management: Why it's Broken and How to Fix it:

I would add a clumsier but more accurate corollary to this: 'Never attribute to malice or stupidity that which can be explained by moderately rational individuals following incentives in a complex system of interactions.' People behaving with no central coordination and acting in their own best interest can still create results that appear to some to be clear proof of conspiracy or a plague of ignorance.

A further example can be seen when semantic barriers interfere with communication. We have all encountered people struggling to speak our native language, perhaps because they are a tourist or have recently moved to the country. You have probably seen someone gets frustrated at them or even been the one getting annoyed. Or if you have ever traveled to or lived in a country where you are not fluent in the language, you might have been the one people got annoyed at. Realistically, the person asking you for directions or struggling to order their coffee is not mixing up their nouns and speaking in a strong accent on purpose.

Hanlon's razor tells us they are merely inarticulate and are not trying to waste anyone's time. The same issues occur when a person uses language which is considered too complex or too basic. This may form a semantic barrier, as other people assume they are trying to confuse them or are being blunt.

A shortcut to regulating what can be strong reactions to inadvertent events is to conscientiously reframe the perpetrator as a toddler knocking over a vase. Their actions are rendered unintentional and clumsy, highlighting their need for help, maturation or supervision, allowing you to rapidly regain composure and not take it personally.

Exceptions and Issues

Like any mental model, Hanlon's razor has its limitations and its validity has been contested. Some critics consider Hanlon's razor to be an overly naive idea that can blind people to true malice. While people have malicious intent far less often than we think, it is still something that must be taken into account. Sometimes actions which could be attributed to incompetence are in fact consciously or unconsciously malicious.

An instance of Hanlon's razor being proven wrong is the mafia. Prior to the 1960s, the existence of the mafia was considered to be a conspiracy theory. Only when a member contacted law enforcement did police realize that the malice being perpetrated was carefully orchestrated.

To make the best use of Hanlon's razor, we must be sure to put it in context, taking into account logic, experience, and empirical evidence. Make it a part of your latticework of mental models, but do not be blind to behavior that is intended to be harmful.

97. Emergence and Power — Four 13th-Century Sisters Who Became Queens

"[S]ome systems ... are very sensitive to their starting conditions, so that a tiny difference in the initial push you give them causes a big difference in where they end up, and there is feedback, so that what a system does affects its own behavior."

— John Gribbin, *Deep Simplicity*

Emergence is the occurrence of genuinely new and novel qualities that are unique to a system and thus separate from its components.

Emergence can be a tricky concept, but it is an extremely useful model to explore. It allows us to understand why some things are greater than the sum of their parts. It demonstrates that power can arise from components that on their own are relatively powerless.

A school of fish is a perfect example. If you studied the movement of one fish, you would have no appreciation for the shape and behavior that 10,000 of them together will produce. Essentially, the complex behavior they exhibit as a group is more than the physical motion of each individual fish.

Understanding that organisms, including humans, can self-organize into systems that have properties that are unique to the collective is a lens through which you can better understand the behaviors of large organizations such as a bureaucracy, political system, or a marketplace.

Western Europe in the 13th century was almost dysfunctional. The borders of England, France, and Germany were not what we'd recognize today, and most rulers spent their time (and money) constantly reorganizing the geopolitical boundaries. Peace treaties were seasonal and monarchs would go into enormous debt to finance various exploits designed to take, or take back, land. Taxes were a certainty. Not so much who you'd be paying them to.

Women of the royalty and nobility were a huge component of these 'raising funds for invasion' schemes. Maybe beauty mattered, and there is some evidence that Kings and Queens did occasionally love each other. But money mattered more. High-class women came with dowries of lands and goods, which helped fund the ongoing conquests. So women didn't get to choose whom they were going to marry. It was like Monopoly trading – I'll give you Pacific Avenue for St. Charles and Ventnor and free rent for the next five rolls.

In 1230 four sisters lived in Provence, then part of the Holy Roman Empire (now part of France). Their father was a Count, which made them nobility, but not royalty. They didn't have loads of money, but they were pretty. They had good marriage prospects, but not amazing ones. They should not have all ended up as Queens. And yet, that's what happened.

Nancy Goldstone, in her book Four Queens, explains the geopolitical maneuverings that brought about this extraordinary set of circumstances.

Marguerite, the eldest, was the first to marry. She was chosen by the Dowager Queen of France, Blanche de Castile, for her eldest son Louis IX. Provence's neighbor Toulouse was acting up, violating his treaty with France and the Dowager wanted friends in the region. A storm was brewing with England, and she knew France couldn't handle a war on two fronts. So Marguerite, pretty, but of inferior rank, was chosen, as long as her family could provide a dowry of 10000 silver marks (needed for, among other things, dealing with the English). They couldn't, so they pledged some Provence real estate which was good enough for all parties and the deal was done.

Eleanor was next, the second eldest of the sisters. She married Henry III, the King of England. Eleanor was even a less obvious choice than Marguerite. Henry III was broke,

and what little liquid assets the Provence family had all went to Marguerite's marriage. Goldstone argues that it is the first marriage that made all the difference for the second. Marguerite's marriage to the King of France had elevated the position of all the sisters. Plus, Henry was sick of losing to France and so sought Eleanor out. If Blanche "had selected a daughter of the count of Provence to be the wife of her eldest son [which] carried weight with Henry. ... There must be something to it." Essentially the King of England wanted what the King of France had.

The third daughter, Sanchia, was the unfortunate victim of her older sisters' success. Also unhelpful was that she was rumored to be the most beautiful of the four. She was propositioned by Henry's brother, Richard, the Earl of Cornwall and the richest man in England. They married, and Goldstone shows how her family connections helped him eventually buy the title of King of Germany, then part of the Holy Roman Empire (allegiances changed before Richard could be crowned Emperor.)

Finally, there was Beatrice. Because he had no sons, the father of the four sisters chose his estate, the rule of Provence, to be passed down to his youngest daughter Beatrice upon his death. When he died, she was still single and therefore had the best dowry to offer. Perhaps due to a dearth of available kings, she married the King of France's youngest brother, Charles. Goldstone notes that they were well matched in terms of ambition. Their political and military endeavors eventually gave them the title of King and Queen of Sicily.

The key concept of emergence that is at play here is that components of a system self-organize to produce a state of affairs that is neither obvious nor predictable if you focus on the capabilities of the components themselves. The coming together produces capabilities that are new.

The internet encyclopedia of philosophy explains it this way:

Effects are resultant if they can be calculated by the mere addition or subtraction of causes operating together, as with the weight of an object, when one can calculate its weight merely by adding the weights of the parts that make it up. Effects are emergent if they cannot be thus calculated because they are qualitatively novel compared to the causes from which they emerge.

The power that each sister wielded in each marriage, if we generally consider how much power an individual woman would have had in a royal relationship, does not add up to explain their immense influence over the events of the mid-13th century.

Goldstone writes that "almost nothing of significance that occurred in western Europe during the period in which they lived was not influenced by the actions of this family. It is impossible to fully understand the underlying political motivations of the thirteenth century without them."

The thing about emergent phenomenon is you can't point to the components and say, 'oh yeah, it's because of this and that'. Like the school of fish, you can't say, 'they're moving this way because of fish number 8 and number 63'. You can only look at the behavior of the school as a whole. And this whole has, for example, a power to evade predators that the individual doesn't have.

So too with the sisters from Provence. Looking at the influence Marguerite developed over her husband or the fact that Eleanor and Henry ended up respecting each and thus worked as a team is not enough to explain what they could achieve. It wasn't Sanchia alone who got Richard a crown, and Beatrice's money didn't directly buy Sicily. The sisters were, in varying degrees, determined, smart, pious, ambitious, and beautiful. And they all had sons. But although these things may have played a part, you can't point to any of them and say it was the deciding factor in the influence they had. The reach of the collective was more than adding up the reach of each individual. A higher degree of power emerged, and one that couldn't have been predicted.

Goldstone tells of the reaction of the family when one of the Queens' uncles was captured in battle. "The news of his capture spread quickly to the courts of Europe and the family took immediate action. In England, Henry and Eleanor shut down trade with northern Italy, and forcibly detained all merchants and citizens from Asti and Turin who happened to be visiting at the time. In France, Marguerite had Louis follow suit, an action that resulted in hundreds of arrests. She then demanded a payment of ten thousand pounds, in addition to the release of her relative, as a condition of freedom. Beatrice of Savoy, the sisters' mother (in a bit of a power struggle with her youngest daughter over lands in Provence), ordered her soldiers to close the roads between Switzerland and Provence and took numerous prisoners. Sanchia even persuaded Richard to do his part by forwarding the money needed to underwrite a rescue attempt. Faced with the poverty brought on by the imposition of what were, in effect, international economic sanctions, the citizens of Asti realized their mistake, and let Uncle Thomas go."

If Marguerite was the only one of the sisters who was a Queen, would the King of England and his brother have actively participated in the rescue of an ally of the King of France? Likely not, given the history between the two countries, which, both before and after, was characterized more by war than cooperation.

The sisters didn't always work together, but this supports the explanation of emergence, which occurs due to interconnectivity and complex causal relations, not from any organized, external control factor. The power the sisters had was not conscientiously developed and wielded, it was more a force that influenced behavior and outcomes for an entire continent for over 30 years.

98. Cleopatra and Self-Preservation

*“For the last time in two thousand years Cleopatra VII stands offstage.
In a matter of days she will launch herself into history,
which is to say that faced with the inevitable,
she will counter with the improbable. It is 48 BC.”*

— Stacy Schiff

Cleopatra (69BC 30-BC) was a master of self-preservation. She lived a life under constant threat and yet never fell victim to it. Her success was so uncommon, particularly for a woman, that it seems like history has been trying to make excuses for it for over 2000 years. But as Stacy Schiff illuminates in her book, Cleopatra: A Life, her story is worth learning and taking inspiration from. Cleopatra has a lot to teach us about drawing on all our resources in the face of adversity.

Self-preservation in the biological sense is about our very profound instinct to keep ourselves alive. This instinct is exhibited by all animals and is about the survival of our genes. It's not about spirituality or morality or about how we feel. It's a biological desire to live until we can pass our genes onto the next generation and ensure their survival.

As John Medina explains in Brain Rules, “Without a flexible, immediately available, highly regulated stress response, we would die. Remember, the brain is the world's most sophisticated survival organ. All of its many complexities are built toward a mildly erotic, singularly selfish goal: to live long enough to thrust our genes on to the next generation. Our reactions to stress serve the live-long-enough part of that goal. Stress helps us manage the threats that could keep us from procreating.”

This sophisticated stress response is an extremely useful system to have. It works when it needs to — no effort required — propelling us to fight, flight, or freeze. It allows us to process information so quickly that we are not conscious of the thoughts. We obey our bodies when it tells us not to move a muscle, to attack with as much violence as possible, or to run like hell.

But it has to be able to turn off. It can't be the only system you use every day. Why? Because it is meant to come out only in situations where our life is threatened.

Our stress responses were shaped to solve problems that lasted not for years, but for seconds. ... These days, our stresses are measured not in moments with mountain lions, but in hours, days, and sometimes months with hectic workplaces, screaming toddlers, and money problems. Our system isn't built for that. And when moderate amounts of hormone build up to large amounts, or when moderate amounts of hormone hang around too long, they become quite harmful.

And so, in human society, which often seems one long, ongoing battle, we can't exist in a constant state of fight/flight/freeze if we are to preserve both our genes and our sanity. We need to integrate other capabilities of our brain into our dealings with stress, such as rational, strategic thought that leverages the resources of knowledge we've built over the years. And this is where Cleopatra excelled.

To be fair, we all don't respond the same way to stress. As Medina says, “Psychiatrists long have observed that some people are more tolerant of stress than others. ... Some people's genetic complement naturally buffers them against the effects of stress, even the chronic type.”

We will never know if this is true for Cleopatra, but there is no doubt she rose to the formidable challenges of being Queen of Egypt circa 40 BCE. She adapted, survived, and thrived despite constant peril. So maybe her story can illuminate for us a different mindset with which to deal with our daily stressors.

First she had to deal with a tradition of murder within her own family.

Schiff explains in Cleopatra: A Life:

Over the generations the family indulged in what has been termed ‘an orgy of pillage and murder’ ... Over and over mothers sent troops against sons. Sisters waged war against brothers. Cleopatra’s great-grandmother fought one civil war against her parents, a second against her children.

Because, in Cleopatra’s Ptolemy line, brothers often married sisters, all children had legitimate claims to the throne and often ended up disposing of each other. In keeping up with family practices, Cleopatra got rid of a brother/husband and a sister who had designs on her throne.

So right from the beginning it was kill or be killed. There were no allies in the home. When Caesar arrived in 48 BCE, Cleopatra’s brother was occupying the throne having banished her to the desert.

That summer she rallied a band of mercenaries, at a desert camp, under the glassy heat of the Syrian sun. She was twenty-one, an orphan and an exile. Already she had known both excessive good fortune and its flamboyant consort, calamity. Accustomed to the greatest luxury of the day, she held court two hundred miles from the ebony doors and onyx floors of home. Her tent amid the scrub of the desert was the closest she had come in a year. Over those months she had scrambled for her life, fleeing through Middle Egypt, Palestine, and southern Syria. She had spent a dusty summer raising an army.

She was resourceful. She took the throne back and held on for 18 tumultuous years.

Politics in the Mediterranean during her time were volatile. Changing allegiances, murder, competing personalities and ideologies characterized the Roman spirit. Caesar had formed a vision of how powerful Rome could be, and this was tempting to many.

Egypt was the richest country on the Mediterranean. Because it had the most fertile soil, it could grow and produce exceptional amounts of food. So it was an early stop in any attempts to conquer the world, because it could fund the efforts.

Rather than focus on the things she couldn’t overtly control (e.g. the timing of Roman invasions), she set to order those elements within her sphere of power and influence. The Greek language, “by Cleopatra’s day [was] the language of business and bureaucracy ... While Egyptian speakers learned Greek, it was rare that anyone ventured in the opposite direction. To the punishing study of Egyptian, however, Cleopatra applied herself. She was allegedly the first and only Ptolemy to bother to learn the language of the 7 million people over whom she ruled.”

She worked hard to gain and maintain the support of her people because no monarch wants to be fighting on two fronts at once. She got rid of her competitors, spent money on developing Egypt’s infrastructure, and as Schiff explains, learned Egyptian culture so well that she was able to invoke their Goddess Isis as “provider of wisdom and of material and spiritual sustenance.” Rome was always going to be a problem, but she did an excellent job keeping peace on the home front. She had the longest reign of all the Ptolemies.

When the inevitable Roman intrusions came she aimed to best support Egyptian interests, sometimes backing the wrong horse. After Caesar, there was a fight for Roman leadership.

When the dust settled Mark Antony was in charge of everything East of Rome and Cleopatra was in the awkward and potentially fatal position of not having supported him.

Confident though she may have been, contemptuous though she may have appeared, Cleopatra left nothing in her preparation to chance. ... She would have known she was entering a sort-of sweepstakes for Antony’s attention. She seemed determined to conjure a display so stunning it would propel Plutarch to Shakespearean heights, as it would elicit from Shakespeare his richest poetry. And she succeeded. In the annals of indelible entrances – the wooden horse into Troy; Christ into Jerusalem; Benjamin Franklin into Philadelphia; the Beatles on Ed Sullivan’s stage – Cleopatra’s alone lifts off the page in iridescent color, amid inexhaustible, expensive clouds of incense, a sensational, simultaneous assault on every sense.

She was also extremely adept at framing her actions to suit whatever narrative she needed to preserve her power. By the time she was dealing with Mark Antony, “her ability to molt, instantly and as the situation required, to slide effortlessly from one idiom to another, her irresistible charm, were already well established.”

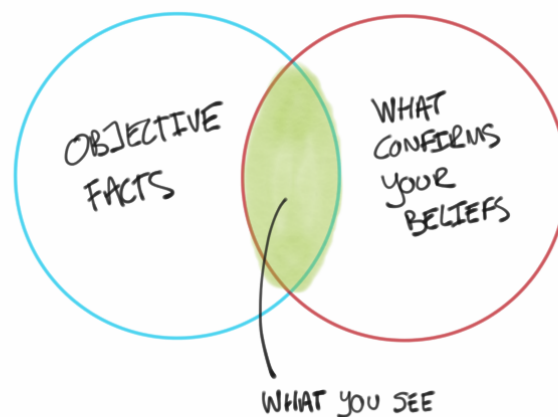
Cleopatra worked her whole life to keep her independence from Rome, to maintain her control over the land of which she was Queen. She fought to preserve her power and in doing so preserve her self and give her children the best chance of survival. “Cleopatra could generally be counted on to do the intelligent thing,” Schiff writes. “She was fighting for her life, her throne, and her children. She had ruled for two decades, and was without illusion.”

She adapted to the many vicissitudes of life by learning as much as she could, making sure her risks were calculated, and never giving up control of the position she held. Even her death was on her own terms. Although Schiff artfully argues that the actual circumstances of her death are unlikely to ever be known for sure, “for any number of reasons Cleopatra was unlikely to have recruited an asp, or an Egyptian cobra, for the job. A woman known for her crisp decisions and meticulous planning would surely have hesitated to entrust her fate to a wild animal.”

Eventually, Cleopatra could not outrun the aggression of Rome in pursuing the fertile Nile valley. But her intelligence and adaptability allowed her to last a remarkably long time in the face of a lifetime of tumult.

99. Confirmation Bias And the Power of Disconfirming Evidence

Confirmation bias is our tendency to cherry-pick information that confirms our existing beliefs or ideas. Confirmation bias explains why two people with opposing views on a topic can see the same evidence and come away feeling validated by it. This cognitive bias is most pronounced in the case of ingrained, ideological, or emotionally charged views. Failing to interpret information in an unbiased way can lead to serious misjudgments. By understanding this, we can learn to identify it in ourselves and others. We can be cautious of data that seems to immediately support our views.



When we feel as if others “cannot see sense,” a grasp of how confirmation bias works can enable us to understand why. Willard V. Quine and J.S. Ullian described this bias in *The Web of Belief* as such:

The desire to be right and the desire to have been right are two desires, and the sooner we separate them the better off we are. The desire to be right is the thirst for truth. On all counts, both practical and theoretical, there is nothing but good to be said for it. The desire to have been right, on the other hand, is the pride that goeth before a fall. It stands in the way of our seeing we were wrong, and thus blocks the progress of our knowledge.

Experimentation beginning in the 1960s revealed our tendency to confirm existing beliefs, rather than questioning them or seeking new ones. Other research has revealed our single-minded need to enforce ideas.

“What the human being is best at doing is interpreting all new information so that their prior conclusions remain intact.”

— Warren Buffett

Like many mental models, confirmation bias was first identified by the ancient Greeks. In *The History of the Peloponnesian War*, Thucydides described this tendency as such:

For it is a habit of humanity to entrust to careless hope what they long for, and to use sovereign reason to thrust aside what they do not fancy.

Our use of this cognitive shortcut is understandable. Evaluating evidence (especially when it is complicated or unclear) requires a great deal of mental energy. Our brains prefer to take shortcuts. This saves the time needed to make decisions, especially when we’re under pressure. As many evolutionary scientists have pointed out, our minds are

unequipped to handle the modern world. For most of human history, people experienced very little new information during their lifetimes. Decisions tended to be survival based. Now, we are constantly receiving new information and have to make numerous complex choices each day. To stave off overwhelm, we have a natural tendency to take shortcuts. In “The Case for Motivated Reasoning,” Ziva Kunda wrote, “we give special weight to information that allows us to come to the conclusion we want to reach.” Accepting information that confirms our beliefs is easy and requires little mental energy. Contradicting information causes us to shy away, grasping for a reason to discard it.

In *The Little Book of Stupidity*, Sia Mohajer wrote:

The confirmation bias is so fundamental to your development and your reality that you might not even realize it is happening. We look for evidence that supports our beliefs and opinions about the world but excludes those that run contrary to our own... In an attempt to simplify the world and make it conform to our expectations, we have been blessed with the gift of cognitive biases.

“The human understanding when it has once adopted an opinion, draws all things else to support and agree with it. And though there be a greater number and weight of instances to be found on the other side, yet these it either neglects and despises, or else by some distinction sets aside and rejects.”

— Francis Bacon

How Confirmation Bias Clouds Our Judgment

The complexity of confirmation bias arises partly from the fact that it is impossible to overcome it without an awareness of the concept. Even when shown evidence to contradict a biased view, we may still interpret it in a manner that reinforces our current perspective.

In one Stanford study, half of the participants were in favor of capital punishment, and the other half were opposed to it. Both groups read details of the same two fictional studies. Half of the participants were told that one study supported the deterrent effect of capital punishment, and the other opposed it. The other participants read the opposite information. No matter, the majority of participants stuck to their original views, pointing to the data that supported it and discarding that which did not.

Confirmation bias clouds our judgment. It gives us a skewed view of information, even when it consists only of numerical figures. Understanding this cannot fail to transform a person’s worldview — or rather, our perspective on it. Lewis Carroll stated, “we are what we believe we are,” but it seems that the world is also what we believe it to be.

A poem by Shannon L. Alder illustrates this concept:

Read it with sorrow and you will feel hate.

Read it with anger and you will feel vengeful.

Read it with paranoia and you will feel confusion.

Read it with empathy and you will feel compassion.

Read it with love and you will feel flattery.

Read it with hope and you will feel positive.

Read it with humor and you will feel joy.

Read it without bias and you will feel peace.

Do not read it at all and you will not feel a thing.

Confirmation bias is somewhat linked to our memories (similar to availability bias). We have a penchant for recalling evidence that backs up our beliefs. However neutral the original information was, we fall prey to selective recall. As Leo Tolstoy wrote:

The most difficult subjects can be explained to the most slow-witted man if he has not formed any idea of them already; but the simplest thing cannot be made clear to the most

intelligent man if he is firmly persuaded that he knows already, without a shadow of doubt, what is laid before him.

“Beliefs can survive potent logical or empirical challenges. They can survive and even be bolstered by evidence that most uncommitted observers would agree logically demands some weakening of such beliefs. They can even survive the destruction of their original evidential bases.”

— Lee Ross and Craig Anderson

Why We Ignore Contradicting Evidence

Why is it that we struggle to even acknowledge information that contradicts our views?

When first learning about the existence of confirmation bias, many people deny that they are affected. After all, most of us see ourselves as intelligent, rational people. So, how can our beliefs persevere even in the face of clear empirical evidence? Even when something is proven untrue, many entirely sane people continue to find ways to mitigate the subsequent cognitive dissonance.

Much of this is the result of our need for cognitive consistency. We are bombarded by information. It comes from other people, the media, our experience, and various other sources. Our minds must find means of encoding, storing, and retrieving the data we are exposed to. One way we do this is by developing cognitive shortcuts and models. These can be either useful or unhelpful.

Confirmation bias is one of the less-helpful heuristics which exists as a result. The information that we interpret is influenced by existing beliefs, meaning we are more likely to recall it. As a consequence, we tend to see more evidence that enforces our worldview. Confirmatory data is taken seriously, while disconfirming data is treated with skepticism. Our general assimilation of information is subject to deep bias.

Constantly evaluating our worldview is exhausting, so we prefer to strengthen it instead. Plus holding different ideas in our head is hard work. It's much easier to just focus on one. We ignore contradictory evidence because it is so unpalatable for our brains. According to research by Jennifer Lerner and Philip Tetlock, we are motivated to think critically only when held accountable by others. If we are expected to justify our beliefs, feelings, and behaviors to others, we are less likely to be biased towards confirmatory evidence. This is less out of a desire to be accurate, and more the result of wanting to avoid negative consequences or derision for being illogical. Ignoring evidence can be beneficial, such as when we side with the beliefs of others to avoid social alienation.

Examples of Confirmation Bias in Action

Creationists vs. Evolutionary Biologists

A prime example of confirmation bias can be seen in the clashes between creationists and evolutionary biologists. The latter use scientific evidence and experimentation to reveal the process of biological evolution over millions of years. The former see the Bible as being true in the literal sense and think the world is only a few thousand years old. Creationists are skilled at mitigating the cognitive dissonance caused by factual evidence that disproves their ideas. Many consider the non-empirical “evidence” for their beliefs (such as spiritual experiences and the existence of scripture) to be of greater value than the empirical evidence for evolution.

Evolutionary biologists have used fossil records to prove that the process of evolution has occurred over millions of years. Meanwhile, some creationists view the same fossils as planted by a god to test our beliefs. Others claim that fossils are proof of the global flood described in the Bible. They ignore evidence to contradict these conspiratorial ideas and instead use it to confirm what they already think.

Doomsayers

Take a walk through London on a busy day, and you are pretty much guaranteed to see a

doomsayer on a street corner, ranting about the upcoming apocalypse. Return a while later and you will find them still there, announcing that the end has been postponed.

In *When Prophecy Fails*, Leon Festinger explained the phenomenon this way:

Suppose an individual believes something with his whole heart; suppose further that he has a commitment to this belief, that he has taken irrevocable actions because of it; finally, suppose that he is presented with evidence, unequivocal and undeniable evidence, that his belief is wrong: what will happen? The individual will frequently emerge, not only unshaken but even more convinced of the truth of his beliefs than ever before. Indeed, he may even show a new fervor about convincing and converting people to his view.

Music

Confirmation bias in music is interesting because it is actually part of why we enjoy it so much. According to Daniel Levitin, author of *This Is Your Brain on Music*:

As music unfolds, the brain constantly updates its estimates of when new beats will occur, and takes satisfaction in matching a mental beat with a real-in-the-world one.

Witness the way a group of teenagers will act when someone puts on “Wonderwall” by Oasis or “Creep” by Radiohead. Or how their parents react to “Starman” by Bowie or “Alone” by Heart. Or even their grandparents to “The Way You Look Tonight” by Sinatra or “Non, Je ne Regrette Rien” by Edith Piaf. The ability to predict each successive beat or syllable is intrinsically pleasurable. This is a case of confirmation bias serving us well. We learn to understand musical patterns and conventions, enjoying seeing them play out.

Homeopathy

The multibillion-dollar homeopathy industry is an example of mass confirmation bias.

Homeopathy was invented by Jacques Benveniste, a French researcher studying histamines. Benveniste became convinced that as a solution of histamines was diluted, the effectiveness increased due to what he termed “water memories.” Test results were performed without blinding, leading to a placebo effect.

Benveniste was so certain of his hypothesis that he found data to confirm it and ignored that which did not. Other researchers repeated his experiments with appropriate blinding and proved Benveniste’s results to have been false. Many of the people who worked with him withdrew from science as a result.

Yet homeopathy supporters have only grown in numbers. Supporters cling to any evidence to support homeopathy while ignoring that which does not.

“One of the biggest problems with the world today is that we have large groups of people who will accept whatever they hear on the grapevine, just because it suits their worldview—not because it is actually true or because they have evidence to support it. The striking thing is that it would not take much effort to establish validity in most of these cases... but people prefer reassurance to research.”

— Neil deGrasse Tyson

Scientific Experiments

In good scientific experiments, researchers should seek to falsify their hypotheses, not to confirm them. Unfortunately, this is not always the case (as shown by homeopathy). There are many cases of scientists interpreting data in a biased manner, or repeating experiments until they achieve the desired result. Confirmation bias also comes into play when scientists peer-review studies. They tend to give positive reviews of studies that confirm their views and of studies accepted by the scientific community.

This is problematic. Inadequate research programs can continue past the point where the evidence points to a false hypothesis. Confirmation bias wastes a huge amount of time and funding. We must not take science at face value and must be aware of the role of biased reporting.

“The eye sees only what the mind is prepared to comprehend.”

— Robertson Davies

Conclusion

This article can provide an opportunity for you to assess how confirmation bias affects you. Consider looking back over the previous paragraphs and asking:

- Which parts did I automatically agree with?
- Which parts did I ignore or skim over without realizing?
- How did I react to the points which I agreed or disagreed with?
- Did this post confirm any ideas I already had? Why?
- What if I thought the opposite of those ideas?

Being cognizant of confirmation is not easy, but with practice, it is possible to recognize the role it plays in the way we interpret information. You need to search out disconfirming evidence.

As Rebecca Goldstein wrote in *Incompleteness: The Proof and Paradox of Kurt Godel*: *All truths — even those that had seemed so certain as to be immune to the very possibility of revision — are essentially manufactured. Indeed, the very notion of the objectively true is a socially constructed myth. Our knowing minds are not embedded in truth. Rather, the entire notion of truth is embedded in our minds, which are themselves the unwitting lackeys of organizational forms of influence.*

100. Galilean Relativity and the Invasion of Scotland

A few centuries ago, when Galileo (1564-1642) was trying to make a couple of points about how our world really works, one of the arguments that frequently came up in response to his 'the earth orbits the sun' theory was "if the earth is moving through space, how come I don't notice?"

Not that I have much to begin with, but I don't feel the wind constantly in my hair, I don't get orbit-induced motion sickness, so why, Galileo, don't I notice this movement as the earth is spinning around over 100,000 km per hour?

His answer is known as Galilean Relativity and it contains principles that have broad application in life.

Understanding Galilean Relativity allows you to consider your perspective in relation to results. Are you really achieving what you think you are?

First, an explanation of the theory.

Imagine you are on a ship that has reached constant velocity (meaning without a change in speed or direction). You are below decks and there are no portholes. You drop a ball from your raised hand to the floor. To you, it looks as if the ball is dropping straight down, thereby confirming gravity is at work. You are able to perceive this vertical shift as the ball changed its location by about three feet.

Now imagine you are a fish (with special x-ray vision) and you are watching this ship go past. You see the scientist inside, dropping a ball. You register the vertical change in the position of the ball. But you are also able to see a horizontal change. As the ball was pulled down by gravity it also shifted its position east by about 20 feet. The ship moved through the water and therefore so did the ball. The scientist on board, with no external point of reference, was not able to perceive this horizontal shift.

This analogy helped Galileo explain why we don't notice the earth moving — because we're at the same constant velocity, moving with our planet.

It can also show us the limits of our perception. And how we must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share.

History offers an illuminating example of this principle at work.

In the early fourteenth century, two English kings (Edwards I and II) were repeatedly in conflict with Scotland over Scottish independence.

Nationalism wasn't as prevalent as an identity characteristic as it is today. Lands came and went with war, marriage, and papal edicts, and the royal echelons of Europe spent a lot of time trying to acquire and hold on to land, as that is where their money ultimately came from.

There were a lot of factors that led Edward I, King of England, to decide that Scotland should be his. It has to do with how William the Conqueror divided things up in the area in 1066, the constant struggle by the English for the strategic upper hand against France, and more generally, the fact that the King of England was at the head of a feudal system that, "by enlarging a class of professional soldiers who owed military service in payment for land, it enabled it," says William Rosen in his book [The Third Horseman: Climate Change and the Great Famine of the 14th Century](#).

Edward I wanted to rule Scotland. The Scots weren't interested. He invaded half a dozen times and succeeded only in giving birth to a separate Scottish identity. His desire for Scotland became his Galilean ship. He couldn't see beyond that desire to understand how his actions were actually fundamentally undermining his goals.

History regards Edward I as a decent king. Strategic in battle, a good administrator, and so one can assume that what he generally wanted was to rule over a prosperous and powerful country. In his mind then it may have been a very simple equation — since

prosperity in the middle ages was tied up with land, then to have more of it must be good. And Scotland was in a convenient location, as opposed to, say, Mongolia.

What Edward I did not see was that the repeated invasion of Scotland was undermining the very prosperity and power he was hoping to augment. It was costing tons of money, money that had to be raised from the nobility that supported his monarchy, which in turn had to be raised via the peasants from the land. People were getting sick of watching their taxes go up in flames on the Scottish border. And, as Rosen claims, "A king's authority depends utterly on the loyalty and faith of his people." Lose your popular support and you lose everything.

When Edward I died, his son, Edward II, inherited his father's quest to own Scotland. He too repeatedly invaded with no lasting success. And he had it even worse. The beginning of his reign coincided with a major famine that decimated the population. This was followed by diseases that swept through the agricultural animal populations. So there was less money to support war.

But Edward II kept taxing and invading Scotland anyway, indifferent to the plight of his people. This contributed to widespread disgust with his reign and eventually led to his being disposed of, and likely murdered, in favor of his son. A cautionary tale on what happens when you lose the loyalty of the people you are meant to be leading!

This all begs the question, was Scotland really such a great prize to justify the repeated attempts to conquer it?

The answer is no. As Rosen writes, "the conquest of medieval Scotland was, by any rational economic calculus, a poor bargain for both of England's King Edwards, who together spent more than the entire value of the country in one failed expedition after another."

They certainly did not see this.

It is important to know that in Galilean relativity, neither the perspective of the scientist on the ship nor the fish in the ocean is incorrect. Both perspectives are true for those doing the observing. Because the scientist has no external frame of reference, he is not mistaken when he says that the ball moved only vertically, and not horizontally.

You aren't always going to be able to adjust for Galilean relativity. Given the roles, expectations, and mythology surrounding kings, both Edwards were acting according to the viewpoint they had.

So discussing the attempted conquest of Scotland by both Kings is not about revealing that their assumptions were incorrect. From their perspective acquiring land was always a good thing. But by failing to consider other perspectives they didn't achieve their intended results – control of Scotland – and, more importantly, were unable to appreciate the results they were affecting. More land cannot come at the expense of support for your leadership.

It is likely that at least one advisor might have said to the Edwards, 'hey, maybe you should spend some more money on preventing the starvation of the population that pays you taxes and take a break on this Scottish thing'. This is where understanding Galilean relativity is useful – you won't shoot the messenger.

You will know that sometimes you are on the ship, and the limitations this entails, and so be open when the fish shares his perspective with you.

101. Understanding the Limitations of Maps

Maps are flawed but useful. For instance, we can leverage the experiences of others to help us navigate through territories that are, to us, new and unknown. We just have to understand and respect the inherent limitations of maps whose territories may have changed. We have to put some work into really seeing what the maps can show us. Here are three things you need to think about when using a map: The perspective, the author, and the territory.

The Perspective

Maps are an abstraction, which means information is lost in order to save space. So perhaps the most important thing we can do before reading a map is to stop and consider what choices have been made in the representation before us.

First, there are some limitations based on the medium used, like paper or digital, and the scale of the territory you are trying to represent. Take the solar system. Our maps of the solar system typically fit on one page. This makes them useful for understanding the order of the planets from the sun but does not even come close to conveying the size of the territory of space.

Bill Bryson explains in A Short History of Nearly Everything, “such are the distances, in fact, that it isn’t possible, in any practical terms, to draw the solar system to scale. ... On a diagram of the solar system to scale, with the Earth reduced to about the diameter of a pea, Jupiter would be over a thousand feet away, and Pluto would be a mile and half distant (and about the size of a bacterium, so you wouldn’t be able to see it anyway).”

Maps are furthermore a single visual perspective chosen because you believe it the best one for what you are trying to communicate. This perspective is both literal — what I actually see from my eyes, and figurative — the bias that guides the choices I make.

It’s easy to understand how unique my perspective is. Someone standing three feet away from me is going to have a different perspective than I do. I’ve been totally amazed by the view out of my neighbour’s window.

Jerry Brotton, in his book A History of the World in Twelve Maps, reveals that “the problem of defining where the viewer stands in the relation to a map of the world is one geographers have struggled with for centuries.” Right from the beginning, your starting point becomes your frame of reference, the centre of understanding that everything else links back to.

In an example that should be a classic, but isn’t because of a legacy of visual representation that has yet to change, most of us seriously underestimate the size of Africa. Why? Because, as Tim Marshall explains in his book Prisoners of Geography, most of us use the standard Mercator world map, and “this, as do other maps, depicts a sphere on a flat surface and thus distorts shapes.” A world map always has to be distorted, with a bent toward the view you are trying to present. Which has led to a northern hemisphere centric vision of the world that has been burned into our brains. Even though Africa looks roughly the size of Greenland, in fact, it is actually about 14 times larger. Don’t use the standard Mercator map to plan your hiking trip!

Knowing a map’s limitations in perspective points you to where you need to bring context. Consider this passage from Marshall’s book: “Africa’s coastline? Great beaches – really, really lovely beaches – but terrible natural harbors. Amazing rivers, but most of them are worthless for actually transporting anything, given that every few miles you go over a waterfall.”

A lot of maps wouldn’t show you this – the lines that are rivers are all drawn the same. So you’d look at the success the Europeans had with the Danube or the Rhine and think, why didn’t Africans think to use their rivers in the same way? And then maybe you decide to invest in an African mineral company, bringing to the table the brilliant idea of getting your products to market via river. And then they take you to the waterfalls.

The Author/Cartographer

Consider who draws the maps. A map of the modern day Middle East will probably tell you more about the British and French than any inhabitants of the region. In 1916 a British diplomat named Sykes and a French diplomat name Picot drew a line dividing the territory between their countries

based on their interests in the region and not on the cultures of the people living there, or the physical formations that give it form.

Marshall explains, “The region’s very name is based on a European view of the world, and it is a European view of the region that shaped it. The Europeans used ink to draw lines on maps: they were lines that did not exist in reality and created some of the most artificial borders the world has seen. An attempt is now being made to redraw them in blood.”

The map creator is going to bring not only their understanding but also their biases and agenda. Even if your goal is to create the most accurate, unbiased map ever, that intent frames the decisions you make on what to represent and what to leave out. Our relatively new digital mapping makes a decision to respect some privacy at the outset and so Google doesn’t include images of people in its ‘streetview’.

Brotton argues that “a map always manages the reality it tries to show.” And as we have seen before, because there really isn’t one objective reality, maps need to be understood as portraying personal or cultural realities.

“No world map is, or can be, a definitive, transparent depiction of its subject that offers a disembodied eye onto the world.” All maps reflect our understanding of the territory at that moment in time. We change, and maps change with us.

The Territory

This leads to another pitfall. Get the right map. Or better yet, get multiple maps of the same territory. Different explorations require different maps. Don’t get comfortable with one and assume that’s going to explain everything you need. Change the angle.

Derek Hayes, in his Historical Atlas of Toronto, has put together a fascinating pictorial representation of the history of Toronto in maps. Sewer maps, transit maps, maps from before there were any roads, and planning maps for the future. Maps of buildings that were, and maps of buildings that are only dreams. Putting all these together starts to flesh out the context, allowing for an appreciation of a complex city versus a dot on a piece of paper. Maps may never be able to describe the whole territory, but the more you can combine them, the fewer blind spots you will have.

If you compare a map of American naval bases in 1947 with one from 1937, you would notice a huge discrepancy. The number increased significantly. Armed only with this map you might conclude that in addition to fighting in WWII, the Americans invested a lot of resources in base building during the 40s. But if you could get your hands on a map of British naval bases from 1937 you would conclude something entirely different.

As Marshall explains, “In the autumn of 1940, the British desperately needed more warships. The Americans had fifty to spare and so, with what was called the Destroyers for Bases Agreement, the British swapped their ability to be a global power for help in remaining in the war. Almost every British naval base in the Western Hemisphere was handed over.”

The message here is not to give up on maps. They can be wonderful and provide many useful insights. It is rather to understand their limitations. Each map carries the perspective of its creator and is limited by the medium it’s presented in. The more maps you have of a territory, the increased understanding you will have of the complexities of the terrain, allowing you to make better decisions as you navigate through it.

102. Proximate vs Root Causes: Keep Digging to Find the Answer

“Anything perceived has a cause.

All conclusions have premises.

All effects have causes.

All actions have motives.”

— Arthur Schopenhauer

The Basics

One of the first principles we learn as babies is that of cause and effect. Infants learn that pushing an object will cause it to move, crying will cause people to give them attention, and bumping into something will cause pain. As we get older, this understanding becomes more complex. Many people love to talk about the causes of significant events in their lives (if I hadn't missed the bus that day I would never have met my partner! or if I hadn't taken that class in college I would never have discovered my passion and got my job!) Likewise, when something bad happens we have a tendency to look for somewhere to pin the blame.

The mental model of proximate vs root causes is a more advanced version of this reasoning, which involves looking beyond what appears to be the cause and finding the real cause. As a higher form of understanding, it is useful for creative and innovative thinking. It can also help us to solve problems, rather than relying on band-aid solutions. Much of our understanding of cause and effect comes from Isaac Newton. His work examined how forces lead to motion and other effects. Newton's laws explain how a body remains stationary unless a force acts upon it. From this, we can take a cause to be whatever causes something to happen.

For example, someone might ask: Why did I lose my job?

- Proximate cause: the company was experiencing financial difficulties and could not continue to pay all its employees.
- Root cause: I was not of particular value to the company and they could survive easily without me.

This can then be explored further: Why was I not of value to the company?

- Ultimate cause: I allowed my learning to stagnate and did not seek constant improvement. I continued doing the same as I had been for years which did not help the company progress.
- Even further: Newer employees were of more value because they had more up-to-date knowledge and could help the company progress.

This can then help us to find solutions: How can I prevent this from happening again?

- Answer: In future jobs, I can continually aim to learn more, keep to date with industry advancements, read new books on the topic and bring creative insights to my work. I will know this is working if I find myself receiving increasing amounts of responsibility and being promoted to higher roles.

This example illustrates the usefulness of this line of thinking. If our hypothetical person went with the proximate cause, they would walk away feeling nothing but annoyance at the company which fired them. By establishing the root causes, they can mitigate the risk of the same thing happening in the future.

There are a number of relevant factors which we must take into account when figuring out root causes. These are known as predisposing factors and can be used to prevent a future repeat of an unwanted occurrence.

Predisposing factors tend to include:

- The location of the effect
- The exact nature of the effect
- The severity of the effect
- The time at which the effect occurs
- The level of vulnerability to the effect
- The cause of the effect
- The factors which prevented it from being more severe.

Looking at proximate vs root causes is a form of abductive reasoning- a process used to unearth simple, probable explanations. We can use it in conjunction with philosophical razors (such as Occam's and Hanlon's) to make smart decisions and choices.

In Root Cause Analysis, Paul Wilson defines root causes as:

Root cause is that most basic reason for an undesirable condition or problem which, if eliminated or corrected, would have prevented it from existing or occurring.

In Leviathan, Chapter XI (1651) Thomas Hobbes wrote:

Ignorance of remote causes disposeth men to attribute all events to the causes immediate and instrumental: for these are all the causes they perceive...Anxiety for the future time disposeth men to inquire into the causes of things: because the knowledge of them maketh men the better able to order the present to their best advantage. Curiosity, or love of the knowledge of causes, draws a man from consideration of the effect to seek the cause; and again, the cause of that cause; till of necessity he must come to this thought at last that there is some cause whereof there is no former cause.

In Maxims of the Law, Francis Bacon wrote:

It were infinite for the law to consider the causes of causes, and their impulsions one of another; therefore it contented itself with the immediate cause, and judgeth of acts by that, without looking to any further degree.

A rather tongue in cheek perspective comes from the ever satirical George Orwell:

Man is the only real enemy we have. Remove Man from the scene, and the root cause of hunger and overwork is abolished forever."

The issue with root cause analysis is that it can lead to oversimplification and it is rare for there to be one single root cause. It can also lead us to go too far (as George Orwell illustrates.) Over emphasizing root causes is common among depressed people who end up seeing their existence as the cause of all their problems. As a consequence, suicide can seem like a solution (although it is the exact opposite.) The same can occur after a relationship ends, as people imagine their personality and nature to be the cause. To use this mental model in an effective manner, we must avoid letting it lead to self blame or negative thought spirals. When using it to examine our lives, it is best to only do so with a qualified therapist, rather than while ruminating in bed late at night. Finding root causes should be done with the future in mind, not for dwelling on past issues. Expert root cause analysts use it to prevent further problems and create innovative solutions. We can do the same in our own lives and work.

"Shallow men believe in luck or in circumstance. Strong men believe in cause and effect."

— Ralph Waldo Emerson
Establishing Root Causes

Establishing root causes is rarely an easy task. However, there are a number of techniques we can use to simplify the deduction process. These are similar to the methods used to find first principles:

Socratic questioning

Socratic questioning is a technique which can be used to establish root causes through strict analysis. This is a disciplined questioning process used to uncover truths, reveal underlying assumptions and separate knowledge from ignorance. The key distinction between Socratic questioning and normal discussions is that the former seeks to draw out root causes in a systematic manner. Socratic questioning generally follows this process:

1. Clarifying thinking and explaining origins of ideas. (What happened? What do I think caused it?)
2. Challenging assumptions. (How do I know this is the cause? What could have caused that cause?)
3. Looking for evidence. (How do I know that was the cause? What can I do to prove or disprove my ideas?)
4. Considering alternative perspectives. (What might others think? What are all the potential causes?)
5. Examining consequences and implications. (What are the consequences of the causes I have established? How can they help me solve problems?)
6. Questioning the original questions. (What can I do differently now that I know the root cause? How will this help me?)

The 5 Whys

This technique is simpler and less structured than Socratic questioning. Parents of young children will no doubt be familiar with this process, which necessitates asking 'why?' five times to a given statement. The purpose is to understand cause and effect relationships, leading to the root causes. Five is generally the necessary number of repetitions required. Each question is based on the previous answer, not the initial statement.

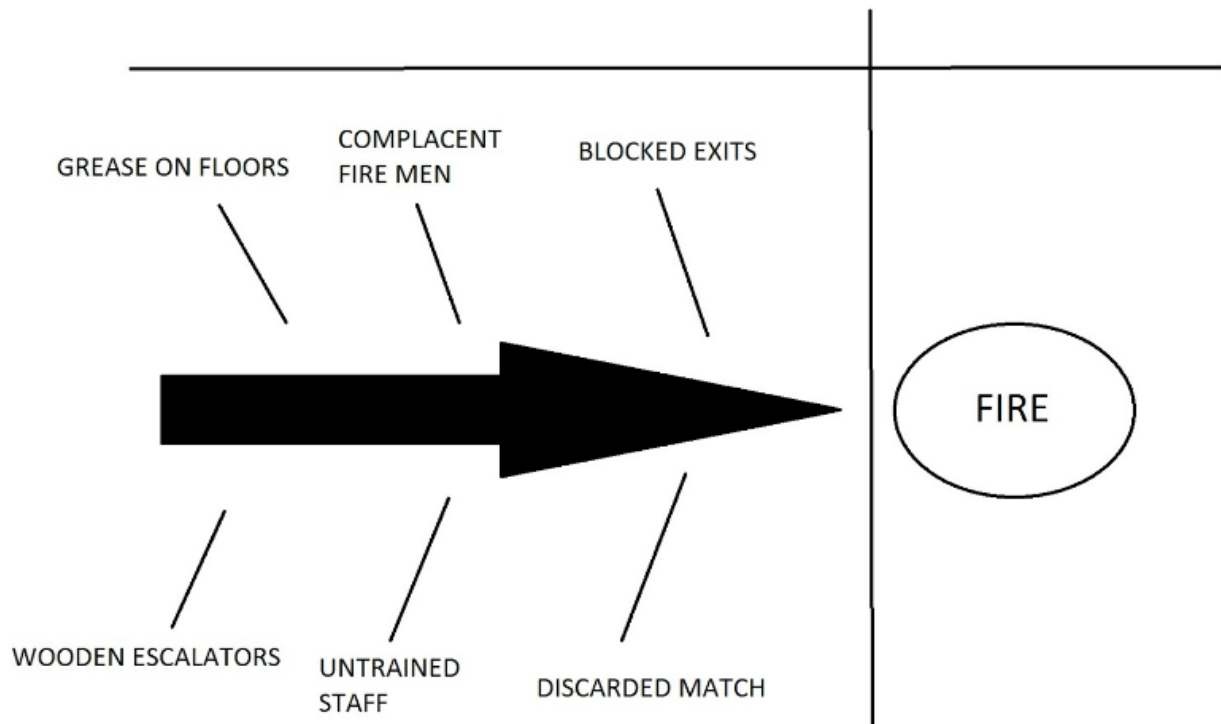
Returning to the example of our hypothetical laid off employee (mentioned in the introduction), we can see how this technique works.

- Effect: I lost my job.
- Why? Because I was not valuable enough to the company and they could let me go without it causing any problems.
- Why? Because a newer employee in my department was getting far more done and having more creative ideas than me.
- Why? Because I had allowed my learning to stagnate and stopped keeping up with industry developments. I continued doing what I have for years because I thought it was effective.
- Why? Because I only received encouraging feedback from people higher up in the company, and even when I knew my work was substandard, they avoided mentioning it.
- Why? Because whenever I received negative feedback in the past, I got angry and defensive. After a few occurrences of this, I was left to keep doing work which was not of much use. Then, when the company began to experience financial difficulties, firing me was the practical choice.

- Solution: In future jobs, I must learn to be responsive to feedback, aim to keep learning and make myself valuable. I can also request regular updates on my performance. To avoid becoming angry when I receive negative feedback, I can try meditating during breaks to stay calmer at work.

As this example illustrates, the 5 whys technique is useful for drawing out root causes and finding solutions.

Cause and Effect Mapping



This technique is often used to establish causes of accidents, disasters, and other mishaps. Let's take a look at how cause and effect mapping can be used to identify the root cause of a disaster which occurred in 1987: The King's Cross fire. This was a shocking event, where 31 people died and 100 were injured in a tube station fire. It was the first fatal fire to have occurred on the London Underground and led to tremendous changes in rules and regulations. This diagram shows the main factors which led to the fire, and how they all combined to lead to the tragic event. Factors included: flammable grease on the floors which allowed flames to spread, flammable out of date wooden escalators, complacent fire staff who failed to control the initial flames, untrained staff with no knowledge of how to evacuate people, blocked exits (believed to be due to cleaning staff negligence) and a dropped match (assumed to have been discarded by someone lighting a cigarette.)

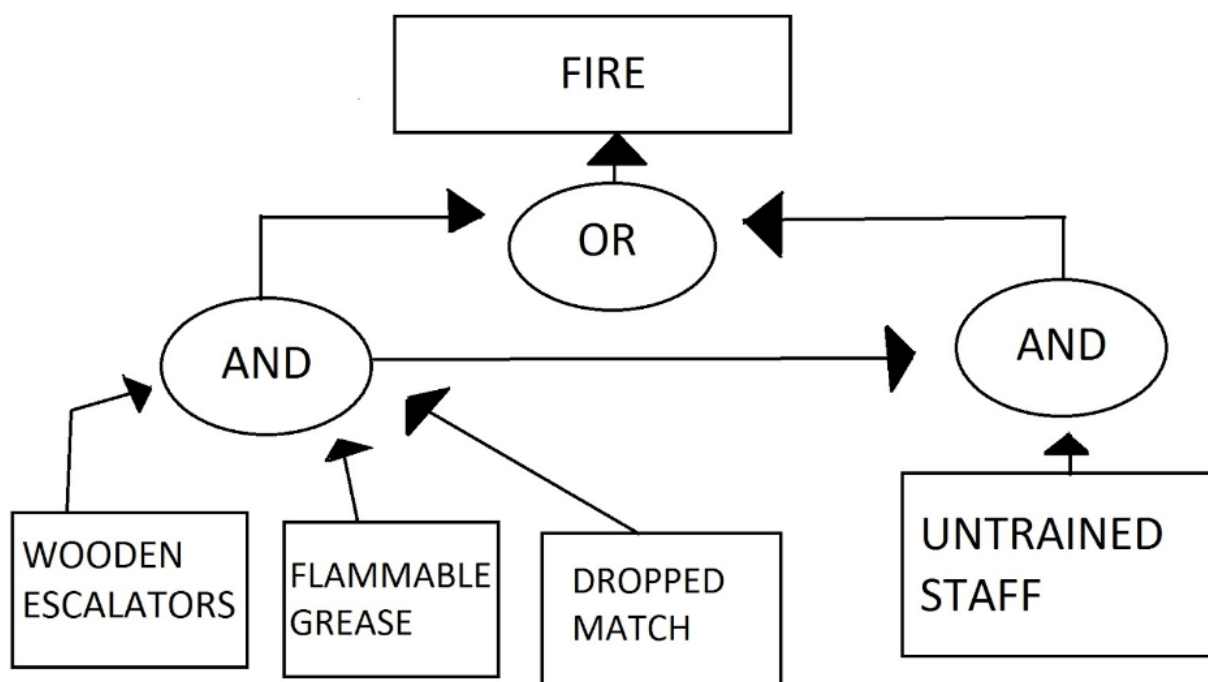
Once investigators had established these factors which led to the fire, they could begin looking for solutions to prevent another fatal fire. Of course, solving the wrong problem would have been ineffective. Let's take a look at each of the causes and figure out the root problem:

- Cause: A dropped match. Smoking on Underground trains had been banned 3 years prior, but many people still lit cigarettes on the escalators as they left. Investigators were certain that the fire was caused by a match, and was not arson.

Research found that many other fires had begun in the past, yet had not spread. This alone did not explain the severity of this particular fire. Better measures have since been put into place to prevent smoking in stations (although Londoners can vouch for the fact that it still occasionally happens late at night or in secluded stations.)

- Cause: flammable grease on escalators. Research found that this was indeed highly flammable. Solving this would have been almost impossible- the sheer size of stations and the numbers of people passing through them made thorough cleaning difficult. Solving this alone would not have been sufficient.
- Cause: wooden escalators. Soon after the fire, stations began replacing these with metal (although it took until 2014 for the entire Underground network to replace every single one.
- Cause: untrained staff. This was established to be the root cause. Even if the other factors were resolved, the lack of staff training or access to fire fighting equipment still left a high risk of another fatal incident. Investigations found that staff were only instructed to call the Fire Brigade once a fire was out of control, most had no training and little ability to communicate with each other. Once this root cause was found, it could be dealt with. Staff were given improved emergency training and better radio tools for communicating. Heat detectors and sprinklers were fitted in stations.

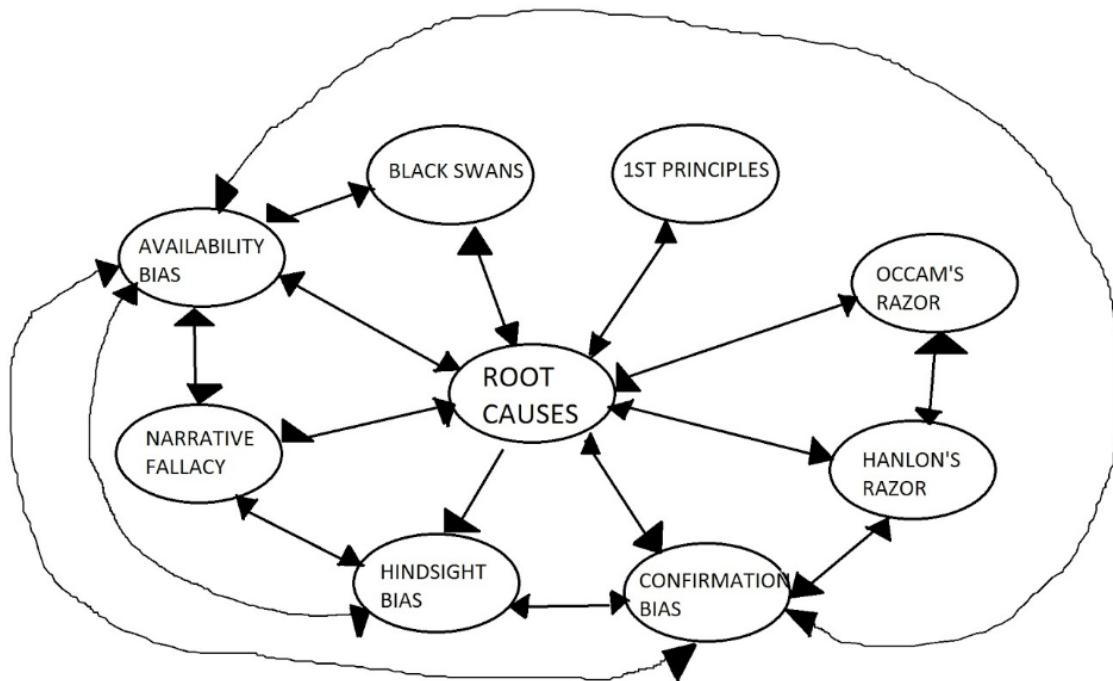
From this example, we can see how useful finding root causes is. The lack of staff training was the root cause, while the other factors were proximate causes which contributed. From this information, we can create this diagram to illustrate the relationship between causes.



"All our knowledge has its origins in our perceptions ... In nature, there is no effect without a cause ... Experience never errs; it is only your judgments that err by promising themselves effects such as are not caused by your experiments."

- Leonardo da Vinci

How We Can Use This Mental Model as Part of our Latticework



- Hanlon's Razor — This mental model states: never attribute to malice that which can be attributed to incompetence. It is relevant when looking for root causes. Take the aforementioned example of the Kings Cross fire. It could be assumed that staff failed to control the fire due to malice. However, we can be 99% certain that their failure to act was due to incompetence (the result of poor training and miscommunication.) When analysing root causes, we must be sure not to attribute blame where it does not exist.
- Occam's Razor — This model states: the simplest solution is usually correct. In the case of the fire, there are infinite possible causes which could be investigated. It could be said that the fire was started on purpose, the builders of the station made it flammable on purpose so they would be required to rebuild it that the whole thing is a conspiracy theory and people actually died in an alternate manner. However, the simplest solution is that the fire was caused by a discarded match. When looking for root causes, it is wise to first consider the simplest potential causes, rather than looking at everything which could have contributed.
- Arguing from first principles — This mental model involves establishing the first principles of any given area of knowledge- information which cannot be deduced from anything else. Understanding the first principles of how fire spreads (such as the fire triangle) could have helped to prevent the event.
- Black swans — This model, developed by Nassim Taleb is: “an event with the following three attributes. First, it is an outlier, as it lies outside the realm of regular expectations because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact.... Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.” The King's Cross fire was a black swan- surprising, impactful and much analyzed afterwards. Understanding that black swans do occur can help us to plan for serious events before they happen.

- Availability bias — This model states: we misjudge the frequency of events which have happened recently and information which is vivid. Imagine a survivor of the Kings Cross fire who had also been on a derailed train a few months earlier. The intensity of the two memories would be likely to lead them to see travelling on the Underground as dangerous. However, this is not the case – only one in 300 million journeys experience issues (much safer than driving.) When devising root causes, we must be sure to consider all information, not just that which comes to mind with ease.
- Narrative fallacy — This model states: we tend to turn the past into a narrative, imagining events as fitting together in a manner which is usually false.
- Hindsight bias — This model states: we see events as predictable when looking back on them.
- Confirmation bias — This model states: we tend to look for information which confirms pre-existing beliefs and ideas.

103. Leverage: Gaining Disproportionate Strength

"It is easier to conquer than to administer.

*With enough leverage, a finger could overturn the world;
but to support the world, one must have the shoulders of Hercules."*

— Jean-Jacques Rousseau, *The Social Contract*

The Basics

A good place to begin understanding the concept of leverage is the etymology of the word. We can trace its origins back to the Proto-Indo-European 'legwh' which described something light, agile, or easy. From this, the Latin 'levare' formed, which referred to something that was 'not heavy.' But the word absorbed into English in the 14th century from Old French, where 'levier' referred to raising something (hence the reflexive verb, 'se lever' which, in general, is used in the context of getting up in the morning.) So in essence, leverage refers to making something light by raising it in a specific manner.

The fusion of these two ideas perfectly describes a physical lever- a pole connected to a fulcrum which serves to create additional strength or force. A lever does not bend or create additional friction.

Three main types of physical levers have been identified

1. Levers with the fulcrum in the middle. A force is applied on one side and the load is on the other side (such as a crowbar.)
2. Levers where the load is placed in the middle and the force is applied on one side, with the fulcrum located on the other (such as a bottle opener.)
3. Levers where the force is applied in the middle (such as our lower jaw bones.)

Archimedes is credited with establishing the concept of leverage, over 2000 years ago. He famously stated that, given a lever long enough and enough distance, he could lift the earth.

In On the Equilibrium of Planes, Archimedes wrote: "Magnitudes in equilibrium at distances are reciprocally proportional to their weights."

However, the Peripatetic School (the followers of Aristotle) wrote of levers before the birth of Archimedes. In *Mechanica*, a work believed to have been written by members of this school of thought, they state:

Why is it that small forces can move great weights by means of a lever, as was said at the beginning of the treatise, seeing that one naturally adds the weight of the lever? For surely the smaller weight is easier to move, and it is smaller without the lever. Is the lever the reason, being equivalent to a beam with a cord attached below, and divided into two equal parts? For the fulcrum acts as the attached cord: for both these remain stationary, and act as a centre. For since under the impulse of the same weight the greater radius from the centre moves the more rapidly, and there are three elements in the lever, the fulcrum, that is the cord or centre, and the two weights, the one which causes the movement, and the one that is moved : now the ratio of the weight moved to the weight moving it is the inverse ratio of the distances from the centre. Now, the greater the distance from the fulcrum, the more easily it will move. The reason has been given before that the point further from the centre describes the greater circle, so that by the use of the same force, when the motive force is farther from the lever, it will cause a greater movement.

Like many of our mental models, leverage is a scientific concept which has applications in many other areas.

Leverage is an idea which humans have used to great effect for thousands of years, enabling them to gain disproportionate strength. For example, the ancient Egyptians used levers to lift stones weighing up to 100 tons in order to build the pyramids and obelisks.

Many of humanity's tools, used for centuries all over the world, incorporate levers- scissors, pliers, door handles, wheelbarrows, fishing rods and more.

The concept of leverage has been applied to other areas over the last century or so.

In Decision Making, Alan C McLucas defines leverage and leverage points as:

Leverage is built on the notion that small, well-focused actions can sometimes produce significant, enduring improvements if they are applied in the right place. Tackling a difficult problem is often a matter of seeing where the high leverage lies.

... A leverage point is where a small difference can make a large difference. Leverage points provide kernel ideas and procedures for formulating solutions. Identifying leverage points helps us: create new courses of action, develop increased awareness of those things that may cause a difficult before there are any obvious signs of trouble and figure out what is causing a difficult.

Leverage in Negotiations and Business

"You don't convince people by challenging their longest and most firmly held opinions. You find common ground and work from there. Or you look for leverage to make them listen. Or you create an alternative with so much support from other people that the opposition voluntarily abandons its views and joins your camp."

— Ryan Holiday, *The Obstacle Is the Way*

Roger J Volkema provides an example of how people use leverage for their own benefit in negotiations:

It is one of the hottest days of the year and something is wrong with your refrigerator...the temperature seems too warm. You contact a repairman who promises to come that afternoon. You ask about the likely cost. He says it could be around \$80... The repairman arrives, late in the afternoon. He believes the problem is with your freezer. He takes out all the frozen foods, unscrews panels, cuts wires. There is the problem: a coil had gone bad. It will cost you \$230. Sound familiar? You are now at the mercy of the repairman. You know little to nothing about freezer coils...you lack a choice and agree to pay the price. This story has been repeated dozens of times in your life...in each case, you felt at a disadvantage... They had leverage.

This tactic is used commonly by businesses. Buying a drink or snack on an airplane will always be expensive because the airline knows people lack an alternative, giving them the leverage. Spotify and Youtube can subject users to endless advertisements because the service is otherwise free and this gives them control. Companies with a monopoly (due to a patent, for example) can charge more because they own a particular market. A doctor can present an extortionate bill because we have no option to return the service ("hey doc, can you undo these stitches? I can get a cheaper operation elsewhere.")

Volkema goes on to explain the key principles of leverage:

1. Leverage is based on perceptions. If a party to a negotiation has an advantage and nobody perceives that the advantage exists...there is no leverage. This is especially true for the party with the disadvantage...Thus, it is perceived cost, real or imaginary that enables leverage.

... 2. Leverage is dynamic. Leverage can change as quickly as new information becomes available...These sorts of changes occur during formal business negotiations as well. If, for example, information central to an upcoming bidding process known only to one company becomes available to the other company, then leverage among companies has shifted.

...3. Leverage is situation specific...The aforementioned company with privileged information might have an advantage over another company, but in another situation, the advantage could be reversed (for example, the second company has just made a technical breakthrough that will revolutionize the industry.) Sometimes the situations that create leverage overlap or can be linked in some way.

...4. Leverage is a social or relational construct. Therefore, one has advantage over another individual only as long as the relationship exists. If one part leaves the relationship...leverage ceases to exist...Without another party, it is like being on a seesaw by yourself.

In one of his iconic letters to shareholders, Warren Buffett declared: “Don’t ask the barber whether you need a haircut.” To do so transfers leverage to the barber, who will always say yes. To retain leverage would necessitate telling the barber you certainly do not need a haircut, leading them to offer you an attractive deal.

Anyone who has ever haggled at a market or with a salesperson will understand the principle of using leverage in a negotiation. The trick is to declare their product or service to be so flawed and worthless that you are doing them a favor by buying it. Subsequently, the next step is usually to offer a low price which they counter with a slightly higher one that is still much lower than the asking price.

Another amusing example of leverage in negotiation comes from Jarod Kintz:

Money is not equal for all people. A strong personal brand adds more lift and leverage. One dollar from me may buy a soda from a car dealership, but one dollar from Justin Bieber may get him a Ferrari. And they would pay him to drive away.

Related Mental Models and Concepts

- **Critical mass** — Also known as a boiling point or tipping point, critical mass is the point where something (an idea, belief, trend, virus, behavior etc) is prevalent enough to grow at an exponential rate. It becomes contagious and is everywhere in a short span of time. We can combine this mental model with leverage to understand how drastic changes can be created with minimal effort. The critical mass serves as a lever. Imagine a teacher who wants to encourage the 30 pupils in her class to read more. Research has shown that just 10% of a population are necessary to form a critical mass. Rather than seeking to convince all 30 pupils to read more, she needs to persuade 3 popular ones. Once they begin reading more, the teacher can leverage them to spread their new love of books. Once this is achieved, it can pass on to the rest of the school.
- **Power law** — A power law is a relationship between two things when a change in one can lead to a large change in the other, regardless of the initial quantities. In the case of leverage, a power law relationship exists between the effort exerted on the lever (actual or metaphorical) and the outcome. For example, consider two children on a seesaw. If both children are an equal weight, the seesaw will go up and down with ease. If one goes away and a heavier child replaces them, a small difference in their weights will lead to a large increase in the speed at which the seesaw moves.
- **Pareto’s principle** — This principle states that 80% of outcomes are the result of 20% of inputs. Recognizing the 20% can provide us with a great deal of leverage. If a business receives 80% of its income from 20% of customers, the latter group can be leveraged to increase profits (e.g. by offering special deals and treatment to them, increasing their loyalty.) If 20% of the foods we eat comprise 80% of our diets, we can leverage these to improve our health (e.g. if a person eats bread each day, they could switch from white bread to wholegrain.)
- **Tribal leadership** — This concept involves leveraging ‘tribes’ within an organisation to further an agenda and grow a company culture. Tribes go through five stages towards maximum productivity and each has different leverage points.
- **Outsourcing** — Outsourcing certain tasks (such as cleaning or making transcripts) enables us to leverage one asset – money- to free up more time and make more money as a result.

- Commitment consistency bias — We have a desire to remain consistent with our past behaviour. Companies and manipulative people leverage this cleverly. If our favorite coffee shop raises their prices, we are unlikely to switch to somewhere else- after all, we have a loyalty card and the baristas know our usual order. If we realize the interest rates at our bank are lower than elsewhere, we are unlikely to change- we must have chosen them in the first place for a good reason. If an old friend suddenly becomes obnoxious and insulting, we are unlikely to stop spending time with them, due to the sunken costs of all the time spent together in the past
- Activation energy — Activation energy is the initial amount of energy necessary to commence a chemical reaction. We can apply this to leverage – the energy required to move the lever is the activation energy required to create movement.

104. Mutually Assured Destruction: When Not to Play

Mutually assured destruction is a military mental model with powerful applications in life and business. It refers to a situation where two parties are in a stalemate, and neither can make a move without causing their own destruction. Here's why this happens and how we can avoid putting ourselves in situations where playing means losing.

"A strange game. The only winning move is not to play."

— Professor Falken in the 1983 Movie *War Games*

The History of Mutually Assured Destruction

On the day in 1945 that Robert A Lewis, copilot of the B-29 Superfortress dropped the first atomic bomb on Hiroshima, he wrote six agonizingly poignant words in his log book: "My God, what have we done?"

What exactly had he done? His question is more complex than it seems.

If we look at that act in the literal sense, Lewis had just dropped 'Little Boy', the first of two atomic bombs which killed an estimated 129,000+ people. An accurate figure of the death toll is impossible to establish. This act was ordered by President Truman at the end of World War 2, to end the invasion of Japan and create 'peace.'

Less than a week after the bombing of Nagasaki, Japan surrendered and World War 2 ended a short time later.

Nuclear fission was first discovered in 1938, and scientists soon theorized that the development of atomic bombs was plausible. After hearing of Nazi plans to develop nuclear weapons, the US began its own research projects.

The Manhattan Project was set up and researchers developed two types of atomic bomb. When Japan refused to surrender, the decision was made to use the new weapon on two major cities. It achieved the desired effect and the war was finally over.

In his declaration to the Japanese people upon the topic of surrender, Emperor Hirohito stated:

The enemy now possesses a new and terrible weapon with the power to destroy many innocent lives and do incalculable damage. Should we continue to fight, not only would it result in an ultimate collapse and obliteration of the Japanese nation, but also it would lead to the total extinction of human civilization.

Controversy is still prevalent (and doubtless always will be) as to the justification of the bombing. Many scholars debate if it caused or prevented more deaths. However, the big question is not 'what have we done?' but 'what will we do?' Dropping the first atomic bomb did not just open a macabre Pandora's box, it also forced humanity to see the possibility that we will destroy ourselves and this entire planet in the process of settling disputes between nations.

As of 2016, 174,000 survivors of the bombing are still alive, living with the physical, psychological, and social consequences. The after effects spread far beyond Japan—indeed the ripples of the first use of nuclear weapons affect us all, even if not in an obvious way.

We have a strange tendency to forget that we are all — every human on earth — in this together. As it stands — for now, Elon — Earth is the only planet we have to live on. We can segregate it by national borders, but these are man-made ideas, not physical separations. This is where the concept of mutually assured destruction comes in. It happens to be one of the few instances where we can all agree on something: we must not wipe ourselves out and destroy our planet.

Why The Concept of Mutually Assured Destruction Matters

The concept of mutually assured destruction was first described by Wilkie Collins, a 19th century English author. In a letter written at the time of the Franco-Prussian war, over 70 years before the first atomic bomb dropped, Collins wrote:

I am, like the rest of my countrymen, heartily on the German side in the War. But what is to be said of the progress of humanity? Here are the nations still ready to slaughter each other, at the command of one miserable wretch whose interest is to set them fighting! Is this the nineteenth century? or the ninth? Are we before the time of Christ or after? I begin to believe in only one civilizing influence – the discovery one of these days, of a destructive agent so terrible that War shall mean annihilation, and men's fears shall force them to keep the peace.

It seems that Collins was very much ahead of his time.

Alfred Nobel (founder of the Nobel Prize and the inventor of dynamite) recognized this too, saying:

The day when two army corps can annihilate each other in one second, all civilized nations, it is to be hoped, will recoil from war and discharge their troops.

For most of human history, combat was hand to hand. People fought face to face, using swords, knives, bayonets, clubs, and other handheld weapons.

Humans have always fought each other with a viciousness largely unique to our species. Archaeological digs have uncovered evidence of genocides as far back as 5000 BC. As our intelligence and technology has advanced, so has our capacity to kill each other in large numbers.

Warren Buffett pointed this out in a [CNN interview](#).

You know, thousands of years ago we had psychotics and we had religious fanatics and we had megalomaniacs. But about the most they could do was throw a stone at somebody if they wished evil on them. Today, since 1945, the ability to inflict evil, or harm, on other people in huge numbers has grown exponentially.

Nuclear weapons are the culmination of this progress towards methods of wiping out huge numbers of people with minimal effort.

After the US dropped the first atomic bombs on Japan, other countries raced to develop their own. The USSR had hydrogen bombs within 8 years. Both developed their technology to the point where either of them had the ability to basically decimate the entire world if the leaders chose to. It goes without saying that a nation had never held that type of power before.

By the 1960s, the concept of mutually assured destruction (hereafter referred to as MAD) was crystallized. Both the US and the USSR could bring about the end of humanity (including themselves), but neither wanted to. This led to a stalemate, essentially stating 'I won't if you don't.' For either to attack would mean their own destruction, defeating the purpose of war. Ironically enough, the concept of MAD has led to relative peace between countries with nuclear capabilities. Tension is still prevalent, as each must keep up with the developments of the other to ensure continued equality.

During the Cold War, MAD was probably responsible for the lack of serious conflict between the US and USSR. The US kept a fleet of airplanes airborne non-stop, ready to drop nuclear bombs on the USSR at a moment's notice, should they strike first. Even if the USSR tried to destroy the entire US, they would still be able to retaliate using airplanes. However, airplanes were logistically and financially difficult to sustain and the US began to look for alternatives. Ballistic missile submarines were adopted as a solution. Submarines are also operated by the UK, France, China, India, and Russia. While world peace is certainly a long way off, this nuclear fleet provides a semblance of global stability.

The Key Components of Mutually Assured Destruction

There are several key components of the doctrine of MAD:

- Both sides in a combat must have the capacity to completely destroy the other. Any inequality in their power has the potential to tip the balance. The US and USSR have since developed more nuclear technology – guided missile systems, and weapons sprinkled around the globe in submarines. Neither side can have sufficient nuclear shelters to protect substantial numbers of people in the event of an attack. If

one side can cause a degree of destruction which would prevent a counterattack, the concept of MAD is not applicable.

- Both sides must have a genuine reason and motivation to believe that the other would be willing to destroy them. Any doubt in this area is dangerous.
- Both sides must be able to detect attacks with perfect accuracy. This necessitates the ability to know when a nuclear attack has occurred, without any errors. If one side uses stealth detonation (such as bombs smuggled into a country), MAD is not assured.
- Both sides must know exactly where a threat originates from. One serious problem is the border between China and Russia, both of which have nuclear weapons. Parts of China actually protrude into Russia, which could lead to complications as one could make it appear as if an attack originated from the other.
- Both sides must act rationally (in short, all those with power must be able to act like adults and take the concept of MAD seriously.) A rogue leader with a great deal of power and a disregard for human life beyond their own would have the potential to start a nuclear war. A chilling fact is that this came close to happening during the Cuban Missile Crisis when a lone submarine commander attempted to detonate a nuclear missile. That single act of insanity might have easily meant that you could not be reading this right now. Carl Sagan sums this up: "The nuclear arms race is like two sworn enemies standing waist-deep in gasoline, one with three matches and the other with five...every thinking person fears nuclear war and every technological state plans for it. Everyone knows it is madness and every nation has an excuse."

As that list shows, the concept is somewhat fragile and requires constant vigilance and innovation to maintain. There is also the ever prevalent risk of accidental or terrorist detonation.

The Potential Consequences of Mutually Assured Destruction

Thankfully, we do not have a clear picture of the potential consequences of MAD playing out. We do have an idea of what they would be – a nuclear apocalypse. Although the concept of a nuclear apocalypse has become almost comical due to its prevalence in science fiction, it is important to understand that it remains a very real possibility.

Should a nuclear war break out, it is believed that the result would be the collapse of human civilization, as much or all of the planet becomes unsuitable for life, cities are erased and technology becomes unusable.

Any people who manage to survive the initial blast(s), would have a poor chance of long-term survival due to firestorms, a possible nuclear winter and the effects of radiation.

Combine that with a famine and lack of law enforcement or medical care for survivors- the outlook would be bleak, to say the least. Substantial numbers of people could survive a global world war, although it is unlikely that we would be able to overcome the secondary impact. In any case, what would human life be without any economic or political structure or any of the other important concepts we take for granted?

Once again, it is difficult yet important to take this concept seriously as it seems so unrealistic. When we take into account the fact that at least 15,000 nuclear weapons are held worldwide, the chances are higher than we imagine.

In Bomb Steve Sheinkin writes:

"Consider this. A study published in Scientific American in 2010 looked at the probable impact of a "small" nuclear war, one where India and Pakistan each dropped fifty atomic bombs. The scientists concluded that the explosions would ignite massive firestorms,

sending enormous amounts of dust and smoke into the atmosphere. This would block some of the sun's light from reaching the earth, making the planet colder and darker – for about ten years. Farming would collapse, and people all over the globe would starve to death. And that's if only half of one percent of all the atomic bombs on earth were used. In the end, this is a difficult story to sum up. The making of the atomic bomb is one of history's most amazing examples of teamwork and genius and poise under pressure. But it's also the story of how humans created a weapon capable of wiping our species off the planet. It's a story with no end in sight. And, like it or not, you are in it."

The mental model of mutually assured destruction can be particularly useful outside of warfare.

Consider two mafia members who can't tell on one another. Or when companies obtain a large patent portfolio but don't pursue legal action against competitors with large patent portfolios.

Competition

Ask yourself, "Where are we competing where everyone is effectively the same?" and "What would happen if we got into a heated price war ... could we destroy our competitor? Would they destroy us?" Ideally, you can avoid these situations but if you can't you should, at least, be aware of them.

You can learn a lot just from identifying the situations where you're in a version of mutually assured destruction. For the model to work as a thinking tool you don't have to go as far as destruction. You can think in terms of ability for competitors to cause you pain or for you to cause them pain.

Trust

One of the ways we understand trust is through mutually assured destruction.

Consider two businesses engaged in tax fraud together. Either could rat the other out, knowing full well they would then be turned over.

The list goes on and on.

In the end, while you should try to avoid situations of mutually assured destruction, they can promote good behavior between parties. However, it only takes one party in a situation to start a massive chain reaction with usually catastrophic outcomes.

105. People Don't Follow Titles: Necessity and Sufficiency in Leadership

"Colonel Graff: You have a habit of upsetting your commander.

Ender Wiggin: I find it hard to respect someone just because they outrank me, sir."

— Orson Scott Card

Many leaders confuse necessary conditions for leadership with sufficient ones.

Titles often come with the assumption people will follow you based on a title. Whether by election, appointment, or divine right, at some point you were officially put in the position. But leadership is based on more than just titles.

Not only do title-based leaders feel like once they get the title that everyone will fall in line, but they also feel they are leading because they are in charge — a violation of the golden rules of leadership. This makes them toxic to organization culture.

A necessary condition for leadership is trust, which doesn't come from titles. You have to earn it.

Necessary conditions are those that must be present, but are not, on their own, enough for achievement. This is an exceptional mental model that will help you achieve outcomes. Perhaps an easy example will help illuminate. Swinging at a pitch in baseball is necessary to hit the ball, but not sufficient to do so.

War offers another example. It's necessary to know the capabilities of your enemy and their positions, but that is not sufficient to win a battle.

Leadership can be very similar. Being in a position of leadership is necessary to lead an organization, but that is not sufficient to get people moving towards a common goal. Titles, on their own, do not confer legitimacy. And legitimacy is one of the sufficient conditions of leadership.

If your team, organization, or country doesn't view you as legitimate you will have a hard time getting anything done. Because they won't work for you, and you can't do it all yourself. Leadership without legitimacy is a case of multiply by zero.

There is a wonderful example of this, from the interesting history of the Mongolians. In his book The Secret History of the Mongol Queens, Jack Weatherford tells an amazing story of the unlikely, but immensely successful, leadership of Manduhai the Wise.

250 years after Genghis Khan, the empire was in fragments. The Mongols had retreated into their various tribes, often fighting each other and nominally ruled by outsiders from China and the Middle East. There was still a Khan, but he exercised no real power. The Mongol tribes were very much at the mercy of their neighbors.

In 1470 the sitting Khan died, survived only by a junior wife. There were immediate suitors vying for her affection because by marrying her the title of Khan could be claimed. Her name was Manduhai. Instead of choosing the easy path of remarriage and an alliance, she decided to pursue her dream of uniting the Mongol nation.

First, she had to choose a consort that would allow her to keep the title of Queen. There was one remaining legitimate survivor of Genghis Khan's bloodline – a sickly 7-year-old boy. Orphaned as a baby and neglected by his first caregiver, he had been under Manduhai's protection for a few years. Because of his lineage, she took him to the Shrine of the First Queen and asked for divine blessings in installing him as the Great Khan. They would rule together, but clearly, due to his age and condition, she would be in charge.

Although her words would be addressed to the shrine, and she would face away from the crowd, there could be no question that, in addition to being the spiritual outcry of a pilgrim, these words constituted a desperate plea of a queen to her people. This would be the most important political speech of her life.

She was successful in securing the appointment. But Manduhai understood that the title of Great Khan for the little boy and Khatun (Queen) for her would not be enough. She

needed the support of all the Mongol tribes to give the titles legitimacy, and here there were a significant number of obstacles to overcome.

Twice before in the previous generations, boys of his age had been proclaimed Great Khan, only to be murdered by their rivals before they could reach full maturity. Other fully grown men who bore the title were also ignominiously struck down and killed by the Muslim warlords who tried to control them.

First Manduhai had to keep herself and the boy, Dayan Khan, alive. Then she had to demonstrate that they were the right people to unite the Mongol tribes and ensure prosperity for all. This would take both physical battles and a strategic understanding of how to employ little power for great effect. Her success was by no means guaranteed. *Throughout their reign, as on this awkward inaugural day, they frequently benefited from the underestimation of their abilities by those who struggled against them. In the world where physical strength and mastery of the horse and bow seemed to be all that really mattered, no one seemed to anticipate the advantages of patient intelligence, careful planning, and consistency of action.*

It was these traits that led Manduhai to carefully craft her plan of action. She needed to position herself as a true leader that could unite the Mongol tribes.

Vows, prayers, and rituals before a shrine added much needed sacred legitimacy to Dayan Khan's rule, but without force of arms, they amounted to empty gestures and wasted breath. Only after demonstrating that she had the skill to win, as well as the supernatural blessing to do so, could Manduhai hope to rule the Mongols. She had enemies on every side, and she needed to choose her first battle carefully. She had to confront each enemy, but she had to confront each in its own due time. Manduhai needed to manage the flow of conflicts by deciding when and where to fight and not allowing others to force her into a war for which she was not prepared or stood little chance of winning.

She made an important strategic alliance with one of the failed suitors, a popular and intelligent general who controlled the area immediately east of her power base. Then she went to battle to secure her western front. Some tribes supported her from the outset, due to the spiritual power of her partnership with the boy, the 'true Khan'. The rest she conquered, support snowballing behind her.

In addition to its strategic importance, the western campaign against the Oirat was a notable propaganda victory, demonstrating that Manduhai had the blessing of the Shrine of the First Queen and the Eternal Blue Sky. Manduhai showed that she was in control of her country.

Grinding it out in the trenches inspired support. Manduhai demonstrated the courage and intelligence to lead and to provide what her people needed. She was not an empire builder, seeking to conquer the world. Rather, she was pragmatic desiring to unify the Mongol nation to ensure they had the means to thwart any future attempt at takeover by a foreign power.

In contrast to the expansive territorial acquisition favored by prior generations of steppe conquerors, Manduhai pursued a strategy of geographic precision. Better to control the right spot rather than be responsible for conquering, organizing, and running a massive empire of reluctant subjects. ... Rather than trying to conquer and occupy the extensive links of the Silk Route or the vast expanse of China, she sought to conquer just the strategic spot from which to control them.

Her story teaches us the difference between necessity and sufficiency when it comes to leadership.

Manduhai ticked all the necessary boxes, being a Queen, choosing a descendant of Genghis Khan to rule by her side, and asking for meaningful spiritual blessings. While necessary these were not sufficient to rule. To actually be accepted as a leader, she had to prove herself both on the battlefield and in strategic negotiations. She understood that people would only follow her if they believed in her, and saw that she was working for

them. And finally, she also considered how to use her leadership to create something that would continue long after she had gone.

Manduhai concentrated the remainder of her life in protecting what she had accomplished and making certain that the nation could sustain itself after her departure. With the same assiduous devotion she had applied to the battlefield and the unification of the Mongol nation, Manduhai and Dayan Khan now set to the reorganization of the Mongol government and its protection in the future.

In this, she succeeded. She cemented her power as Queen by ultimately working for the peace and prosperity of the entire Mongol nation. Perhaps this is why she is remembered by them as Mandukhai the Wise.

106. Counterinsurgency: Fighting Back

The Basics

For an accurate definition of counterinsurgency (and the flipside, insurgency), we can look to one of the definitive texts on the topic.

In Counterinsurgency, David Kilcullen writes:

An insurgency, according to the current US military field manual on the subject is 'an organized movement aimed at the overthrow of a constituted government through the use of subversion and armed conflict... Stated another way, an insurgency is an organized, protracted politico-military struggle designed to weaken the control and legitimacy of an established government, occupying power or other political authority while increasing insurgent control.' The same field manual defines counterinsurgency as the 'military, paramilitary, political, economic, psychological and civic actions taken by a government to defeat insurgency.' Counterinsurgency therefore is an umbrella term that describes the complete range of measures that governments take to defeat insurgencies... there is no template, no single set of techniques for countering insurgencies. Counterinsurgency is simply whatever governments do to defeat rebellions.

In essence, counterinsurgency involves the attempts governments make to restore peace. The aim is to minimize civilian deaths while strengthening the influence of governments. No rulebook or particular strategy exists-counterinsurgent forces combine psychological, military, economic and political techniques. In the end, counterinsurgents try to create stability in the least harmful way possible, allowing a country to return to normal functioning.

How Counterinsurgency Works

Counterinsurgency is complex and delicate, full of metaphorical minefields.

Combat can be viewed as a sped up evolutionary process, wherein both sides adapt constantly in response to the behavior of the other. Each learns to defend themselves and to predict risks to their agenda.

One critical, omnipresent element is the effort to forge partnerships with civilian populations.

We often see photographs of soldiers handing out toys and sweets to children in war zones. What seems like a simple act of kindness is actually a clever military tactic. Small efforts like that compound to create trust and subsequent cooperation. The more a population sides with counterinsurgents, the less power insurgents have.

Kilcullen writes:

Insurgents cannot operate without the support... of the local population... violence against noncombatant civilians by security forces, whether intentional or accidental is almost always entirely counterproductive.

One common method is to force the population to move to a different area, making insurgents easier to identify. Civilians may be forced to carry ID and have it checked at regular intervals. Food supplies for insurgents can be cut off, such as through the use of Agent Orange in Vietnam to kill crops.

In Counterinsurgency Warfare, David Galula expands upon this key component of counterinsurgent efforts:

The population represents this new ground. If the insurgent manages to dissociate the population from the counterinsurgent... he will win the war... Thus the battle for the population is a major characteristic of the revolutionary war.

Other theorists have explained that the objective is to gain support, not terrain. Another typical technique is the restoration of as much stability as possible to reduce the power of insurgents.

Galula writes:

Prompting disorder is a legitimate objective for the insurgent. It helps disrupt the economy, hence to produce discontent; it serves to undermine the strength and the authority of the counterinsurgent. Moreover, disorder- the normal state of nature- is cheap to create and very costly to prevent.

Populations of people tend towards entropy without coherent political, economic, social and educational structures. Insurgents aim to disrupt these, while counterinsurgents aim to rebuild them.

Looking at conflicts he has experienced, Galula considers the perspectives of both sides. Despite the liquid nature of counterinsurgency, he outlines the key principles. Firstly, the goal is to gain support rather than control. Once a population supports its governing bodies, conflict becomes unlikely. Even an uncooperative population must be kept safe while mutual trust builds. Galula advocates starting in one location and spreading out, using it as a safe base until the surrounding areas can be controlled. This is known as the 'oil spot' strategy. He sums up his attitude thus: "Build (or rebuild) a political machine from the population upwards."

Counterinsurgency techniques tend to be formed through trial and error, based on our understanding of a particular location and feedback loops. As David Morris, a former Marine, put it: "In order to learn a lesson, you had to lose somebody."

According to Dr. Lorenzo Zambenardi, counterinsurgency involves three main goals:

1. The protection of counterinsurgent forces. A classic rule for firefighters states that the safety of the rescuer is always more important than that of the person being rescued. The same applied to counterinsurgents.

2. The formation of a separation between insurgents and non-combative civilians.

Counterinsurgents must create a physical or mental barrier. Sometimes this is done by moving noncombatants to a different location or providing them with ID cards. Separation can also be psychological – teaching people that they should not side with insurgents and are not part of the conflict. Understanding of the 'human terrain' is required

3. The destruction or conversion of insurgents. This might involve undermining power structures, cutting off resources or strategic assassinations.

The Origin of Counterinsurgency: Santa Cruz de Marcenado

We can trace the roots of counterinsurgency back to the 18th century when Santa Cruz de Marcenado wrote of the concept in Reflexiones Militaires.

Santa Cruz wrote that a leader must win the trust of a population, rather than battering them into submission with physical force- a somewhat modern attitude for the early 1700s. Recognizing that rebellion is a risky endeavor, he cautioned leaders to realize that people do not revolt without strong logic.

Santa Cruz's writing was based on his own experiences during the war of the Spanish Succession (1701-1714.) The conflict occurred both within Spain and with rival nations. He would ultimately lose his life in a Spanish colonial war.

Santa Cruz's principles, outlined in the text, are still relevant today. He encouraged leaders to take preventative measures against insurgencies, namely the fair treatment of all.

People must be respected and allowed to continue their traditions and cultural practices wherever possible. Counterinsurgent forces must behave according to strict protocol, with punishments for anyone who express cruelty. However, Santa Cruz did still advocate cutting off food supplies to a population and using intense military force to end insurgencies in the shortest time possible.

The Impact of Frank Kitson on Counterinsurgency

The works of Frank Kitson have foundational importance in counterinsurgent doctrine.

Kitson is a controversial figure, due to his role in assassinations and the Bloody Sunday massacre during the Troubles in Northern Ireland. He was not adverse to discarding legal and ethical considerations for the sake of his goals as a leader.

Expanding upon the ancient writings of Sun Tzu, he advocated mirroring insurgent behavior in order to understand them. Kitson also made use of spies within insurgent groups to garner information. His strategies created uncertainty and confusion amongst rival power structures, as well as destabilizing their public image.

One soldier summed up the tactics used under Kitson's guidance: "We were not there to act like an Army unit, we were there to act like a terror group." His theories stress the importance of the media in counterinsurgency.

Kitson's theories formed the basis of the way the British counterinsurgents handled the Northern Irish conflict. A counterinsurgent group (the MRF) targeted the insurgents (the IRA) by essentially using enhanced versions of their own tactics against them. Many of their strategies were morally repugnant.

Civilians were killed to show the population that the IRA could not protect them. Innocent people were shot at random to create further unrest.

As this illustrates, counterinsurgency is a complex, delicate technique which often leads to moral dilemmas. It is undeniable that Kitson's strategies led to many innocent deaths.

However, the risk was high at the time of unrest spreading to the rest of the UK, with the potential for huge numbers of casualties. Counterinsurgents in Northern Ireland aimed to quell this risk as soon as possible before the situation worsened. Kitson saw the transgression of legal boundaries as necessary during counterinsurgency.

There are always going to be controversies surrounding counterinsurgency. In part, this is due to the confused relationship between cause and effect during the conflict.

No one can quite say what led to or ended a period of unrest. Consequently, the efficacy of counterinsurgency is difficult to gauge. Individuals such as Kitson often come under fire, as the public seeks to blame someone for the loss of lives. Removed from the situation, we cannot expect to understand counterinsurgent motivations. We also cannot know what the consequences of acting differently (or not at all) would have been.

Examples Of Counterinsurgency in Action- Malaya

Between 1948 and 1960, an insurgency broke out in Malaya. The causes brewed for a while- British taxes led to a rise in poverty and tension between Malays and Chinese people working in traditional industries. Japanese occupation during the Second World War further complicated matters, forcing Malays to focus on subsistence farming (rather than exporting goods.) By the time the Japanese withdrew, severe famine-racked the country and the economy was at its historic worst. Protests broke out from 1946 onwards as a result.

The British were motivated to protect Malaya, due to the tin and rubber industries. As occurs all too often, the British administration attempted to counteract protests with violence which only worsened the tension. Eventually, a critical mass of rebellious people formed.

The tipping point occurred in June 1948, when insurgents killed 3 European plantation managers. British counterinsurgents were brought in to undermine Malayan Communist and left-wing groups. Once again, this further aggravated insurgents who clustered in rural areas to plan attacks on mines and plantations.

The British counterinsurgents attempted gentler measures, offering money to insurgents who agreed to surrender. Even so, over 4000 insurgents refused to disband and went into hiding. Echoing Santa Cruz's statement that people only rebel for a good reason, Chinese people in Malaya were treated as second class citizens and denied rights. Supporters (mostly Chinese immigrants) assisted them and many joined the insurgents, who organized themselves into ranks, with their own media, education and supply chains. Even so, they were never able to establish any real control over the nation due to British counterinsurgency. This consisted of a number of strategies. Locations which were probable targets received protection, food supplies were cut off and civilians were

encouraged not to join the uprising. Large numbers of people relocated to newly built, guarded camps.

Over several years, counterinsurgents restored order by degrees. This conflict illustrates Galula's point – disorder is easy to create and difficult to resolve. It took 40,000 counterinsurgents to defeat 8000 insurgents. It is believed that the most effective strategies used in Malaya were:

- Minimizing the deaths of noncombatant civilians and counterinsurgents.
- Building support from the population of Malaya, making them less likely to join the uprising.
- Enforcing an understanding that the insurgents were a risk to everyone.
- Creating organised political strategies and undermining those of insurgents.
- Reducing the incentives to rebel by providing Chinese citizens with fairer rights.
- Offering enticing sums of money to those who provided useful information and supported counterinsurgent efforts to locate insurgents.
- Giving insurgents the opportunity to surrender, without the risk of punishment. Although few actually opted for this, it created a sense of the government as trustworthy.

The Issues With Counterinsurgency

Counterinsurgency is never perfect and mistakes are always made. There are a number of key issues:

- Counterinsurgent efforts usually attempt to enforce Western attitudes and values. Most nations have a clear, although not always accurate, sense of their own equilibrium. Ignoring the importance of cultural relativism, counterinsurgents force round pegs into square holes. We think that our own way is the best, but who can decide what is best for a different country? Who says that modernization is the preferable route?
- Counterinsurgency is costly in terms of both human life and resources. In order to kill insurgents, civilian lives must be risked, while protecting civilians means more counterinsurgent casualties. Insurgents are often decentralised and spread out over large areas, meaning they have the advantage of surprise attack.
- Counterinsurgency is often ineffective. The solution for unrest is usually political changes, not military intervention. Combat alone cannot solve fundamental instability. There is also a lack of clear information as to the long term results. In some cases, it can backfire and worsen a situation.
- Counterinsurgency often lacks a clear end goal, or objectives may differ. The concepts of 'peace' and 'stability' are objective.

107. Activation Energy: Why Getting Started Is the Hardest Part

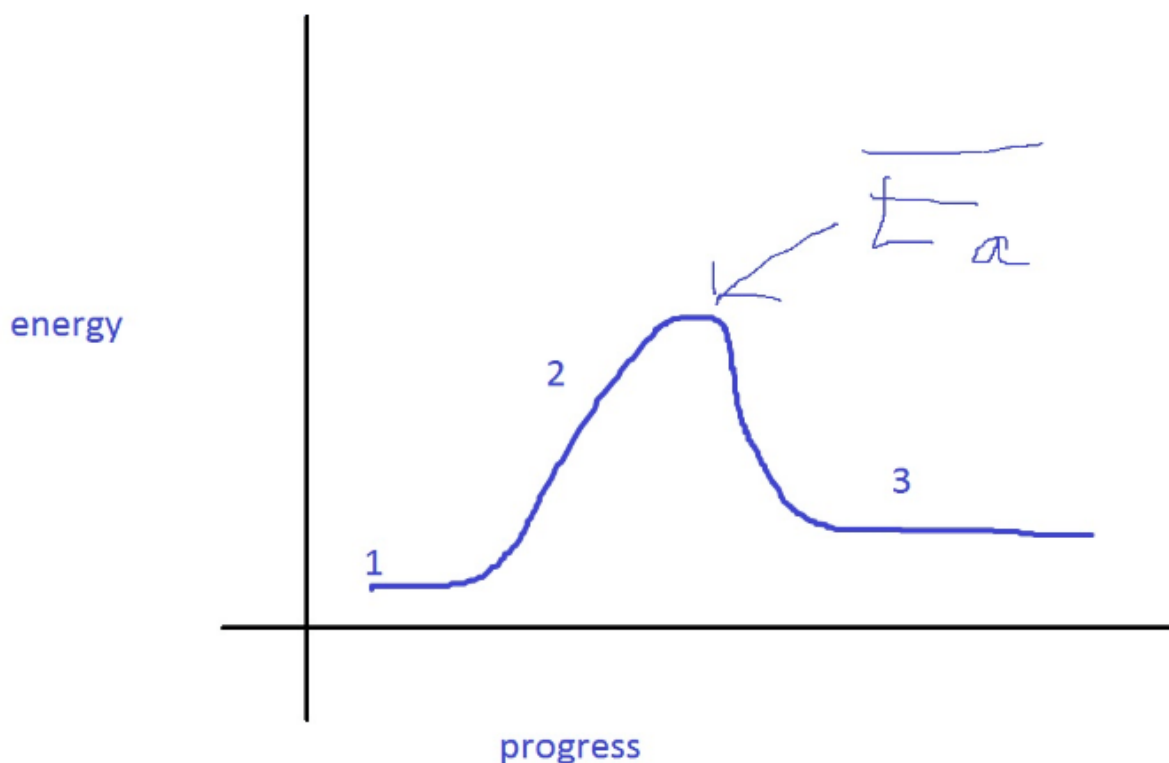
The beginning of any complex or challenging endeavor is always the hardest part. Not all of us wake up and jump out of bed ready for the day. Some of us, like me, need a little extra energy to transition out of sleep and into the day. Once I've had a cup of coffee, my energy level jumps and I'm good for the rest of the day. Chemical reactions work in much the same way. They need their coffee, too. We call this activation energy.

Understanding how this works can be a useful perspective as part of our latticework of mental models.

Whether you use chemistry in your everyday work or have tried your best not to think about it since school, the ideas behind activation energy are simple and useful outside of chemistry. Understanding the principle can, for example, help you get kids to eat their vegetables, motivate yourself and others, and overcome inertia.

How Activation Energy Works in Chemistry

Chemical reactions need a certain amount of energy to begin working. Activation energy is the minimum energy required to cause a reaction to occur.



To understand activation energy, we must first think about how a chemical reaction occurs. Anyone who has ever lit a fire will have an intuitive understanding of the process, even if they have not connected it to chemistry.

Most of us have a general feel for the heat necessary to start flames. We know that putting a single match to a large log will not be sufficient and a flame thrower would be excessive. We also know that damp or dense materials will require more heat than dry ones. The imprecise amount of energy we know we need to start a fire is representative of the activation energy.

For a reaction to occur, existing bonds must break and new ones form. A reaction will only proceed if the products are more stable than the reactants. In a fire, we convert carbon in the form of wood into CO₂ and is a more stable form of carbon than wood, so the reaction proceeds and in the process produces heat. In this example, the activation energy is the

initial heat required to get the fire started. Our effort and spent matches are representative of this.

We can think of activation energy as the barrier between the minima (smallest necessary values) of the reactants and products in a chemical reaction.

The Arrhenius Equation

Svante Arrhenius, a Swedish scientist, established the existence of activation energy in 1889.

Arrhenius developed his eponymous equation to describe the correlation between temperature and reaction rate.

The Arrhenius equation is crucial for calculating the rates of chemical reactions and, importantly, the quantity of energy necessary to start them.

In the Arrhenius equation, k is the reaction rate coefficient (the rate of reaction). A is the frequency factor (how often molecules collide), R is the universal gas constant (units of energy per temperature increment per mole), T represents the absolute temperature (usually measured in kelvins), and E is the activation energy.

It is not necessary to know the value of A to calculate E_a as this can be figured out from the variation in reaction rate coefficients in relation to temperature. Like many equations, it can be rearranged to calculate different values. The Arrhenius equation is used in many branches of chemistry.

Why Activation Energy Matters

Understanding the energy necessary for a reaction to occur gives us control over our surroundings.

Returning to the example of fire, our intuitive knowledge of activation energy keeps us safe. Many chemical reactions have high activation energy requirements, so they do not proceed without an additional input. We all know that a book on a desk is flammable, but will not combust without heat application. At room temperature, we need not see the book as a fire hazard. If we light a candle on the desk, we know to move the book away.

If chemical reactions did not have reliable activation energy requirements, we would live in a dangerous world.

Catalysts

Chemical reactions which require substantial amounts of energy can be difficult to control. Increasing temperature is not always a viable source of energy due to costs, safety issues, or simple impracticality. Chemical reactions that occur within our bodies, for example, cannot use high temperatures as a source of activation energy. Consequently, it is sometimes necessary to reduce the activation energy required.

Speeding up a reaction by lowering the activation energy required is called *catalysis*. This is done with an additional substance known as a catalyst, which is generally not consumed in the reaction. In principle, you only need a tiny amount of catalyst to cause catalysis.

Catalysts work by providing an alternative pathway with lower activation energy requirements. Consequently, more of the particles have sufficient energy to react.

Catalysts are used in industrial scale reactions to lower costs.

Returning to the fire example, we know that attempting to light a large log with a match is rarely effective. Adding some paper will provide an alternative pathway and serve as a catalyst — firestarters do the same.

Within our bodies, enzymes serve as catalysts in vital reactions (such as building DNA.)

“Energy can have two dimensions. One is motivated, going somewhere, a goal somewhere, this moment is only a means and the goal is going to be the dimension of activity, goal oriented-then everything is a means, somehow it has to be done and you have to reach the goal, then you will relax. But for this type of energy, the goal never comes because this type of energy goes on changing every present moment into a means for something else, into the future. The goal always remains on the horizon. You go on running, but the distance remains the same.”

No, there is another dimension of energy: that dimension is unmotivated celebration. The goal is here, now; the goal is not somewhere else. In fact, you are the goal. In fact, there is no other fulfillment than that of this moment—consider the lilies. When you are the goal and when the goal is not in the future, when there is nothing to be achieved, rather you are just celebrating it, then you have already achieved it, it is there. This is relaxation, unmotivated energy.”

— Osho, Tantra

Applying the Concept of Activation Energy to Our Daily Lives

Although activation energy is a scientific concept, we can use it as a practical mental model.

Returning to the morning coffee example, many of the things we do each day depend upon an initial push.

Take the example of a class of students set an essay for their coursework. Each student requires a different sort of activation energy for them to get started. For one student, it might be hearing their friend say she has already finished hers. For another, it might be blocking social media and turning off their phone. A different student might need a few cans of Red Bull and an impending deadline. Or, for another, reading an interesting article on the topic which provides a spark of inspiration. The act of writing an essay necessitates a certain sort of energy.

Getting kids to eat their vegetables can be a difficult process. In this case, incentives can act as a catalyst. “You can’t have your dessert until you eat your vegetables” is not only a psychological play on incentives; it also often requires less energy than constantly fighting with the kids to eat their vegetables. Once kids eat a carrot, they generally eat another one and another one. While they still want dessert, you won’t have to remind them each time, so you’ll save a lot of energy.

The concept of activation energy can also apply to making drastic life changes. Anyone who has ever done something dramatic and difficult (such as quitting an addiction, leaving an abusive relationship, quitting a long-term job, or making crucial lifestyle changes) knows that it is necessary to reach a breaking point first. The bigger and more challenging an action is, the more activation energy we require to do it.

Our coffee drinker might crave little activation energy (a cup or two) to begin their day if they are well rested. Meanwhile, it will take a whole lot more coffee for them to get going if they slept badly and have a dull day to get through.

Conclusion

To understand and use the concept of activation energy in our lives does not require a degree in chemistry. While the concept as used by scientists is complex, we can use the basic idea.

It is no coincidence that many of most useful mental models in our latticework originate from science. There is something quite poetic about the way in which human behavior mirrors what occurs at a microscopic level.

108. Human Misjudgment and the American Revolution

We try to look at mental models in history through the lens of people who got it right, but once in a while, it's beneficial to examine a model through the lens of those who got it wrong.

In this case, let's take a look at the remarkable series of misjudgments that resulted in the British losing their American colonies.

Our list of mental models includes 24 models in the human nature + judgment category, and at least seven of those were a factor in the British being driven out of America. Sometimes it helps to understand how great the consequences of these very human tendencies can be. And, perhaps more significantly, how a large group of people can succumb to them at the same time.

Bias from Incentives

Money, the root of stupidity.

In the mid-18th century, the British had a parliament, but it was very different from what exists today. As Barbara W. Tuchman describes in The March of Folly, the House of Commons was made up mostly of second sons of the nobility – the landowning class.

Urban centers such as London were poorly represented, and not surprisingly Parliament tended to pass laws that were primarily good for its members.

A lot of the issues which ultimately led to the revolution were about money.

The British wanted to tax the colonies, as Tuchman explains, so they would at least pay for their own defense, which was costly. The colonists felt that, with the exception of trade tariffs, the British had no right to tax those who were not represented in Parliament.

So part of the reason Parliament passed incendiary legislation, taxing, for example, stamps and tea, was so that the members of parliament, the landowners, could pay less tax. This was short-sighted — an incentive that could never be realized. As Tuchman describes, some more thoughtful dissenters pointed out that the cost of collecting the taxes from the hostile colonists was more than what the taxes would bring in.

Tendency to distort due to disliking/hating

We have written before that *“Our inability to examine the situation from all sides and shake our beliefs, together with self-justifying behavior, can lead us to conclude that others are the problem. Such asymmetric views, amplified by strong perceived differences, often fuel hate.”*

One of the things that Tuchman points out a few times is the complete ignorance of the British when it came to the sensibilities and interests of the Americans. And we can't blame this on the distance or comparative slow speed of communication. Tuchman highlights what is most startling is those in positions of power in the Parliament literally had no desire to understand the colonists' position. *“That the British were invincibly uninformed – and stayed uninformed – about the people they insisted on ruling was a major problem of the imperial-colonial relationship.”*

Parliament did not seek the advice or opinion of those Brits who had spent time in the colonies as Administrators, nor did it interview the well-educated and thoughtful Americans who were in London, such as Benjamin Franklin.

Due to their own sense of superiority, the British nobility believing they were the pinnacle of humanity, allowed their dislike of the colonists to distort the policies they pursued.

(Remember history doesn't repeat but it rhymes.) As Tuchman writes, *“Attitude was again the obstacle; the English could not visualize Americans in terms of equality.”*

You certainly don't declare war on people you admire and respect.

Denial Tendency

To stubbornly pursue a course of action in the face of evidence that it will eventually blow up in your face is denial. We all do it, but to do it as a political group can lose you a war.

The American revolution did not start without warning. There were years of attempts by the British to assert control over the colonies. As Tuchman describes, they would institute taxes then rescind them, only to reinstate them later. The colonists had the same response every time. They rejected the ability of the British to tax them. It was total denial that kept the British trying.

The British passed a series of acts, called the Coercive Acts that seemed designed to piss off the Americans. But in reality, it was more about the total inability of the British to see the situation clearly. Tuchman says, “if Britain had really been pursuing a plan to goad the colonies to insurrection in order to subjugate them, then her conduct of policy becomes rational. Unhappily for reason, that version cannot be reconciled to the repeals, the backings and fillings, the haphazard or individual decisions.”

As we mentioned earlier, the cost of bringing in the tax was more than the tax itself. And if taxation was the issue that was driving the colonies to war, then why keep doing it? Denial is likely part of the answer.

Social Proof

“When we feel uncertain, we all tend to look to others for answers as to how we should behave, what we should think and what we should do.”

This is social proof.

The House of Commons was not a homogenized unit; there were dissenters to the British approach in the American colonies, though these voices were always in the minority. Some people argued against the taxes and the war, offering alternatives to Parliament to act in the interest of keeping the colonies part of the empire. But the majority followed their peers.

Added to this was the fact that, as Tuchman describes, the situation in America wasn't a hot issue for most British. The nobility of the House of Commons was frequently more occupied with the various social scandals that occurred in their ranks.

What this helped to create was a situation of largely uninformed people responsible for voting on legislation that could have significant impacts. It is a human tendency to look to the majority for guidance on behavior when we are unsure about what to do. It is always easier to go with the majority than to oppose it. In the House of Commons, it was easier to vote with the majority than to take a stand against it, particularly if one wasn't all that interested in the issue.

First-Conclusion Bias

We tend to stick with the first conclusion we reach. Because of our commitment to our own narrative, it becomes very hard for us to change our minds once we form a definite opinion. This involves us admitting we made a mistake — something we avoid, as it can challenge our very sense of self.

The core issue that started the conflict between Britain and the American colonies, which eventually led to the war, was, as Tuchman describes, the absolute conviction of the British that they had a right to directly tax the colonies, and the equal conviction of the American that no right existed.

At the beginning, the Americans did attempt some compromise. The British, however, never did.

Despite the dissent, the cost, and the effects, the British never reexamined their first conclusion. It became layered with other issues but remained at the core of their position. Tuchman demonstrates that “they persisted in first pursuing, then fighting for an aim whose result would be harmful whether they won or lost.”

Their first conclusion, the right of the British state to tax the American colonies, was never abandoned or modified in light of what enforcing it would actually result in. Even if it were true, the absolute nature of their position prevented them from finding a compromise. This bias was a contributing factor in the result the British finally had to accept. The loss of the war.

Commitment and Consistency Bias

Partnered with the first conclusion bias, this one essentially reinforces the pain. This is what causes us to *“stick with our original decision, even in the face of new information.”*

Although consistency is generally perceived to be good, uncompromising consistency is more synonymous with ignorance and fear. If torpedos are aimed at your boat, your crew might appreciate you turning it around, giving yourself time to regroup.

The British made attempts to solve their problems, but these were halfhearted at best.

Tuchman actually depicts the British policy as not being consistent at all. The levied taxes, then they repealed them. They eventually sent a peace delegation but gave it no power to actually come to a compromise.

But they were fully committed to their overall attitude, which was, as Tuchman writes, *“a sense of superiority so dense as to be impenetrable. A feeling of this kind leads to ignorance of the world and of others because it suppresses curiosity. [All] ministries went through a full decade of mounting conflict with the colonies without any of them sending a representative, much less a minister, across the Atlantic to make acquaintance, to discuss, to find out what was spoiling, even endangering, the relationship and how it might be better managed. They were not interested in Americans because they considered them rabble or at best children whom it was inconceivable to treat – or even fight – as equals.”*

Given that this attitude of superiority was so entrenched, is it any wonder that the decisions made were those that reinforced this image?

Tendency to Want to Do Something

Busyness signals productivity. The faster you are walking the more important you are.

Having time on your hands means you aren't doing enough, not seizing the day, not contributing anything of value. Slow walkers are assumed to be seniors, students, or those who have nothing going on.

We can see the same trends in governments. Strong governments defend their position at all costs, while those who value negotiating or finding common ground are perceived as weaker. Powerful governments go to war. Those with less power find a compromise.

Tuchman claims, *“Confronted by menace, or what is perceived as menace, governments will usually attempt to smash it, rarely to examine it, understand it, define it.”*

So many times during the decade of conflict between the British and the Americans, the British might have put themselves in a better position if they had been willing to pause, regroup, or even walk away. Given some space, they might have compensated for the load of biases they were operating under and better defined and focused on a win-win solution.

But all the misjudgments flying around, combined with the innate human tendency to do something, led to chasing bad decisions with even worse ones.

[quote]If there is a silver lining, it's that we can learn from our mistakes so as to not be perpetual victims of our misjudgment tendencies.[/quote]

Tuchman concludes that the British did learn from their experiences during the American Revolution.

“Fifty years later, after a period of troubled relations with Canada, Commonwealth status began to emerge from the Durham Report, which resulted from England's recognition that any other course would lead to a repetition of the American rebellion.”

109. Active Listening: The Master Key to Effective Communication

"You cannot truly listen to anyone and do anything else at the same time."

— M. Scott Peck

The Basics

The sense that we are not being listened to is one of the most frustrating feelings imaginable. Toddlers scream about it, teenagers move out, couples split up, companies breakdown.

One of the main reasons this breakdown in communication occurs is that listening (like reading, thinking clearly and focusing) is a skill which we rarely consider to be something requiring knowledge and practice.

There is a difference between hearing and listening.

We assume that, as long as we can hear someone and understand their words that we are listening. Hearing alone, however, is not enough. Among other things, we need to comprehend what's being said and why, reflect on intentions, and consider non-verbal communication.

Listening is one of the foundations of society – it is what enables us to form meaningful relationships and connections. And yet most of us haven't thought about how we listen.

As Mortimer J. Adler writes in How to Speak, How to Listen:

We all realize that the ability to read requires training...the same would appear to be true of speaking and listening ... training is required ... Likewise, skill in listening is either a native gift or it must be acquired by training.

Active listening is a technique for developing our ability to listen.

As a communication technique, it is used in many professional settings but is also valuable for everyday life. Anyone who has ever seen a good therapist will be familiar with the efficacy of active listening. A one-to-one therapist will listen with intent, clarify any uncertain points, often paraphrase what is said and ask the speaker to expand. A family or couple therapist will help to resolve a conflict by facilitating calm communication through reflection, open body language, and by helping couples understand one another.

As Sheldon B. Kopp writes:

The therapist can interpret, advise, provide the emotional acceptance and support that nurtures personal growth, and above all, he can listen. I do not mean that he can simply hear the other, but that he will listen actively and purposefully, responding with the instrument of his trade that is, with the personal vulnerability of his own trembling self. This listening is that which will facilitate the patient's telling of his tale, the telling that can set him free.

For the sake of clarity, we will refer to active listening in the context of two people conversing throughout this article. However, it can occur in communication between multiple people and in groups.

[quote]Listening is difficult because it involves suppressing your ego long enough to consider what is being said before you respond.[/quote]

The Core Components of Active Listening

Comprehending

To communicate, we must first understand what the other person (or people) are actually saying. This is not as simple as it appears.

In most cases, comprehension occurs instantly and unconsciously. However, a number of potential barriers can prevent comprehension, including:

- Language barriers.
- The use of jargon or slang.
- Difference in culture, age, social rank and other discrepancies between people.

In Eyes Wide Open, Isaac Lidsky recommends simplifying comprehension by asking 'can you explain that like I'm five years old?.' This is the same technique we use to rapidly improve learning. Removing jargon and explaining things in your own language results in massively improved comprehension of complex topics.

Retaining

To respond in an appropriate manner, we must understand and retain what the other person has said. Not everyone will retain the same details.

Some people recall very specific details, while others hold on to the general idea. It is common for us to only retain details which are relevant for our response.

When actively listening, we focus on the other person's words, rather than thinking about what we can say next. Suppressing our ego is difficult. It's as if we think we already know what the other person is going to say. And we fool ourselves into thinking that we've done the work: that we not only know what the other person will say but that we've thought about it before. Only, we haven't.

There are a number of potential barriers to retention, including:

- Cognitive biases and selective listening (we will look at this in more detail later.)
- Distractions, either internal or external (such as fatigue or a noisy environment.)
- Issues with memory (such as Dementia.)

Responding

Conversations are active, not passive. A conversation between people cannot occur without a response.

Active listening requires careful responses which are made possible with comprehending and retaining.

An active response should show that we understand what the other person has said, have paid attention to their words and also read their non-verbal cues.

Ronald A. Heifetz writes that "The activity of interpreting might be understood as listening for the song beneath the words." To be an active listener, we must try to go beyond the words and form a rich picture of the other person's emotions and intentions. However, we must also avoid inventing meaning or colouring their words with our own thoughts. The same potential barriers apply to responding as to retaining and comprehending.

[quote]To be an active listener, we must try to go beyond the words and form a rich picture of the other person's emotions and intentions.[/quote]

Active Listening and Overcoming Cognitive Biases

Active listening requires an understanding of how cognitive biases and shortcuts impact our communication. These are particularly prevalent when people are arguing and disagreeing.

Consider the following hypothetical argument between a couple, Mary and John. Any resemblance to your marriage is purely coincidental.

Mary: You never help around the house, you came home drunk twice last week, you forgot to pick the kids up from school, you never buy me flowers, you—

John: I bought you flowers on Valentine's day!

In this instance, John is succumbing to confirmation bias in order to refute Mary's statements. Ignoring the other claims, he responds to the one which he can easily disagree with. John fools himself into believing that because he can refute one statement, they are all false.

John: I bought you flowers on Valentine's day!

Mary: That was the first you've brought me flowers in 5 years.

John is now falling prey to availability bias. He remembers one event which was recent and salient, *while ignoring the preceding times*.

Mary: That was the first time you've brought me flowers in 5 years.

John: So? None of my friends buy their partners flowers, even on Valentine's day.

Social proof is now coming into play. John has looked to their peers for clues as to how he should behave. Rather than considering how Mary feels, he is reassuring himself that his behavior is fine because it is common.

Mary: Anyway, the flowers you brought me that time were wilted and you clearly got them from the gas station on your way home.

Here, Mary is seeing a distorted view of events due to her current anger (bias from hating/disliking.) An event which previously made Mary happy is now only further evidence of her partner's inadequacy.

The examples above are just a few of the numerous cognitive biases and shortcuts which impede our communication.

Now, let's imagine how this argument might have gone if John had used active listening techniques.

This would necessitate putting aside emotions and ego and rather trying to understand why Mary is upset.

Mary: You never help around the house, you came home drunk twice last week, you forgot to pick the kids up from school, you never buy me flowers and I'm sick of it.

John: So, you feel I am being a bad parent, ignoring your needs, and allowing my social life to interfere with our relationship?

John is now paraphrasing what Mary has said, confirming that he is listening. It's important to note that John is not outright agreeing with Mary. Rather than seeking to defend himself, he is making sure Mary knows he is listening.

By keeping calm and showing open body language, he can then allow Mary to finish venting her frustration without interrupting. This provides a safe and secure environment for Mary to open up and express her true feelings.

John maintains eye contact and uses nonverbal cues (such as nodding and tilting his head to indicate he is listening.) Mary relaxes a little, seeing that her partner appears to be truly interested in what she has to say.

Then, John can speak:

John: What can I do which would make you feel better about our relationship?

This question is neutral and not related to personal opinion. John has allowed Mary to explore her feelings. By continuing in this way, they can turn an argument into a valuable opportunity to understand each other better.

The result in this situation is likely to be far more positive than the initial example. Even just by reading the words, you probably pictured both scenarios somewhat differently, complete with altered tones of voice and outcomes.

Active Listening as a Means of Overcoming Conversational Narcissism

If you have ever been in a conversation with someone who is only interested in talking about themselves, you will understand what conversational narcissism is and how it makes you feel.

Sociologist Charles Derber first observed the phenomenon, wherein people allow their self obsession to manifest in their conversational practices. Rather than listening to what the other person has to say and responding accordingly, many people shift the discussion to themselves.

In Inarticulate Society: Eloquence and Culture in America, Tom Shachtman writes:

[Conversational Narcissism] is pervasive and rooted in our culture of individualism, a pattern that leads to self-absorption ... by the use of 'I' statements, by boasting, by the tactic of asking questions only in order to demonstrate the questioner's superior knowledge or to top the other person's story with one's own, and by continual shifting... The most frequently used written word in the language is 'the', but the most frequently spoken word..is 'I.'

Derber describes this as the 'shift response' as opposed to a 'support response.' In The Pursuit of Attention: Power and Ego in Everyday Life, he writes:

The subtlety of the shift-response is that it is always based on a connection to the previous subject. This creates an opening for the respondent to shift the topic to himself ... when serving narcissistic ends, shift-responses are repeated until a clear shift in subject has transpired ... The effectiveness is the shift response as an attention getting device lies partly in the difficulty in distinguishing immediately whether a given response is a sharing one of a narcissistic initiative.

Conversational narcissists will often repeat shift-responses until the conversation steers towards them. Again.

Returning to our hypothetical couple, this might look like this:

John: I'm just really stressed about work at the moment.

Mary: Me too, you wouldn't believe what one of my coworkers did yesterday.

John: And it's hard for me to pay enough attention to the kids when I have this much on my plate and just want to relax when I get home.

Mary: Seriously, what she did was ridiculous.

John: What did she do?

In this conversation, Mary repeats the shift-response until John finally gets the point and switches the topic away from himself.

The narcissistic nature of this is obvious in a conversational transcript but can be difficult to identify.

Support-responses are the opposite of shift-responses — they sustain the speaker's words and encourage them. If Mary had used support responses, the conversation might look like this:

John: I'm just really stressed about work at the moment.

Mary: Why is it more stressful than usual right now?

John: Well, one of the people in my team is on holiday for a couple of weeks and I keep getting landed with their usual responsibilities.

Mary: Have you spoken to your boss about that? You shouldn't be doing someone else's job as well as your own.

Notice how different those two scenarios sounded in your head.

In the first conversation, Mary was purely narcissistic and just wanted to talk about herself.

In the second, the couple was able to understand each other a bit better and to see a potential root cause of their conflict.

Conversational narcissism also occurs through passive behavior.

Derber writes:

Passive conversational narcissism entails neglect of supportive questions at all such discretionary points and extremely sparse use of them throughout conversation. Listening behaviour takes place but is passive. There is little attempt to draw others out or assume other forms of active listening. This creates doubt in the other regarding the interest of their topics or their rights to attention ... A second very common minimal use practice involves the ... delay of background acknowledgements. Although weaker than supportive questions, background acknowledgements such as 'yeah' or 'uh huh' are nonetheless critical cues by which speakers gauge the degree of interest in their topics.

As Derber illustrates, we must not underestimate the importance of our responses when it comes to active listening.

The other person does not care if we listen with great attention if our responses do not reflect this. In some cases, a comment or question is necessary. Often, a simple acknowledgment is sufficient.

In The Plateau Effect, Sullivan and Thompson explain the folly of conversational narcissism:

Most people listen with intent to do something – usually to defend themselves, or to solve a problem. Nearly everyone listens with the intent of having something ready to say as soon as the speaker is finished. Have you ever wondered how crazy that is? Shouldn't there be a pause once in a while, as one of the speakers actually thinks about what to say, or even better, thinks about what has been said? Here's a phenomenon you'll observe repeatedly if you look for it: Two speakers, appearing to be carrying on a conversation, but really just giving two monologues, split up by each other, each one waiting simply for time on whatever stage he or she imagines to be on...Listeners usually can't wait to leap to their own defense, and spend their time thinking like an attorney who's planning a closing argument rather than hearing what's being said. You can imagine how ineffective this is."

How Can We Improve Our Active Listening Skills?

While there is no one method for learning to listen actively, there are a number of small changes we can make.

Active listening, like any skill, is developed by practicing, not by reading about it. By applying the concept to each conversation we have, we can gradually develop the ability to communicate well. This might include:

- Educate yourself on common cognitive biases and shortcuts. Learn to spot them in yourself and others and to see how they impede communication.
- Avoid trying to respond immediately. Allow the other person time to finish speaking, then provide a considered response. Consider first if it is a shift or support response.
- Minimize conversational narcissism by keeping track of your use of pronouns. An over-reliance on 'I' and 'me' can indicate a desire to steer the conversation towards yourself. Aim to make liberal use of 'you' instead.
- Adler recommends taking notes during key conversations. Although this may be disconcerting to a speaker, it is relevant in some situations. Adler writes: *"The notes you take while listening record what you have done with your mind to take in what you have heard. That record enables you to go on to the second step...What you have notes...provides you with food for thought."*
- During an argument, accept that people are rarely willing to change their viewpoint. Instead of becoming enraged or frustrated, seek to develop a clear picture of the other person's logic. Using the Socratic questioning technique can be helpful for drawing out this information. Using active listening, it is possible to turn an argument into a calm discussion, where you can explain your own thoughts. Adler explains: *"The logically sensitive speaker will ask you to follow his reasoning by accepting his assumptions for the time being – accepting them to discern their consequences, to see how they lead to the conclusions he wishes to arrive at...they are not axioms or self-evident truths...your task is to be on the alert to detect the initial premises...that provide the ultimate grounds for what is being said."*
- Increase your motivation to listen. This is known as the affective framework for active listening. This motivation might be the desire to improve a relationship, follow instructions without wasting time, make someone feel better or to make an exchange as clear as possible.

110. The Trojan Horse: When True Intents Are Concealed

A Trojan Horse is an innocuous appearing container for hiding something within to get past defenses or some other obstacle. Trojan Horses can be used for both good and evil. Here's how to recognize and use them.

The Basics

The story of the Trojan Horse is perhaps the most famous of all the Greek myths.

The Trojan War had been going on for a decade, with no end in sight and many Greek heroes dying, when Odysseus came up with an idea that won the war for the Greeks. Because the Trojans considered horses to be sacred, the Greeks built a large, hollow wooden horse. To make it even more irresistible, they used wood from Cornel trees (also sacred) to construct it. Odysseus and a group of men hid inside while the rest of the Greek army pretended to leave the area, destroying their camp and boarding their ships. After some debate as to whether the Greeks could be trusted, the Trojans dragged the giant horse inside the walls of the city. The end of the ten-year siege was a huge relief to the people of Troy, who spent the night celebrating.

By midnight, everyone was in a drunken stupor. Odysseus then acted, signaling to the Greek fleet to return and leading his men out of the Trojan Horse to kill the unsuspecting guards and open the doors. The Greeks then had access to the city. They massacred the Trojans, keeping a few alive as slaves. Some of the soldiers traveled further afield, forming settlements which are supposed to have led to the creation of Rome.

Ancient Greeks saw this myth as factual, with the events occurring between 1300–1200 BC in the area near Dardanelles.

There is some archeological evidence for the existence of Troy, although most historians now accept that the story is mythological. There is probably still some basis in actual events, as sieges were common during that era.

Myth or not, the fact that the story of the Trojan Horse has survived for over 3,000 years indicates its power and utility as a mental model.

Why, exactly, has this particular story retained its grip on our imagination for so long?

We can only speculate as to why. Perhaps the answer lies in the fact that the Trojan Horse is not just a story. It's also a parable, a metaphor, an invitation to be ingenious, an example of out-of-the-box thinking.

Reading it has sparked so many ideas for so many people. It is at once practical and bizarre.

Using it as a mental model, we can apply the Trojan Horse story to an array of disciplines and situations. As a concept, it can be used for both good and evil.

The Trojan Horse in Marketing and Business

We live in an era when we are all besieged by marketing messages every moment of the day. Like the Trojans hiding in their city, we have learned to shut these messages out — we use advertisement blockers, throw away junk mail unopened, ignore billboards, and filter out spam emails.

In order to gain our attention, marketers often use a technique similar to the Trojan Horse. They offer people an apparent gift — a free ebook, a discount card, a sample. Only once this item has been enjoyed can its real purpose can be enacted.

[quote]A good heuristic when things seem too good to be true is to just forget about them.[/quote]

Many marketing lessons can be found in the original myth.

The Greeks chose a form which appealed to their targets, using a sacred creature and type of wood. Likewise, marketers must fit their gift to the audience, making it appealing to their basic interests. The Greeks used innovative thinking, inventing a tactic which was

new and therefore unexpected. If they had tried the same thing again, it would have had no effect.

Once a marketing technique is recognizable, its impact wanes. No one is going to click on a “5 ways to kill belly fat” pop-up anymore, or fall for an email from a Nigerian prince telling you just how much money you left there, or enjoy a free executable file that will clean your computer. These ruses are now well known and we ignore them. But when these techniques were new and unfamiliar, huge numbers of people were attracted by the offers.

Some examples of Trojan Horse marketing include:

- Offering the first chapter of a book for free to people who join an email list — Having read the chapter and received more emails which connect them to the author, people are more likely to buy the full book than they would have been if they had only seen an advert.
- Creating free high-quality blog content for an audience to enjoy — Once people are interested in the blogger’s voice and expertise, the marketing can begin. Many people will at some point want to support the person whose work they have been consuming for free. This support might include buying courses, books, or consulting services or donating to a Patreon page. We developed the membership as not only a bunch of extras for people but also a means to support the free content we provide.
- Writing a book detailing an expert’s specialized knowledge — While sales of the book are often not high, having it published benefits the expert’s business. For example, Ryan Holiday has stated that his books have led to more income from speaking and consulting than from actual book sales.
- Making the most income from revenue streams which do not appear to be the main objective of a business — For example, high-fashion brands often make more money from perfume than from clothing, cinemas rely on sales of popcorn and drinks, and some restaurants profit predominantly from sales of alcohol.
- Creating viral branded content which people share and engage with due to its being interesting and often amusing — For example, just try to watch the Android “Friends Furever” video without forwarding it to at least one person. The adorable video wraps up a marketing message, making people more likely to pay attention to it.

In his book *Permission Marketing*, Seth Godin discusses the idea under a different name. When you let people into your inbox, you’re letting people into your city. They might be there for good or bad reasons; it’s hard to know in advance. In a blog post, Godin explains how the concept works:

Permission marketing is the privilege (not the right) of delivering anticipated, personal, and relevant messages to people who actually want to get them.

It recognizes the new power of the best consumers to ignore marketing. It realizes that treating people with respect is the best way to earn their attention.

Pay attention is a key phrase here, because permission marketers understand that when someone chooses to pay attention they are actually paying you with something precious...

Real permission works like this: if you stop showing up, people complain, they ask where you went...

Permission is like dating. You do not start by asking for the sale at first impression. You earn the right, over time, bit by bit...

In order to get permission, you make a promise. You say, “I will do x, y and z, I hope you will give me permission by listening.” And then, this is the hard part, that’s all you do. You

do not assume you can do more. You do not sell the list or rent the list or demand more attention...

In the book, Godin explains how Amazon has used permission marketing to build an empire:

Using permission, Amazon can fundamentally reconfigure the entire book industry, disintermediating and combining every step of the chain until there are only two: the writer and Amazon ... Amazon appears to be building a permission asset, not a brand asset.

Amazon began by offering cheap books. Once people fell for that initial Trojan Horse, Amazon offered them other products and gradually captured more and more of their online spending. Services such as Prime, Echo, and Kindle are contained within the Trojan Horse — that first cheap purchase someone makes.

Just as the Greeks invested effort into building the horse, Amazon has invested millions in technology and infrastructure. This is the essence of Trojan Horse marketing: offering a gift (with Amazon, this includes free trials, discounts, and generally low costs for popular items) and then upselling and upselling and upselling.

On the topic of Amazon Prime, John Warrillow writes:

Like many subscription models, Amazon Prime is a Trojan horse that is expanding the list of products consumers are willing to buy from Amazon and giving the eggheads in Seattle a mountain of customer data to sift through.

The Trojan Horse and the Benjamin Franklin Effect

Let's say there is a person who dislikes you — a lot. It's fine; this happens to all of us. But what if you need to form an allegiance with this person? Or maybe they don't dislike you, they just don't know you. Either way, you need to build a relationship with them. What should you do? Ask them out for coffee, offer a gift, ask someone for an email introduction?

One solution is to utilize the Benjamin Franklin effect, essentially a sort of Trojan Horse approach to building relationships.

The Benjamin Franklin effect is a psychological phenomenon in which we begin to like people we have done favors for. Essentially, the initial favor is the Trojan Horse, containing within it a relationship. Franklin's original story, told in his autobiography, details how he used this during his time as a legislator:

Having heard that he [a rival who disliked Franklin] had in his library a certain very scarce and curious book, I wrote a note to him, expressing my desire of perusing that book, and requesting he would do me the favour of lending it to me for a few days. He sent it immediately, and I return'd it in about a week with another note, expressing strongly my sense of the favour.

When we next met in the House, he spoke to me (which he had never done before), and with great civility; and he ever after manifested a readiness to serve me on all occasions, so that we became great friends, and our friendship continued to his death.

We can use Franklin's technique as a Trojan Horse to gain the respect, friendship, and cooperation of other people.

Asking someone for a favor indicates that we already respect them and consider them to have something we lack — a form of flattery which serves as the gift. Once they have accepted this and performed the favor, it can be leveraged.

Examples of the conjunction between the Benjamin Franklin effect and the Trojan Horse include:

- Salesmen use the foot-in-the-door technique. This involves making a small request (for example, filling in a survey), then trying to sell you something.
- If someone you know has a particular area of expertise, try texting or emailing them (rather than Googling it) whenever you have a related question. One Reddit user on r/LifeProTips recommends texting your mother simple questions on a regular basis

to strengthen the relationship. Doing so indicates to people that we consider them knowledgeable, making them more likely to respond to larger requests.

Robert Greene also recommends a number of Trojan Horse—style tactics in *The 48 Laws of Power*, concealing true intentions within a facade and using specific behavior to achieve goals.

Use selective honesty and judgment to disarm ... One sincere and honest move will cover over dozens of dishonest ones. Open-hearted gestures of honesty and generosity bring down the guard of even the most suspicious people. Once your selective honesty opens a hole in their armor, you can deceive and manipulate them at will. A timely gift—a Trojan horse—will serve the same purpose.

In *The 33 Strategies of War*, Greene returns to the same analogy:

[B]efriend your enemies, worming your way into their hearts and minds. As your targets' friend, you will naturally learn their needs and insecurities, the soft interior they try so hard to hide. The guard will come down with a friend. And even later on, when you play out your treacherous intentions, the lingering resonance of your friendship will still confuse them, letting you keep on manipulating them by toying with their emotions or pushing them into overreactions. For a more immediate effect, you can try a sudden act of kindness and generosity that gets people to lower their defenses—the Trojan Horse strategy. ...

When confronted by something difficult or thorny, do not be distracted or discouraged by its formidable outer appearance; think your way into the soft core, the center from which the problem blossoms... Knowing the problem's core gives you great power to change it from the inside out. Your first thought must always be to infiltrate the center... never to whale away at the periphery or just pound at the walls.

How Artists Change Your Mind

Many artists (a term used here to denote anyone who creates something, not just those who paint canvases) have used their work to conceal important agendas.

The Beatles, Bob Dylan, and Conor Oberst wrap political and social messages within beautiful music.

Bloggers such as Seth Godin and James Altucher envelop key life lessons and paradigm-altering concepts within humorous anecdotes and metaphors. The women who embroidered the Bayeux Tapestry added their own subtle views to the panoramas of war and victory.

Companies such as Toms, Ben & Jerry, and Lush use the popularity of their products to fund real change. Johannes Vermeer's most serene paintings tell complex, taboo narratives.

Botticelli's La Primavera (above) is actually an exploration of his interest in horticulture, not a study of human figures.

Consider Gatsby, throwing lavish parties with the sole purpose of attracting Daisy back to him. This is the essence of much of art — an attractive and appealing exterior conceals the true purpose.

People use whatever means are available to them to express their views and attitudes. Sometimes this is intentional; sometimes the Trojan Horse is built unconsciously. The purpose is to get a message across in a form which is palatable to people.

Few of us enjoy or engage with straightforward expressions of a particular agenda. But when it comes in an interesting form, we pull the wooden horse within the city walls with glee. Just as with marketing messages, we have become desensitized to these sorts of messages. Artists must now use ingenuity and creativity to spread their ideas.

As Walter Hamady writes:

The book as a structure is the Trojan horse of art — it is not feared by average people. It is a familiar form in the world, and average people will take it from you and examine it whereas a painting, poem, sculpture, or print they will not.

This concept of art as a Trojan Horse is extremely important.

Farnam Street itself serves as a Trojan Horse. Our intention is to spread an appreciation of the importance of clear thinking, lifelong learning, making good decisions and living a meaningful life.

If upon your first visit to this site, you had found nothing but a list of instructions, the chances are high that you would have ignored it and never returned. Through the use of stories, analogies and careful explorations of important ideas, this agenda has reached and inspired many people. When you read a post about a military tactic or the life of a historic figure, the purpose is not the narrative alone. It is about much more than that — a way of changing how people think.

In *Contagious*, Jonah Berger explains the power of stories as a Trojan Horse:

People don't just share information, they tell stories. But just like the epic tale of the Trojan Horse, stories are vessels that carry things such as morals and lessons. Information travels under the guise of what seems like idle chatter. So, we need to build our own Trojan horses, embedding our products and ideas in stories that people want to tell... we need to make our message so integral to the narrative that people can't tell the story without it.

Francis T. Marchese also advocates the Trojan Horse approach to art:

The Trojan Horse is an artifact that possesses a host of hidden agendas. Rather than presenting a one-off manifestation, the Trojan Horse offers many platoons, capable of strategically addressing the wider culture, pointing to replicable solutions through demonstration. Thus, an artwork acting like a Trojan Horse can contain the seeds of multiple strategic outcomes.

In short, when we want to spread an idea or spark change, we would do well to learn from the ancient Greeks.

People have strong defenses against anything which challenges their worldviews. By packaging it in a format which appeals to them, we can pass on meaning. Artists, marketers, and politicians (among others) have long realized the importance of this approach. It is a means of injecting our ideas, both good and bad, into people's worlds through an apparent gift.

111. Critical Mass and Tipping Points: How To Identify Inflection Points Before They Happen

Critical mass, which is sometimes referred to as tipping points, is one of the most effective mental models you can use to understand the world. The concept can explain everything from viral cat videos to why changing habits is so hard.

The Basics

Sometimes it can seem as if drastic changes happen at random.

One moment a country is stable; the next, a revolution begins and the government is overthrown. One day a new piece of technology is a novelty; the next, everyone has it and we cannot imagine life without it. Or an idea lingers at the fringes of society before it suddenly becomes mainstream.

As erratic and unpredictable as these occurrences are, there is a logic to them, which can be explained by the concept of critical mass. A collaboration between Thomas Schelling (a game theorist) and Mark Granovetter (a sociologist) led to the concept's being identified in 1971.

Also known as the boiling point, the percolation threshold, the tipping point, and a host of other names, critical mass is the point at which something (an idea, belief, trend, virus, behavior, etc.) is prevalent enough to grow, or sustain, a process, reaction, or technology. As a mental model, critical mass can help us to understand the world around us by letting us spot changes before they occur, make sense of tumultuous times, and even gain insight into our own behaviors. A firm understanding can also give us an edge in launching products, changing habits, and choosing investments.

In *The Decision Book*, Mikael Krogerus wrote of technological critical masses:

Why is it that some ideas – including stupid ones – take hold and become trends, while others bloom briefly before withering and disappearing from the public eye?

... Translated into a graph, this development takes the form of a curve typical of the progress of an epidemic. It rises, gradually at first, then reaches the critical point of any newly launched product, when many products fail. The critical point for any innovation is the transition from the early adapters to the sceptics, for at this point there is a 'chasm'. ... With technological innovations like the iPod or the iPhone, the cycle described above is very short. Interestingly, the early adaptors turn away from the product as soon as the critical masses have accepted it, in search of the next new thing.

In *Developmental Evaluation*, Michael Quinn Patton wrote:

Complexity theory shows that great changes can emerge from small actions. Change involves a belief in the possible, even the "impossible." Moreover, social innovators don't follow a linear pathway of change; there are ups and downs, roller-coaster rides along cascades of dynamic interactions, unexpected and unanticipated divergences, tipping points and critical mass momentum shifts. Indeed, things often get worse before they get better as systems change creates resistance to and pushback against the new.

In *If Nobody Speaks of Remarkable Things*, Jon McGregor writes a beautiful explanation of how the concept of critical mass applies to weather:

He wonders how so much water can resist the pull of so much gravity for the time it takes such pregnant clouds to form, he wonders about the moment the rain begins, the turn from forming to falling, that slight silent pause in the physics of the sky as the critical mass is reached, the hesitation before the first swollen drop hurtles fatly and effortlessly to the ground.

Critical Mass in Physics

In nuclear physics, critical mass is defined as the minimum amount of a fissile material required to create a self-sustaining fission reaction. In simpler terms, it's the amount of reactant necessary for something to happen and to keep happening.

This concept is similar to the mental model of activation energy. The exact critical mass depends on the nuclear properties of a material, its density, its shape, and other factors. In some nuclear reactions, a reflector made of beryllium is used to speed up the process of reaching critical mass. If the amount of fissile material is inadequate, it is referred to as a subcritical mass. Once the rate of reaction is increasing, the amount of material is referred to as a supercritical mass. This concept has been taken from physics and used in many other disciplines.

Critical Mass in Sociology

In sociology, a critical mass is a term for a group of people who make a drastic change, altering their behavior, opinions or actions.

“When enough people (a critical mass) think about and truly consider the plausibility of a concept, it becomes reality.”

—Joseph Duda

In some societies (e.g., a small Amazonian tribe), just a handful of people can change prevailing views. In larger societies (in particular, those which have a great deal of control over people, such as North Korea), the figure must usually be higher for a change to occur. The concept of a sociological critical mass was first used in the 1960s by Morton Grodzins, a political science professor at the University of Chicago. Grodzins studied racial segregation — in particular, examining why people seemed to separate themselves by race even when that separation was not enforced by law. His hypothesis was that white families had different levels of tolerance for the number of people of racial minorities in their neighborhoods. Some white families were completely racist; others were not concerned with the race of their neighbors. As increasing numbers of racial minorities moved into neighborhoods, the most racist people would soon leave. Then a tipping point would occur — a critical mass of white people would leave until the area was populated by racial minorities. This phenomenon became known as “white flight.”

Critical Mass in Business

In business, at a macro level, critical mass can be defined as the time when a company becomes self-sustaining and is economically viable. (Please note that there is a difference between being economically viable and being profitable.) Just as a nuclear reaction reaches critical mass when it can sustain itself, so must a business. It is important, too, that a business chooses its methods for growth with care: sometimes adding more staff, locations, equipment, stock, or other assets can be the right choice; at other times, these additions can lead to negative cash flow.

The exact threshold and time to reach critical mass varies widely, depending on the industry, competition, startup costs, products, and other economic factors.

Bob Brinker, host of Money Talk, defines critical mass in business as:

A state of freedom from worry and anxiety about money due to the accumulation of assets which make it possible to live your life as you choose without working if you prefer not to work or just working because you enjoy your work but don't need the income. Plainly stated, the Land of Critical Mass is a place in which individuals enjoy their own personal financial nirvana. Differentiation between earned income and assets is a fundamental lesson to learn when thinking in terms of critical mass. Earned income does not produce critical mass ... critical mass is strictly a function of assets.

Independence or “F*** You” Money

Most people work jobs and get paychecks. If you depend on a paycheck, like most of us, this means you are not independent — you are not self-sustaining. Once you have enough money, you can be self-sustaining.

If you were wealthy enough to be free, would you really keep the job you have now? How many of us check our opinions or thoughts before voicing them because we know they

won't be acceptable? How many times have you agreed to work on a project that you know is doomed, because you need the paycheck?

"Whose bread I eat: his song I sing."

—Proverb

In his book *The Black Swan*, Nassim Taleb describes "f*** you" money, which, "in spite of its coarseness, means that it allows you to act like a Victorian gentleman, free from slavery":

*It is a psychological buffer: the capital is not so large as to make you spoiled-rich, but large enough to give you the freedom to choose a new occupation without excessive consideration of the financial rewards. It shields you from prostituting your mind and frees you from outside authority — any outside authority. ... Note that the designation f*** you corresponds to the exhilarating ability to pronounce that compact phrase before hanging up the phone.*

Critical Mass in Psychology

Psychologists have known for a long time that groups of people behave differently than individuals.

Sometimes when we are in a group, we tend to be less inhibited, more rebellious, and more confident. This effect is known as mob behavior. (An interesting detail is that mob psychology is one of the few branches of psychology which does not concern individuals.)

As a general rule, the larger the crowd, the less responsibility people have for their behavior. (This is also why individuals and not groups should make decisions.)

"[Groups of people] can be considered to possess agential capabilities: to think, judge, decide, act, reform; to conceptualize self and others as well as self's actions and interactions; and to reflect."

—Burns and Engdahl

Gustav Le Bon is one psychologist who looked at the formation of critical masses of people necessary to spark change. According to Le Bon, this formation creates a collective unconsciousness, making people "a grain of sand amid other grains of sand which the wind stirs up at will."

He identified three key processes which create a critical mass of people: anonymity, contagion, and suggestibility. When all three are present, a group loses their sense of self-restraint and behaves in a manner he considered to be more primitive than usual. The strongest members (often those who first convinced others to adopt their ideas) have power over others.

Examples of Critical Mass

Virality

Viral media include forms of content (such as text, images, and videos) which are passed amongst people and often modified along the way. We are all familiar with how memes, videos and jokes spread on social media. The term "virality" comes from the similarity to how viruses propagate.

"We are all susceptible to the pull of viral ideas. Like mass hysteria. Or a tune that gets into your head that you keep on humming all day until you spread it to someone else. Jokes. Urban legends. Crackpot religions. No matter how smart we get, there is always this deep irrational part that makes us potential hosts for self-replicating information."

—Neal Stephenson, *Snow Crash*

In *The Selfish Gene*, Richard Dawkins compared memes to human genes. While the term “meme” is now, for the most part, used to describe content that is shared on social media, Dawkins described religion and other cultural objects as memes.

The difference between viral and mainstream media is that the former is more interactive and is shaped by the people who consume it. Gatekeeping and censorship are also less prevalent. Viral content often reflects dominant values and interests, such as kindness (for example, the dancing-man video) and humor. The importance of this form of media is apparent when it is used to negatively impact corporations or powerful individuals (such as the recent United Airlines and Pepsi fiascoes.)

Once a critical mass of people share and comment on a piece of content online, it reaches viral status. Its popularity then grows exponentially before it fades away a short time later. Technology

The concept of critical mass is crucial when it comes to the adoption of new technology. Every piece of technology which is now (or once was) a ubiquitous part of our lives was once new and novel.

Most forms of technology become more useful as more people adopt them. There is no point in having a telephone if it cannot be used to call other people. There is no point in having an email account if it cannot be used to email other people.

The value of networked technology increases as the size of the network itself does. Eventually, the number of users reaches critical mass, and not owning that particular technology becomes a hindrance. Useful technology tends to lead the first adopters to persuade those around them to try it, too. As a general rule, the more a new technology depends upon a network of users, the faster it will reach critical mass. This situation creates a positive feedback loop.

In *Zero to One*, Peter Thiel describes how PayPal achieved the critical mass of users needed for it to be useful:

For PayPal to work, we needed to attract a critical mass of at least a million users.

Advertising was too ineffective to justify the cost. Prospective deals with big banks kept falling through. So we decided to pay people to sign up.

We gave new customers \$10 for joining, and we gave them \$10 more every time they referred a friend. This got us hundreds of thousands of new customers and an exponential growth rate.

Another illustration of the importance of critical mass for technology (and the unique benefits of crowdfunding) comes from Chris LoPresti:

A friend of mine raised a lot of money to launch a mobile app; however, his app was trounced by one from another company that had raised a tenth of what he had, but had done so through 1,000 angels on Kickstarter. Those thousand angels became the customers and evangelists that provided the all-important critical mass early on. Any future project I do, I'll do through Kickstarter, even if I don't need the money.

Urban Legends

Urban legends are an omnipresent part of society, a modern evolution of traditional folklore. They tend to involve references to deep human fears and popular culture.

Whereas traditional folklore was often full of fantastical elements, modern urban legends are usually a twist on reality. They are intended to be believed and passed on. Sociologists refer to them as “contemporary legends.” Some can survive for decades, being modified as time goes by and spreading to different areas and groups. Researchers who study urban legends have noted that many do have vague roots in actual events, and are just more sensationalized than the reality.

One classic urban legend is “The Hook.” This story has two key elements: a young couple parked in a secluded area and a killer with a hook for a hand. The radio in their car announces a serial killer on the loose, often escaped from a nearby institution, with a hook for a hand. In most versions, the couple panics and drives off, only to later find a hook

hanging from the car door handle. In others, the man leaves the car while the woman listens to the radio bulletin. She keeps hearing a thumping sound on the roof of the car. When she exits to investigate, the killer is sitting on the roof, holding the man's severed head. The origins of this story are unknown, although it first emerged in the 1950s in America. By 1960, it began to appear in publications.

Urban legends are an example of how a critical mass of people must be reached before an idea can spread. While the exact origins are rarely clear, it is assumed that it begins with a single person who misunderstands a news story or invents one and passes it on to others, perhaps at a party.

Many urban legends have a cautionary element, so they may first be told in an attempt to protect someone. "The Hook" has been interpreted as a warning to teenagers engaging in promiscuous behavior. When this story is looked at by Freudian folklorists, the implications seem obvious. It could even have been told by parents to their children.

This cautionary element is clear in one of the first printed versions of "The Hook" in 1960: *If you are interested in teenagers, you will print this story. I do not know whether it's true or not, but it does not matter because it served its purpose for me... I do not think I will ever park to make out as long as I live. I hope this does the same for other kids.*

Once a critical mass of people knows an urban legend, the rate at which it spreads grows exponentially. The internet now enables urban legends (and everything else) to pass between people faster. Although a legend might also be disproved faster, that's a complicated mess. For now, as Lefty says in *Donnie Brasco*, "Forget about it."

The more people who believe a story, the more believable it seems. This effect is exacerbated when media outlets or local police fall for the legends and issue warnings.

Urban legends often then appear in popular culture (for example, "The Hook" inspired a *Supernatural* episode) and become part of our modern culture. The majority of people stop believing them, yet the stories linger in different forms.

Changes in Governments and Revolutions

From a distance, it can seem shocking when the people of a country revolt and overthrow dominant powers in a short time.

What is it that makes this sudden change happen? The answer is the formation of a critical mass of people necessary to move marginal ideas to a majority consensus. Pyotr

Kropotkin wrote:

Finally, our studies of the preparatory stages of all revolutions bring us to the conclusion that not a single revolution has originated in parliaments or in any other representative assembly. All began with the people. And no revolution has appeared in full armor — born, like Minerva out of the head of Jupiter, in a day. They all had their periods of incubation during which the masses were very slowly becoming imbued with the revolutionary spirit, grew bolder, commenced to hope, and step by step emerged from their former indifference and resignation. And the awakening of the revolutionary spirit always took place in such a manner that at first, single individuals, deeply moved by the existing state of things, protested against it, one by one. Many perished, "uselessly," the armchair critic would say. But the indifference of society was shaken by these progenitors. The dullest and most narrow-minded people were compelled to reflect, "Why should men, young, sincere, and full of strength, sacrifice their lives in this way?" It was impossible to remain indifferent; it was necessary to take a stand, for, or against: thought was awakening. Then, little by little, small groups came to be imbued with the same spirit of revolt; they also rebelled — sometimes in the hope of local success — in strikes or in small revolts against some official whom they disliked, or in order to get food for their hungry children, but frequently also without any hope of success: simply because the conditions grew unbearable. Not one, or two, or tens, but hundreds of similar revolts have preceded and must precede every revolution.

When an oppressive regime is in power, a change is inevitable. However, it is almost impossible to predict when that change will occur. Often, a large number of people want change and yet fear the consequences or lack the information necessary to join forces. When single individuals act upon their feelings, they are likely to be punished without having any real impact. Only when a critical mass of people's desire for change overwhelms their fear can a revolution occur. Other people are encouraged by the first group, and the idea spreads rapidly.

One example occurred in China in 1989. While the desire for change was almost universal, the consequences felt too dire. When a handful of students protested for reform in Beijing, authorities did not punish them. We have all seen the classic image of a lone student, shopping bags in hand, standing in front of a procession of tanks and halting them. Those few students who protested were the critical mass. Demonstrations erupted in more than 300 towns all over the country as people found the confidence to act.

Malcolm Gladwell on Tipping Points

An influential text on the topic of critical mass is Malcolm Gladwell's *The Tipping Point*. Published in 2000, the book describes a tipping point as "the moment of critical mass, the threshold, the boiling point." He notes that "Ideas and products and messages and behaviors spread just like viruses do" and cites such examples as the sudden popularity of Hush Puppies and the steep drop in crime in New York after 1990. Gladwell writes that although the world "may seem like an immovable, implacable place," it isn't. "With the slightest push — in just the right place — it can be tipped."

Referring to the 80/20 rule (also known as Pareto's principle), Gladwell explains how it takes a tiny number of people to kickstart the tipping point in any sort of epidemic:

Economists often talk about the 80/20 Principle, which is the idea that in any situation roughly 80 percent of the "work" will be done by 20 percent of the participants. In most societies, 20 percent of criminals commit 80 percent of crimes. Twenty percent of motorists cause 80 percent of all accidents. Twenty percent of beer drinkers drink 80 percent of all beer. When it comes to epidemics, though, this disproportionality becomes even more extreme: a tiny percentage of people do the majority of the work.

Rising crime rates are also the result of a critical mass of people who see unlawful behavior as justified, acceptable, or necessary. It takes only a small number of people who commit crimes for a place to seem dangerous and chaotic. Gladwell explains how minor transgressions lead to more serious problems:

[T]he Broken Windows theory ... was the brainchild of the criminologist James Q. Wilson and George Kelling. Wilson and Kelling argued that crime is the inevitable result of disorder. If a window is broken and left unrepaired, people walking by will conclude that no one cares and no one is in charge. Soon, more windows will be broken, and the sense of anarchy will spread from the building to the street it faces, sending a signal that anything goes. In a city, relatively minor problems like graffiti, public disorder, and aggressive panhandling, they write, are all the equivalent of broken windows, invitations to more serious crimes...

According to Gladwell's research, there are three main factors in the creation of a critical mass of people necessary to induce a sudden change.

The first of these is the Law of the Few. Gladwell states that certain categories of people are instrumental in the creation of tipping points. These categories are:

- **Connectors:** We all know connectors. These are highly gregarious, sociable people with large groups of friends. Connectors are those who introduce us to other people, instigate gatherings, and are the fulcrums of social groups. Gladwell defines connectors as those with networks of over one hundred people. An example of a cinematic connector is Kevin Bacon. There is a trivia game known as "Six Degrees of Kevin Bacon," in which players aim to connect any actor/actress to him within a

chain of six films. Gladwell writes that connectors have “some combination of curiosity, self-confidence, sociability, and energy.”

- **Mavens:** Again, we all know a maven. This is the person we call to ask what brand of speakers we should buy, or which Chinese restaurant in New York is the best, or how to cope after a rough breakup. Gladwell defines mavens as “people we rely upon to connect us with new information.” These people help create a critical mass due to their habit of sharing information, passing knowledge on through word of mouth.
- **Salesmen:** Whom would you call for advice about negotiating a raise, a house price, or an insurance payout? That person who just came to mind is probably what Gladwell calls a salesman. These are charismatic, slightly manipulative people who can persuade others to accept what they say.

The second factor cited by Gladwell is the “stickiness factor.” This is what makes a change significant and memorable. Heroin is sticky because it is physiologically addictive. Twitter is sticky because we want to keep returning to see what is being said about and to us. *Game of Thrones* is sticky because viewers are drawn in by the narrative and want to know what happens next. Once something reaches a critical mass, stickiness can be considered to be the rate of decline. The more sticky something is, the slower its decline. Cat videos aren’t very sticky, so even the viral ones thankfully fade into the night quickly. Finally, the third factor is the specific context; the circumstances, time, and place must be right for an epidemic to occur. Understanding how a tipping point works can help to clarify the concept of critical mass.

The 10% Rule

One big question is: what percentage of a population is necessary to create a critical mass?

According to researchers at Rensselaer Polytechnic Institute, the answer is a mere 10%. Computational analysis was used to establish where the shift from minority to majority lies. According to director of research Boleslaw Szymanski:

When the number of committed opinion holders is below 10 percent, there is no visible progress in the spread of ideas. It would literally take the amount of time comparable to the age of the universe for this size group to reach the majority. Once that number grows above 10 percent, the idea spreads like flame.

The research has shown that the 10% can comprise literally anyone in a given society. What matters is that those people are set in their beliefs and do not respond to pressure to change them. Instead, they pass their ideas on to others. (I’d argue that the percentage is lower. Much lower. See [Dictatorship of the Minority](#).)

As an example, Szymanski cites the sudden revolutions in countries such as Egypt and Tunisia: “In those countries, dictators who were in power for decades were suddenly overthrown in just a few weeks.”

According to another researcher:

In general, people do not like to have an unpopular opinion and are always seeking to try locally to come to a consensus ... As agents of change start to convince more and more people, the situation begins to change. People begin to question their own views at first and then completely adopt the new view to spread it even further. If the true believers just influenced their neighbors, that wouldn’t change anything within the larger system, as we saw with percentages less than 10.

The potential use of this knowledge is tremendous. Now that we know how many people are necessary to form a critical mass, this information can be manipulated — for good or evil. The choice is yours.

112. Attrition Warfare: When Even Winners Lose

When warring opponents use similar approaches and possess similar weapons, trench warfare becomes inevitable. The winning side usually has a slight advantage in production capability or resources.

It's hard to see when you're in it, but most people and businesses are in some form of attrition warfare. The best way out is to use a different approach — through tactics, strategy, or weaponry.

"When you do as everyone else does, don't be surprised when you get what everyone else gets."

— Peter Kaufman

The *International Encyclopedia of the First World War* defines attrition warfare as "the sustained process of wearing down an opponent so as to force their physical collapse through continuous losses in personnel, equipment and supplies or [wearing] them down to such an extent that their will to fight collapses."

Attrition warfare is considered a somewhat dirty tactic, although necessary in some situations. Indeed, theorists are divided as to whether attrition is even a separate tactic, rather than a ubiquitous feature of all conflict.

Traditional military theorists such as Sun Tzu ("Supreme excellence consists of breaking the enemy's resistance without fighting") and Machiavelli ("Never attempt to win by force what can be won by deception") evangelized for clever tactics. These methods tend to result in far fewer casualties, waste fewer resources and are a display of superior intellect, rather than just strength.

Attrition warfare is usually a last resort only. And most of the time when you win, it's only temporary. By not scoring a decisive blow, the winners leave room for the losers to believe they can win the next time.

To understand attrition warfare, we can look at examples of how it works. Let's examine two wars where attrition played a substantial role.

Attrition Warfare in World War I

One of the clearest examples of attrition warfare is World War I, so much so that many historians refer to it as "the War of Attrition."

Military technology evolved at an unprecedented rate during the start of the 20th century, and the usual maneuvers and tactics were irrelevant. The large-scale recruitment of horses for cavalry officers, who were then pitted against shells and machine guns, provides a classic image of this sad discrepancy between what was understood and what was done. Raised on Tennyson's images of heroic hand-to-hand combat, soldiers found themselves instead confined to trenches in a vicious fight to gain territory, inch by inch. The goal for much of the war was for each side to amass artillery and troops faster than the other, in order to grind down defenses and sap resources. Both sides were reduced by pure attrition.

Trenches provided a somewhat effective means of protection, as long as soldiers remained within them. Perhaps the most poignant comment on this comes from Harry Patch, the longest surviving World War I soldier, who lived to 111: "If any man tells you he went over the top and he wasn't scared, he's a damn liar."

Even when territory was gained, moving the heavy weapons was difficult and predictable. Germany slowly lost strength, leading to the eventual failure of their army. In the process, millions of people died and vast sums of money were spent on ammunition and other resources.

Strategists and commanders were somewhat out of their depth, as no one had any real experience with this type of warfare. Leaving the trenches meant the loss of the most valuable resource — people — and the usual techniques were irrelevant.

This situation led to a stationary war, wherein each side engaged in an incessant hurling of ammunition in the hope of eroding the other's morale and supplies.

"The war will be ended by the exhaustion of nations rather than the victories of armies."

— Winston Churchill

In a paper entitled The Theories of Attrition versus Manoeuvre and the Levels of War, Abel J. Esterhuyse writes:

Although campaigns were conducted in different parts of the world, the First World War was largely restricted to a relatively small geographical area in Western Europe. It was characterised by high personnel and equipment losses; an inability to bring the war to a decisive end; and bloody attritional fighting where, in a number of cases, the aim was to conquer terrain with no tactical and strategic value. This created an aversion to or negative view of an attritional war. It also contributed to a view that attrition required that terrain be occupied at all cost in order to ensure success.

We can also see the impact of attrition in the extensive efforts to boost the morale of those at home, far from the fighting — what was referred to as "the home front."

War is rarely what we imagine. Attrition warfare was not what people had in mind when they sent off their sons, husbands, and friends, or mailed white feathers to the "cowards" who did not go. The stark difference between early propaganda posters and later photographs of the actual fighting illustrates this disconnect.

In a war of attrition, morale is one of the key resources. Initiatives such as the donation of kettles to make airplanes, the growing of cabbages in rose beds, and letters sent to those in the trenches did little to further the pursuit of peace but did much to keep people hopeful.

Historians and military theorists have asserted that the use of attrition was not altogether a strategic one. Much of World War I was characterized by indecision and poor communication, as commanders grappled with slow technology and the difficulty of seeing the bigger picture.

It's not uncommon in war to develop a chessboard-style mentality, wherein commanders are not averse to sacrificing human life for the sake of a strategic advantage.

One particular battle from World War I which stands out as a notable example of attrition warfare is the Battle of Verdun. Occurring in France over 303 days, it involved a standoff between the German and French forces.

The German army intended to capture hills in the area, thereby gaining an elevated point for strategic maneuvers. Early success boosted German morale before their progress slowed to a glacial crawl.

The French army was ordered not to withdraw under any circumstances and to sustain consistent counter-attacks. Regularly switching tactics, the German army continued trying to gain more useful territory.

By July, the battle of the Somme was in full force and the Germans subsequently had fewer resources — a bad position to be in during a war of attrition. Territory was gained and lost numerous times, with a single village switching hands 16 times between June and August.

As German resources were further reduced, commanders resorted to deceit (which is also not compatible with attrition). By the time the French army reclaimed the lost territory, the Battle of Verdun had morphed into one of the deadliest and most expensive battles ever. Estimates of the number of deaths range from 700,000 to nearly 1 million.

From the start, the Battle of Verdun was fought upon a foundation of attrition. Both sides were essentially trapped, with no option but to keep trying to force the other into submission. Both sides were using similar approaches with similar capabilities.

Much has been written about the tactics used, with some critics stating that the use of attrition was a necessity due to poor judgment, rather than being a considered choice. It also illustrates a problematic element of attrition warfare: Once a substantial number of lives have been lost, commanders are motivated to continue a battle for longer than is wise in an attempt to justify those losses — a deadly instance of the sunk costs fallacy. In *The Price of Glory*, Alistair Horne quotes the diary of a French lieutenant who fought at Verdun: “Humanity is mad. It must be mad to do what it is doing. What a massacre! What scenes of horror and carnage! I cannot find words to translate my impressions. Hell cannot be so terrible. Men are mad!” He was killed a short time later as a result of a shell explosion. Horne also quotes a German soldier: “[The war would not be over] until the last German and the last French hobbled out of the trenches to exterminate each other with pocket knives.”

Attrition Warfare in the Vietnam War

The Vietnam War is another key example of attrition warfare. North Vietnam (aided by China, the Soviet Union, and other communist nations) fought South Vietnam (aided by the US, South Korea, Thailand, Australia and others). Spread over Laos, Cambodia, and Vietnam, the war lasted almost 20 years.

Much like World War II, the Vietnam War left an indelible mark on the affected nations and people. It was characterized by extreme brutality and human suffering — a ubiquitous feature of attrition warfare.

In an attempt to either prevent or foster the growth of communism, dominant world powers faced each other in appalling conditions. Somewhere in the region of 1.4–3.4 million lives were lost in the fight to prevent an economic model from spreading. Ten percent of South Vietnam was destroyed with Agent Orange in a bid to cut off food supplies, leading to hundreds of thousands of birth defects.

In the early 1960s, the US began to send troops to Vietnam (then known as French Indochina). Borders and old alliances were forgotten as the fighting spread over the following two decades.

Guerrilla warfare clashed with attrition. Struggling to compete with an unpredictable guerrilla insurgency (which included raids, sabotage and ambushes), the US army turned to attrition and sought to kill as many Vietnamese people as possible. Rather than aiming to gain territory as in typical conflicts, the goal was to reach the highest feasible body count in order to batter Vietnam into submission.

In *Kill Anything That Moves*, Nick Turse paints a stark portrait of the use of attrition warfare in the Vietnam War:

In Vietnam, the statistically minded war managers focused, above all, on the notion of achieving a “crossover point”: the moment when American soldiers would be killing more enemies than their Vietnamese opponents could replace... Producing a high body count was crucial for promotion in the officer corps. Many high-level officers established “production quotas” for their units, and systems of “debit” and “credit” to calculate exactly how efficiently subordinate units and middle-management personnel performed. Different formulas were used, but the commitment to war as a rational production process was common to all.

In many cases, attrition warfare can become a process of attempting to outright annihilate an opponent.

In Vietnam, uncertainty as to who the enemy was turned every non-American into a target. *The Americans never really grasped who the enemy was... they assumed that most villagers either were in league with the enemy or were guerrillas themselves once the sun went down... Farmers simply wanted nothing to do with the conflict or abstract notions like nationalism and communism... But bombs and napalm don’t discriminate. As gunships and howitzers ravaged the landscape... Vietnamese villages of every type ... perished in vast numbers.”*

Guerrilla warfare is the inverse of attrition: unstructured, fragmented and based on tactics, not force. It can take a large force engaging in attrition to defeat a small one engaged in guerrilla warfare.

Vietnamese revolutionary forces decisively outgunned by their adversaries, relied heavily on mines and other booby traps, as well as sniper fire and ambushes... Unable to deal with an enemy that overwhelmingly dictated the time, place, and duration of combat, US forces took to destroying whatever they could manage.

The Issues With Attrition Warfare

Among the many problems with attrition warfare are these:

- High death tolls — This is the primary issue. Although all wars involve casualties, attrition warfare increases the number of combatants and civilians who are killed.
- High costs — Attrition warfare requires a lot of resources. Adjusting for inflation, the Vietnam war cost \$770 billion, plus \$1 trillion for subsequent veterans benefits. Those figures do not even take into account the impact on industries and economies.
- The potential for abuse — When maximum damage is the goal, there is more potential for war crimes to occur and for people to abuse their power.
- Long durations — A war of attrition may be lengthy and slow moving. As Sun Tzu wrote, “there is no instance of a country having benefited from prolonged warfare.”
- The potential for an unstable outcome — The outcome of attrition warfare is not always clear. A nation which is battered into submission may rebel in the future, and tensions are exacerbated. The unstable outcome of World War I is in part responsible for the outbreak of World War II.
- Long-term impact on a nation — Attrition warfare can cause serious long-term problems for both sides. The deaths of large numbers of young, mostly male combatants can lead to a dramatic drop in birth rates for years to come. It is estimated that World War I led to 3.2 million fewer births than would have been expected in Germany alone. Fewer people to work during and after a war means a decrease in productivity and a change in the structure of economies. Money spent on fighting a war of attrition cannot be used for other areas, such as healthcare. Educational institutions often suffer, as young people are less able to attend. Large areas of land are destroyed, damaging farmland, homes, and infrastructure. It can take decades for a nation to recover from the impact of attrition warfare.

Attrition in Business — and Two Ways Out

The concept of attrition applies outside of war. Bureaucracies grind people out. Excessive competition among businesses might be good for consumers, but it's a grind for the companies involved.

There are two ways out that seem important.

The first option is that after you recognize that you're mired in attrition, you can, of course, opt out. Maybe if you put aside your ego, you'll decide that the time and resources required to compete are too much.

The second option might appeal more. History shows that the way out of trench warfare is the use of asymmetric weaponry. If you're using basically the same strategy with basically the same resources as your competitor, you're in a war of attrition. If, however, you choose a radically different strategy, with the same resources or fewer, you're likely not to be in a war of attrition. Of course, if you're right and your radically different strategy succeeds, you get the spoils. If you're wrong and your strategy fails, you get the humiliation of being

wrong. And since the world rewards conventional failure and not unconventional failure, you've got a difficult choice to make.

113. How Filter Bubbles Distort Reality: Everything You Need to Know

We find ourselves in a filter bubble any time we're only surrounded by views and opinions we agree with, while being sheltered from opposing perspectives. Filter bubbles distort our understanding of the world and hamper our ability to make balanced decisions. Here's how to pop the bubble.

The Basics

Read the headline, tap, scroll, tap, tap, scroll.

It is a typical day and you are browsing your usual news site. The New Yorker, BuzzFeed, The New York Times, BBC, The Globe and Mail, take your pick. As you skim through articles, you share the best ones with like-minded friends and followers. Perhaps you add a comment.

Few of us sit down and decide to inform ourselves on a particular topic. For the most part, we pick up our smartphones or open a new tab, scroll through a favored site and click on whatever looks interesting. Or we look at Facebook or Twitter feeds to see what people are sharing. Chances are high that we are not doing this intending to become educated on a certain topic. No, we are probably waiting in line, reading on the bus or at the gym, procrastinating, or grappling with insomnia, looking for some form of entertainment.

We all do this skimming and sharing and clicking, and it seems so innocent. But many of us are uninformed about or uninterested in the forces affecting what we see online and how content affects us in return — and that ignorance has consequences.

The term “filter bubble” refers to the results of the algorithms that dictate what we encounter online. According to Eli Pariser, those algorithms create “a unique universe of information for each of us ... which fundamentally alters the way we encounter ideas and information.”

Many sites offer personalized content selections, based on our browsing history, age, gender, location, and other data. The result is a flood of articles and posts that support our current opinions and perspectives to ensure that we enjoy what we see. Even when a site is not offering specifically targeted content, we all tend to follow people whose views align with ours. When those people share a piece of content, we can be sure it will be something we are also interested in.

That might not sound so bad, but filter bubbles create echo chambers. We assume that everyone thinks like us, and we forget that other perspectives exist.

Filter bubbles transcend web surfing. In important ways, your social circle is a filter bubble; so is your neighborhood. If you're living in a gated community, for example, you might think that reality is only BMWs, Teslas, and Mercedes. Your work circle acts as a filter bubble, too, depending on whom you know and at what level you operate.

One of the great problems with filters is our human tendency to think that what we see is all there is, without realizing that what we see is being filtered.

Eli Pariser on Filter Bubbles

The concept of filter bubbles was first identified by Eli Pariser, executive of Upworthy, activist, and author. In his revolutionary book *Filter Bubbles*, Pariser explained how Google searches bring up vastly differing results depending on the history of the user. He cites an example in which two people searched for “BP” (British Petroleum). One user saw news related to investing in the company. The other user received information about a recent oil spill.

Pariser describes how the internet tends to give us what we want:

Your computer monitor is a kind of one-way mirror, reflecting your own interests while algorithmic observers watch what you click.

Pariser terms this reflection a filter bubble, a “personal ecosystem of information.” It insulates us from any sort of cognitive dissonance by limiting what we see. At the same time, virtually everything we do online is being monitored — for someone else’s benefit. Each time we click, watch, share, or comment, search engines and social platforms harvest information. In particular, this information serves to generate targeted advertisements. Most of us have experienced the odd sensation of *deja vu* as a product we took a look at online suddenly appears everywhere we go online, as well as in our email inboxes. Often this advertising continues until we succumb and purchase the product.

Targeted advertisements can help us to find what we need with ease, but costs exist: *Personalization is based on a bargain. In exchange for the service of filtering, you hand large companies an enormous amount of data about your daily life — much of which you might not trust your friends with.*

The internet has changed a great deal from the early days, when people worried about strangers finding out who they were. Anonymity was once king. Now, our privacy has been sacrificed for the sake of advertising revenue:

What was once an anonymous medium where anyone could be anyone—where, in the words of the famous New Yorker cartoon, nobody knows you’re a dog—is now a tool for soliciting and analyzing our personal data. According to one Wall Street Journal study, the top fifty Internet sites, from CNN to Yahoo to MSN, install an average of 64 data-laden cookies and personal tracking beacons each. Search for a word like “depression” on Dictionary.com, and the site installs up to 223 tracking cookies and beacons on your computer so that other Web sites can target you with antidepressants. Share an article about cooking on ABC News, and you may be chased around the Web by ads for Teflon-coated pots. Open—even for an instant—a page listing signs that your spouse may be cheating and prepare to be haunted with DNA paternity-test ads. The new Internet doesn’t just know you’re a dog; it knows your breed and wants to sell you a bowl of premium kibble.

The sources of this information can be unexpected. Companies gather it from places we might not even consider:

When you read books on your Kindle, the data about which phrases you highlight, which pages you turn, and whether you read straight through or skip around are all fed back into Amazon’s servers and can be used to indicate what books you might like next. When you log in after a day reading Kindle e-books at the beach, Amazon can subtly customize its site to appeal to what you’ve read: If you’ve spent a lot of time with the latest James Patterson, but only glanced at that new diet guide, you might see more commercial thrillers and fewer health books.

One fact is certain. The personalization process is not crude or random. It operates along defined guidelines which are being refined every day. Honing occurs both on the whole and for individuals:

Most personalized filters are based on a three-step model. First, you figure out who people are and what they like. Then, you provide them with content and services that best fit them. Finally, you tune to get the fit just right. Your identity shapes your media. There’s just one flaw in this logic: Media also shape identity. And as a result, these services may end up creating a good fit between you and your media by changing ... you.

In *The Shallows*, Nicholas Carr also covers online information collection. Carr notes that the more time we spend online, the richer the information we provide:

The faster we surf across the surface of the Web—the more links we click and pages we view—the more opportunities Google gains to collect information about us and to feed us advertisements. Its advertising system, moreover, is explicitly designed to figure out which messages are most likely to grab our attention and then to place those messages in our field of view. Every click we make on the Web marks a break in our concentration, a

bottom-up disruption of our attention—and it's in Google's economic interest to make sure we click as often as possible.

Every single person who has ever spent time on the web knows how addictive the flow of stimulating information can be. No matter how disciplined we otherwise are, we cannot resist clicking related articles or scrolling through newsfeeds. There is a reason for this, as Pariser writes:

Personalized filters play to the most compulsive parts of you, creating “compulsive media” to get you to click things more.

In an attention economy, filter bubbles assist search engines, websites, and platforms in their goal to command the maximum possible share of our online time.

The Impact of Filter Bubbles

Each new technology brings with it a whole host of costs and benefits. Many are realized only as time passes. The invention of books led people to worry that memory and oral tradition would erode. Paper caused panic as young people switched from slates to this newfangled medium. Typewriters led to discussions of morality as female typists entered the job force and “distracted” men. The internet has been no exception. If anything, the issues presented by it are unique only in their complex intensity.

In particular, the existence of filter bubbles has led to widespread concern. Pariser writes:

Democracy requires citizens to see things from one another's point of view, but instead we're more and more enclosed in our own bubbles. Democracy requires a reliance on shared facts; instead we're being offered parallel but separate universes.

... Personalization filters serve a kind of invisible autopropaganda, indoctrinating us with our own ideas, amplifying our desire for things that are familiar and leaving us oblivious to the dangers lurking in the dark territory of the unknown.

Pariser quotes Jon Chait as saying:

Partisans are more likely to consume news sources that confirm their ideological beliefs.

People with more education are more likely to follow political news. Therefore, people with more education can actually become mis-educated.

Many people have debated the impact of filter bubbles on the recent US election and the Brexit vote. In both cases, large numbers of people were shocked by the outcome. Even those within the political and journalistic worlds expected the inverse results.

“We become, neurologically, what we think.”

— Nicholas Carr

In the case of the Brexit vote, a large percentage of those who voted to leave the European Union were older people who are less active online, meaning that their views are less visible. Those who voted to remain tended to be younger and more active online, meaning that they were in an echo chamber of similar attitudes.

Democracy requires everyone to be equally informed. Yet filter bubbles are distorting our ideas of the world. In a paper for Princeton University, Jacob N. Shapiro revealed the extent of the influence on our voting:

The results of these experiments demonstrate that (i) biased search rankings can shift the voting preferences of undecided voters by 20% or more, (ii) the shift can be much higher in some demographic groups, and (iii) search ranking bias can be masked so that people show no awareness of the manipulation. We call this type of influence, which might be applicable to a variety of attitudes and beliefs, the search engine manipulation effect.

Given that many elections are won by small margins, our results suggest that a search engine company has the power to influence the results of a substantial number of elections with impunity. The impact of such manipulations would be especially large in countries dominated by a single search engine company.

Filter bubbles do not just occur on the internet. Shapiro provides an example from a decade ago of TV shifting the results of elections:

It is already well established that biased media sources such as newspapers, political polls, and television sway voters. A 2007 study by DellaVigna and Kaplan found, for example, that whenever the conservative-leaning Fox television network moved into a new market in the United States, conservative votes increased, a phenomenon they labeled the Fox News Effect. These researchers estimated that biased coverage by Fox News was sufficient to shift 10,757 votes in Florida during the 2000 US Presidential election: more than enough to flip the deciding state in the election, which was carried by the Republican presidential candidate by only 537 votes. The Fox News Effect was also found to be smaller in television markets that were more competitive.

However, Shapiro believes the internet has a more dramatic effect than other forms of media:

Search rankings are controlled in most countries today by a single company. If, with or without intervention by company employees, the algorithm that ranked election-related information favored one candidate over another, competing candidates would have no way of compensating for the bias. It would be as if Fox News were the only television network in the country. Biased search rankings would, in effect, be an entirely new type of social influence, and it would be occurring on an unprecedented scale. Massive experiments conducted recently by social media giant Facebook have already introduced other unprecedented types of influence made possible by the Internet. Notably, an experiment reported recently suggested that flashing "VOTE" advertisements to 61 million Facebook users caused more than 340,000 people to vote that day who otherwise would not have done so.

In the US election and the Brexit vote, filter bubbles caused people to become insulated from alternative views. Some critics have theorized that the widespread derision of Trump and Leave voters led them to be less vocal, keeping their opinions within smaller communities to avoid confrontation. Those who voted for Clinton or to Remain loudly expressed themselves within filtered communities. Everyone, it seemed, agreed with each other. Except, they didn't, and no one noticed until it was too late.

A further issue with filter bubbles is that they are something we can only opt out of, not something we consent to. As of March 2017, an estimated 1.94 billion people have a Facebook account, of which 1.28 billion log on every day. It is safe to assume that only a small percentage are informed about the algorithms. Considering that 40% of people regard Facebook as their main news source, this is worrying. As with cognitive biases, a lack of awareness amplifies the impact of filter bubbles.

We have minimal concrete evidence of exactly what information search engines and social platforms collect. Even SEO (search engine optimization) experts do not know for certain how search rankings are organized. We also don't know if sites collect information from users who do not have accounts.

Scandals are becoming increasingly common, as sites and services are found to be harvesting details without consent. For example, Evernote came under fire when documents revealed that staff members can access documents, and Unroll's nasty habit of selling details of user email habits led to criticism. Even when this information is listed in user agreements or disclaimers, it can be difficult for users to ascertain from the confusing jargon how their data are being used, by whom, and why.

In his farewell speech, President Obama aired his personal concerns:

[We] retreat into our own bubbles, ... especially our social media feeds, surrounded by people who look like us and share the same political outlook and never challenge our assumptions. ... And increasingly, we become so secure in our bubbles that we start accepting only information, whether it's true or not, that fits our opinions, instead of basing our opinions on the evidence that is out there.

Filter bubbles can cause cognitive biases and shortcuts to manifest, amplifying their negative impact on our ability to think in a logical and critical manner. A combination of social proof, availability bias, confirmation bias, and bias from disliking/liking is prevalent. As Pariser writes:

The filter bubble tends to dramatically amplify confirmation bias—in a way, it's designed to. Consuming information that conforms to our ideas of the world is easy and pleasurable; consuming information that challenges us to think in new ways or question our assumptions is frustrating and difficult. This is why partisans of one political stripe tend not to consume the media of another. As a result, an information environment built on click signals will favor content that supports our existing notions about the world over content that challenges them.

Pariser sums up the result of extensive filtration: “A world constructed from the familiar is the world in which there’s nothing to learn.”

Filter Bubbles and Group Psychology

We have an inherent desire to be around those who are like us and reinforce our worldview. Our online behavior is no different. People form tribes based on interests, location, employment, affiliation, and other details. These groups — subreddits, Tumblr fandoms, Facebook groups, Google+ circles, etc. — have their own rules, conventions, in-jokes, and even vocabulary. Within groups (even if members never meet each other), beliefs intensify. Anyone who disagrees may be ousted from the community. Sociologists call this behaviour “communal reinforcement” and stress that the ideas perpetuated can have no relation to reality or empirical evidence.

“When you’re asked to fight a war that’s over nothing, it’s best to join the side that’s going to win.”

— Conor Oberst

Communal reinforcement can be positive. Groups geared towards people with mental health problems, chronic illnesses, addictions, and other issues are often supportive and assist many people who might not have another outlet.

However, when a group is encased within a filter bubble, it can lead to groupthink. This is a psychological phenomenon wherein groups of people experience a temporary loss of the ability to think in a rational, moral and realistic manner. When the members of a group are all exposed to the same confirmatory information, the results can be extreme. Symptoms include being excessively optimistic, taking risks, ignoring legal and social conventions, regarding those outside the group as enemies, censoring opposing ideas, and pressuring members to conform. As occurred with the US election and the Brexit vote, those experiencing groupthink within a filter bubble see themselves as in the right and struggle to consider alternative perspectives.

For example, imagine a Facebook group for Trump supporters in the months prior to the election. Members share pro-Trump news items, discuss policies and circulate cohesive information among themselves. Groupthink sets in, as the members selectively process information, fail to evaluate alternative viewpoints, fail to consider risks, haze any members who disagree, and even ignore the possibility of a negative outcome. From the outside, we can see the issues with a combination of filter bubbles and groupthink, but they can be hard to identify from the inside.

How Can We Avoid Filter Bubbles?

Thankfully, it is not difficult to pop the filter bubble if we make an effort to do so. Methods for doing this include:

- Using ad-blocking browser extensions. These remove the majority of advertisements from websites we visit. The downside is that most sites rely on

advertising revenue to support their work, and some (such as Forbes and Business Insider) insist on users' disabling ad blockers before viewing a page.

- Reading news sites and blogs which aim to provide a wide range of perspectives. Pariser's own site, Upworthy, aims to do this. Others, including The Wall Street Journal, the New Yorker, BBC, and AP news claim to offer a balanced view of the world. Regardless of the sources we frequent, a brief analysis of the front page will provide a good idea of any biases. In the wake of the US election, a number of newsletters, sites, apps, and podcasts are working to pop the filter bubble. An excellent example is Colin Wright's podcast, Let's Know Things (<http://letsknowthings.com/>), which examines a news story in context each week.
- Switching our focus from entertainment to education. As Nicholas Carr writes in *The Shallows*: "The Net's interactivity gives us powerful new tools for finding information, expressing ourselves, and conversing with others. It also turns us into lab rats constantly pressing levers to get tiny pellets of social or intellectual nourishment."
- Using Incognito browsing, deleting our search histories, and doing what we need to do online without logging into our accounts.
- Deleting or blocking browser cookies. For the uninitiated, many websites plant "cookies" (small text files) each time we visit them; those cookies are then used to determine what content to show us. Cookies can be manually deleted, and browser extensions are available which remove them. In some instances, cookies are useful, so removal should be done with discretion.

Fish don't know they are in the water and we don't know we are in a filter bubble unless we take the effort to (as David Bowie put it) leave the capsule — if you dare.

In shaping what we see, filter bubbles show us a distorted map and not the terrain. In so doing, they trick our brains into thinking that this is the reality. As technology improves and the ability of someone like the NYT, say, to show the same story to 100 different people using 100 different ways, the filter bubble becomes deeper. We lose track of what's filtered and what's not as the news becomes tailored to cement our existing opinions. After all, everyone wants to read a newspaper that agrees with them.

Systems — be they people, cultures, or web browsing, to name a few examples — naturally have to filter information and thus they reduce options. Sometimes people make decisions, sometimes cultures make them, and increasingly algorithms make them. As the speed of information flowing through these systems increases, filters will play an even more important role.

Understanding that what we see is not all there is will help us realize that we're living in a distorted world and remind us to take off the glasses.

114. The Butterfly Effect: Everything You Need to Know About This Powerful Mental Model

The butterfly effect is an often misunderstood phenomenon wherein a small change in starting conditions can lead to vastly different outcomes. Understanding the butterfly effect can give us a new lens through which to view business, markets, and more.

“You could not remove a single grain of sand from its place without thereby ... changing something throughout all parts of the immeasurable whole.”

— Fichte, *The Vocation of Man* (1800)

In one of Stephen King's greatest works, *11/22/63*, a young man named Jake discovers a portal in a diner's pantry which leads back to 1958. After a few visits and some experiments, Jake deduces that altering history is possible. However long he stays in the past, only two minutes go by in the present. He decides to live in the past until 1963 so he can prevent the assassination of President John F. Kennedy, believing that this change will greatly benefit humanity. After years of stalking Lee Harvey Oswald, Jake manages to prevent him from shooting Kennedy.

Upon returning to the present, he expects to find the world improved as a result. Instead, the opposite has happened. Earthquakes occur everywhere, his old home is in ruins, and nuclear war has destroyed much of the world. (As King wrote in an article for *Marvel Spotlight*, “Not good to fool with Father Time.”) Distraught, Jake returns to 1958 once again and resets history.

In addition to being a masterful work of speculative fiction, *11/22/63* is a classic example of how everything in the world is connected together.

The butterfly effect is the idea that small things can have non-linear impacts on a complex system. The concept is imagined with a butterfly flapping its wings and causing a typhoon. Of course, a single act like the butterfly flapping its wings cannot cause a typhoon. Small events can, however, serve as catalysts that act on starting conditions.

And as John Gribbin writes in his cult-classic work *Deep Simplicity*, “some systems ... are very sensitive to their starting conditions, so that a tiny difference in the initial ‘push’ you give them causes a big difference in where they end up, and there is feedback, so that what a system does affects its own behavior.”

In the foreword to *The Butterfly Effect in Competitive Markets* by Dr. Rajagopal, Tom Breuer writes:

Simple systems, with few variables, can nonetheless show unpredictable and sometimes chaotic behavior...[Albert] Libchaber conducted a series of seminal experiments. He created a small system in his lab to study convection (chaotic system behavior) in a cubic millimeter of helium. By gradually warming this up from the bottom, he could create a state of controlled turbulence. Even this tightly controlled environment displayed chaotic behavior: complex unpredictable disorder that is paradoxically governed by “orderly” rules. ... [A] seemingly stable system (as in Libchaber’s 1 ccm cell of helium) can be exposed to very small influences (like heating it up a mere 0.001 degree), and can transform from orderly convection into wild chaos. Although [such systems are] governed by deterministic phenomena, we are nonetheless unable to predict how [they] will behave over time.

What the Butterfly Effect Is Not

The point of the butterfly effect is not to get leverage. As General Stanley McChrystal writes in *Team of Teams*:

In popular culture, the term “butterfly effect” is almost always misused. It has become synonymous with “leverage”—the idea of a small thing that has a big impact, with the implication that, like a lever, it can be manipulated to a desired end. This misses the point

of Lorenz's insight. The reality is that small things in a complex system may have no effect or a massive one, and it is virtually impossible to know which will turn out to be the case. Benjamin Franklin offered a poetic perspective in his variation of a proverb that's been around since the 14th century in English and the 13th century in German, long before the identification of the butterfly effect:

*For want of a nail the shoe was lost,
For want of a shoe the horse was lost,
For want of a horse the rider was lost,
For want of a rider the battle was lost,
For want of a battle the kingdom was lost,
And all for the want of a horseshoe nail.*

The lack of one horseshoe nail could be inconsequential, or it could indirectly cause the loss of a war. There is no way to predict which outcome will occur. (If you want an excellent kids book to start teaching this to your children, check out *If You Give a Mouse a Cookie*.)

In this post, we will seek to unravel the butterfly effect from its many incorrect connotations, and build an understanding of how it affects our individual lives and the world in general.

Edward Lorenz and the Discovery of the Butterfly Effect

"It used to be thought that the events that changed the world were things like big bombs, maniac politicians, huge earthquakes, or vast population movements, but it has now been realized that this is a very old-fashioned view held by people totally out of touch with modern thought. The things that change the world, according to Chaos theory, are the tiny things. A butterfly flaps its wings in the Amazonian jungle, and subsequently a storm ravages half of Europe."

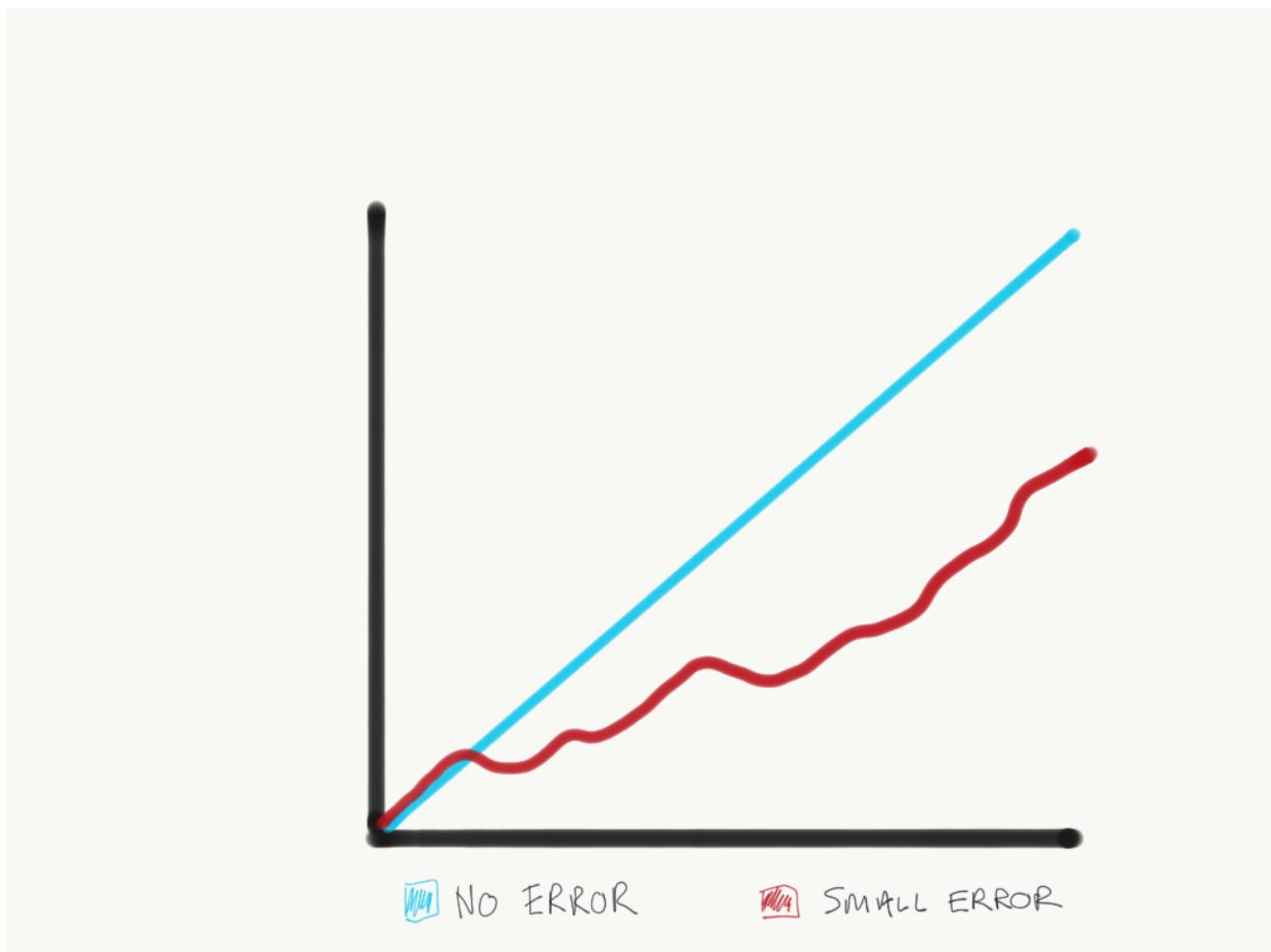
— from Good Omens, by Terry Pratchett and Neil Gaiman

Although the concept of the butterfly effect has long been debated, the identification of it as a distinct effect is credited to Edward Lorenz (1917–2008). Lorenz was a meteorologist and mathematician who successfully combined the two disciplines to create chaos theory. During the 1950s, Lorenz searched for a means of predicting the weather, as he found linear models to be ineffective.

In an experiment to model a weather prediction, he entered the initial condition as 0.506, instead of 0.506127. The result was surprising: a somewhat different prediction. From this, he deduced that the weather must turn on a dime. A tiny change in the initial conditions had enormous long-term implications. By 1963, he had formulated his ideas enough to publish an award-winning paper entitled *Deterministic Nonperiodic Flow*. In it, Lorenz writes:

Subject to the conditions of uniqueness, continuity, and boundedness ... a central trajectory, which in a certain sense is free of transient properties, is unstable if it is nonperiodic. A noncentral trajectory ... is not uniformly stable if it is nonperiodic, and if it is stable at all, its very stability is one of its transient properties, which tends to die out as time progresses. In view of the impossibility of measuring initial conditions precisely, and thereby distinguishing between a central trajectory and a nearby noncentral trajectory, all nonperiodic trajectories are effectively unstable from the point of view of practical prediction.

In simpler language, he theorized that weather prediction models are inaccurate because knowing the precise starting conditions is impossible, and a tiny change can throw off the results. To make the concept understandable to non-scientific audiences, Lorenz began to use the butterfly analogy.



A small error in the initial data magnifies over time.

In speeches and interviews, he explained that a butterfly has the potential to create tiny changes which, while not creating a typhoon, could alter its trajectory. A flapping wing represents the minuscule changes in atmospheric pressure, and these changes compound as a model progresses. Given that small, nearly imperceptible changes can have massive implications in complex systems, Lorenz concluded that attempts to predict the weather were impossible. Elsewhere in the paper, he writes:

If, then, there is any error whatever in observing the present state—and in any real system such errors seem inevitable—an acceptable prediction of an instantaneous state in the distant future may well be impossible.

... In view of the inevitable inaccuracy and incompleteness of weather observations, precise very-long-range forecasting would seem to be nonexistent.

Lorenz always stressed that there is no way of knowing what exactly tipped a system. The butterfly is a symbolic representation of an unknowable quantity.

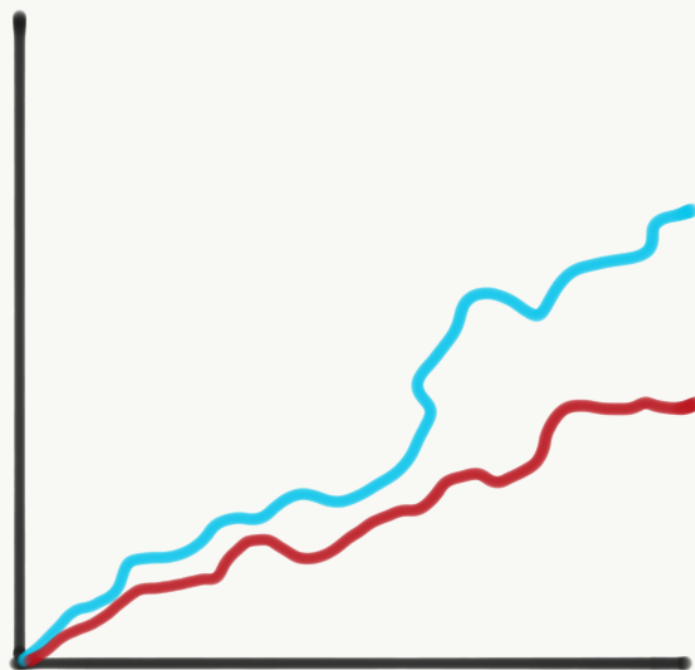
Furthermore, he aimed to contest the use of predictive models that assume a linear, deterministic progression and ignore the potential for derailment. Even the smallest error in an initial setup renders the model useless as inaccuracies compound over time. The exponential growth of errors in a predictive model is known as *deterministic chaos*. It occurs in most systems, regardless of their simplicity or complexity.

The butterfly effect is somewhat humbling—a model that exposes the flaws in other models. It shows science to be less accurate than we assume, as we have no means of making accurate predictions due to the exponential growth of errors.

Before the work of Lorenz, people assumed that an approximate idea of initial conditions would lead to an approximate prediction of the outcome. In *Chaos: Making a New Science*, James Gleick writes:

The models would churn through complicated, somewhat arbitrary webs of equations, meant to turn measurements of initial conditions ... into a simulation of future trends. The programmers hoped the results were not too grossly distorted by the many unavoidable simplifying assumptions. If a model did anything too bizarre ... the programmers would revise the equations to bring the output back in line with expectation... Models proved dismally blind to what the future would bring, but many people who should have known better acted as though they believed the results.

One theoretician declared, “The basic idea of Western science is that you don’t have to take into account the falling of a leaf on some planet in another galaxy when you’re trying to account for the motion of a billiard ball on a pool table on earth.”



An illustration of two weather conditions with very slightly different initial conditions. The trajectories are similar at first, before deviating further and further.

Lorenz’s findings were revolutionary because they proved this assumption to be entirely false. He found that without a perfect idea of initial conditions, predictions are useless—a shocking revelation at the time.

During the early days of computers, many people believed they would enable us to understand complex systems and make accurate predictions. People had been slaves to weather for millennia, and now they wanted to take control. With one innocent mistake, Lorenz shook the forecasting world, sending ripples which (appropriately) spread far beyond meteorology.

Ray Bradbury, the Butterfly Effect, and the Arrow of Time

Ray Bradbury’s classic science fiction story *A Sound of Thunder* predates the identification of chaos theory and the butterfly effect. Set in 2055, it tells of a man named Eckels who travels back 65 million years to shoot a dinosaur. Warned not to deviate from the tour guide’s plan, Eckels (along with his guide and the guide’s assistant) heads off to kill a Tyrannosaurus Rex who was going to die soon anyway when a falling tree lands on it.

Eckels panics at the sight of the creature and steps off the path, leaving his guide to kill the T Rex. The guide is enraged and orders Eckels to remove the bullets before the trio returns to 2055. Upon arrival, they are confused to find that the world has changed. Language is altered, and an evil dictator is now in charge. A confused Eckels notices a crushed butterfly stuck to his boot and realizes that in stepping off the path, he killed the insect and changed the future. Bradbury writes:

Eckels felt himself fall into a chair. He fumbled crazily at the thick slime on his boots. He held up a clod of dirt, trembling, "No, it cannot be. Not a little thing like that. No!"

Embedded in the mud, glistening green and gold and black, was a butterfly, very beautiful and very dead.

"Not a little thing like that! Not a butterfly!" cried Eckels.

It fell to the floor, an exquisite thing, a small thing that could upset balances and knock down a line of small dominoes and then big dominoes and then gigantic dominoes, all down the years across Time. Eckels' mind whirled. It couldn't change things. Killing one butterfly couldn't be that important! Could it?

Bradbury envisioned the passage of time as fragile and liable to be disturbed by minor changes. In the decades since the publication of *A Sound of Thunder*, physicists have examined its accuracy. Obviously, we cannot time-travel, so there is no way of knowing how plausible the story is, beyond predictive models. Bradbury's work raises the questions of what time is and whether it is deterministic.

Physicists refer to the Arrow of Time—the non-reversible progression of entropy (disorder.) As time moves forward, matter becomes more and more chaotic and does not spontaneously return to its original state. If you break an egg, it remains broken and cannot spontaneously re-form, for example. The Arrow of Time gives us a sense of past, present, and future. Arthur Eddington (the astronomer and physicist who coined the term) explained:

Let us draw an arrow arbitrarily. If as we follow the arrow we find more and more of the random element in the state of the world, then the arrow is pointing towards the future; if the random element decreases the arrow points towards the past. That is the only distinction known to physics. This follows at once if our fundamental contention is admitted that the introduction of randomness is the only thing which cannot be undone.

In short, the passage of time as we perceive it does exist, conditional to the existence of entropy. As long as entropy is non-reversible, time can be said to exist. The closest thing we have to a true measurement of time is a measurement of entropy. If the progression of time is nothing but a journey towards chaos, it makes sense for small changes to affect the future by amplifying chaos.

We do not yet know if entropy creates time or is a byproduct of it. Subsequently, we cannot know if changing the past would change the future. Would stepping on a butterfly shift the path of entropy? Did Eckels move off the path out of his own free will, or was that event predetermined? Was the dictatorial future he returned to always meant to be?

These interconnected concepts — the butterfly effect, chaos theory, determinism, free will, time travel — have captured many imaginations since their discoveries. Films ranging from *It's a Wonderful Life* to *Donnie Darko* and the eponymous *Butterfly Effect* have explored the complexities of cause and effect. Once again, it is important to note that works of fiction tend to view the symbolic butterfly as the cause of an effect. According to Lorenz's original writing, though, the point is that small details can tip the balance *without being identifiable*.

The Butterfly Effect in Business

Marketplaces are, in essence, chaotic systems that are influenced by tiny changes. This makes it difficult to predict the future, as the successes and failures of businesses can appear random. Periods of economic growth and decline sprout from nowhere. This is the

result of the exponential impact of subtle stimuli—the economic equivalent of the butterfly effect. Breuer explains:

We live in an interconnected, or rather a hyper-connected society. Organizations and markets “behave” like networks. This triggers chaotic (complex) rather than linear behavior.

Preparing for the future and seeing the logic in the chaos of consumer behavior is not easy. Once-powerful giants collapse as they fall behind the times. Tiny start-ups rise from the ashes and take over industries. Small alterations in existing technology transform how people live their lives. Fads capture everyone’s imagination, then disappear.

Businesses have two options in this situation: build a timeless product or service, or race to keep up with change. Many businesses opt for a combination of the two. For example, Doc Martens continues selling the classic 1460 boot, while bringing out new designs each season. This approach requires extreme vigilance and attention to consumer desires in an attempt to both remain relevant and appear timeless. Businesses leverage the compounding impact of small tweaks that aim to generate interest in all they have to offer.

In *The Butterfly Effect in Competitive Markets*, Dr. Rajagopal writes that most global firms are penetrating bottom-of-the-pyramid market segments by introducing small changes in technology, value perceptions, [and] marketing-mix strategies, and driving production on an unimagined scale of magnitude to derive a major effect on markets. ...Procter & Gamble, Kellogg’s, Unilever, Nestlé, Apple, and Samsung, have experienced this effect in their business growth... Well-managed companies drive small changes in their business strategies by nipping the pulse of consumers...

Most firms use such effect by making a small change in their strategy in reference to produce, price, place, promotion, ... posture (developing corporate image), and proliferation...to gain higher market share and profit in a short span.

For most businesses, incessant small changes are the most effective way to produce the metaphorical typhoon. These iterations keep consumers engaged while preserving brand identity. If these small tweaks fail, the impact is hopefully not too great. But if they succeed and compound, the rewards can be monumental.

By nature, all markets are chaotic, and what seem like inconsequential alterations can propel a business up or down. Rajagopal explains how the butterfly effect connects to business:

Globalization and frequent shifts in consumer preferences toward products and services have accelerated chaos in the market due to the rush of firms, products, and business strategies. Chaos theory in markets addresses the behavior of strategic and dynamic moves of competing firms that are highly sensitive to existing market conditions triggering the butterfly effect.

The initial conditions (economic, social, cultural, political) in which a business sets up are vital influences on its success or failure. Lorenz found that the smallest change in the preliminary conditions created a different outcome in weather predictions, and we can consider the same to be true for businesses. The first few months and years are a crucial time when rates of failure are highest and the basic brand identity forms. Any of the early decisions, achievements, or mistakes have the potential to be the wing flap that creates a storm.

Benoit Mandelbrot on the Butterfly Effect in Economics

International economies can be thought of as a single system, wherein each part influences the others. Much like the atmosphere, the economy is a complex system in which we see only the visible outcomes—rain or shine, boom, or bust. With the advent of globalization and improved communication technology, the economy is even more interconnected than in the past. One episode of market volatility can cause problems for the entire system. The butterfly effect in economics refers to the compounding impact of small changes. As a consequence, it is nearly impossible to make accurate predictions for

the future or to identify the precise cause of an inexplicable change. Long periods of stability are followed by sudden declines and vice versa.

Benoit Mandelbrot (the “father of fractals”) began applying the butterfly effect to economics several decades ago. In a 1999 article for *Scientific American*, he explained his findings. Mandelbrot saw how unstable markets could be, and he cited an example of a company which saw its stock drop 40% in one day, followed by another 6%, before rising by 10%—the typhoon created by an unseen butterfly. When Benoit looked at traditional economic models, he found that they did not even allow for the occurrence of such events. Standard models denied the existence of dramatic market shifts. Benoit writes in *Scientific American*:

According to portfolio theory, the probability of these large fluctuations would be a few millionths of a millionth of a millionth of a millionth. (The fluctuations are greater than 10 standard deviations.) But in fact, one observes spikes on a regular basis—as often as every month—and their probability amounts to a few hundredths.

If these changes are unpredictable, what causes them? Mandelbrot’s answer lay in his work on fractals. To explain fractals would require a whole separate post, so we will go with Mandelbrot’s own simplified description: “A fractal is a geometric shape that can be separated into parts, each of which is a reduced-scale version of the whole.” He goes on to explain the connection:

In finance, this concept is not a rootless abstraction but a theoretical reformulation of a down-to-earth bit of market folklore—namely that movements of a stock or currency all look alike when a market chart is enlarged or reduced so that it fits the same time and price scale. An observer then cannot tell which of the data concern prices that change from week to week, day to day or hour to hour. This quality defines the charts as fractal curves and makes available many powerful tools of mathematical and computer analysis.”

In a talk, Mandelbrot held up his coffee and declared that predicting its temperature in a minute is impossible, but in an hour is perfectly possible. He applied the same concept to markets that change in dramatic ways in the short term. Even if a long-term pattern can be deduced, it has little use for those who trade on a shorter timescale.

Mandelbrot explains how his fractals can be used to create a more useful model of the chaotic nature of the economy:

Instead, multifractals can be put to work to “stress-test” a portfolio. In this technique, the rules underlying multifractals attempt to create the same patterns of variability as do the unknown rules that govern actual markets. Multifractals describe accurately the relation between the shape of the generator and the patterns of up-and-down swings of prices to be found on charts of real market data... They provide estimates of the probability of what the market might do and allow one to prepare for inevitable sea changes. The new modeling techniques are designed to cast a light of order into the seemingly impenetrable thicket of the financial markets. They also recognize the mariner’s warning that, as recent events demonstrate, deserves to be heeded: On even the calmest sea, a gale may be just over the horizon.

In *The Misbehaviour of Markets*, Mandelbrot and Richard Hudson expand upon the topic of financial chaos. They begin with a discussion of the infamous 2008 crash and its implications:

The worldwide market crash of autumn 2008 had many causes: greedy bankers, lax regulators and gullible investors, to name a few. But there is also a less-obvious cause: our all-too-limited understanding of how markets work, how prices move and how risks evolve. ...

Markets are complex, and treacherous. The bone-chilling fall of September 29, 2008—a 7 percent, 777 point plunge in the Dow Jones Industrial Average—was, in historical terms, just a particularly dramatic demonstration of that fact. In just a few hours, more than \$1.6 trillion was wiped off the value of American industry—\$5 trillion worldwide.

Mandelbrot and Hudson believe that the 2008 credit crisis can be attributed in part to the increasing confidence in financial predictions. People who created computer models designed to guess the future failed to take into account the butterfly effect. No matter how complex the models became, they could not create a perfect picture of initial conditions or account for the compounding impact of small changes. Just as people believed they could predict and therefore control the weather before Lorenz published his work, people thought they could do the same for markets until the 2008 crash proved otherwise. Wall Street banks trusted their models of the future so much that they felt safe borrowing growing sums of money for what was, in essence, gambling. After all, their predictions said such a crash was impossible. Impossible or not, it happened.

According to Mandelbrot and Hudson, predictive models view markets as “a risky but ultimately ... manageable world.” As with meteorology, economic predictions are based on approximate ideas of initial conditions—ideas that, as we know, are close to useless. As Mandelbrot and Hudson write:

[C]auses are usually obscure. ... The precise market mechanism that links news to price, cause to effect, is mysterious and seems inconsistent. Threat of war: Dollar falls. Threat of war: Dollar rises. Which of the two will actually happen? After the fact, it seems obvious; in hindsight, fundamental analysis can be reconstituted and is always brilliant. But before the fact, both outcomes may seem equally likely.

In the same way that apparently similar weather conditions can create drastically different outcomes, apparently similar market conditions can create drastically different outcomes. We cannot see the extent to which the economy is interconnected, and we cannot identify where the butterfly lies. Mandelbrot and Hudson disagree with the view of the economy as separate from other parts of our world. Everything connects:

No one is alone in this world. No act is without consequences for others. It is a tenet of chaos theory that, in dynamical systems, the outcome of any process is sensitive to its starting point—or in the famous cliché, the flap of a butterfly's wings in the Amazon can cause a tornado in Texas. I do not assert that markets are chaotic.... But clearly, the global economy is an unfathomably complicated machine. To all the complexity of the physical world... you add the psychological complexity of men acting on their fleeting expectations....

Why do people prefer to blame crashes (such as the 2008 credit crisis) on the folly of those in the financial industry? Jonathan Cainer provides a succinct explanation:

Why do we love the idea that people might be secretly working together to control and organize the world? Because we do not like to face the fact that our world runs on a combination of chaos, incompetence, and confusion.

Historic Examples of the Butterfly Effect

*“A very small cause which escapes our notice determines a considerable effect that we cannot fail to see, and then we say the effect is due to chance. If we knew exactly the laws of nature and the situation of the universe at the initial moment, we could predict exactly the situation of that same universe at a succeeding moment. But even if it were the case that the natural laws had no longer any secret for us, we could still only know the initial situation *approximately*. If that enabled us to predict the succeeding situation with *the same approximation*, that is all we require, and we should say that the phenomenon had been predicted, that it is governed by laws. But it is not always so; it may happen that small differences in the initial conditions produce very great ones in the final phenomena. A small error in the former will produce an enormous error in the latter. Prediction becomes impossible, and we have the fortuitous phenomenon.”*

— Jules Henri Poincaré (1854–1912)

Many examples exist of instances where a tiny detail led to a dramatic change. In each case, the world we live in could be different if the situation had been reversed. Here are some examples of how the butterfly effect has shaped our lives.

- The bombing of Nagasaki. The US initially intended to bomb the Japanese city of Kuroko, with the munitions factory as a target. On the day the US planned to attack, cloudy weather conditions prevented the factory from being seen by military personnel as they flew overhead. The airplane passed over the city three times before the pilots gave up. Locals huddled in shelters heard the hum of the airplane preparing to drop the nuclear bomb and prepared for their destruction. Except Kuroko was never bombed. Military personnel decided on Nagasaki as the target due to improved visibility. The implications of that split-second decision were monumental. We cannot even begin to comprehend how different history might have been if that day had not been cloudy. Kuroko is sometimes referred to as the luckiest city in Japan, and those who lived there during the war are still shaken by the near-miss.
- The Academy of Fine Arts in Vienna rejecting Adolf Hitler's application, twice. In the early 1900s, a young Hitler applied for art school and was rejected, possibly by a Jewish professor. By his own estimation and that of scholars, this rejection went on to shape his metamorphosis from an aspiring bohemian artist into the human manifestation of evil. We can only speculate as to how history would have been different. But it is safe to assume that a great deal of tragedy could have been avoided if Hitler had applied himself to water colors, not to genocide.
- The assassination of Archduke Franz Ferdinand. A little-known fact about the event considered to be the catalyst for both world wars is that it almost didn't happen. On the 28th of June, 1914, a teenage Bosnian-Serb named Gavrilo Princip went to Sarajevo with two other nationalists to assassinate the Archduke. The initial assassination attempt failed; a bomb or grenade exploded beneath the car behind the Archduke's and wounded its occupants. The route was supposed to have been changed after that, but the Archduke's driver didn't get the message. Had he actually taken the alternate route, Princip would not have been on the same street as the car and would not have had the chance to shoot the Archduke and his wife that day. Were it not for a failure of communication, both world wars might never have happened.
- The Chernobyl disaster. In 1986, a test at the Chernobyl nuclear plant went awry and released 400 times the radiation produced by the bombing of Hiroshima. One hundred fifteen thousand people were evacuated from the area, with many deaths and birth defects resulting from the radiation. Even today, some areas remain too dangerous to visit. However, it could have been much worse. After the initial explosion, three plant workers volunteered to turn off the underwater valves to prevent a second explosion. It has long been believed that the trio died as a result, although there is now some evidence this may not have been the case. Regardless, diving into a dark basement flooded with radioactive water was a heroic act. Had they failed to turn off the valve, half of Europe would have been destroyed and rendered uninhabitable for half a million years. Russia, Ukraine, and Kiev also would have become unfit for human habitation. Whether they lived or not, the three men—Alexei Ananenko, Valeri Bezpalov, and Boris Baranov—stilled the wings of a deadly butterfly. Indeed, the entire Chernobyl disaster was the result of poor design and the ineptitude of staff. The long-term result (in addition to the impact on residents of the area) was widespread anxiety towards nuclear plants and bias

against nuclear power, leading to a preference for fossil fuels. Some people have speculated that Chernobyl is responsible for the acceleration of global warming, as countries became unduly slow to adopt nuclear power.

- The Cuban Missile Crisis. We all may owe our lives to a single Russian Navy officer named Vasili Arkhipov, who has been called “the man who saved the world.” During the Cuban Missile Crisis, Arkhipov was stationed on a nuclear-armed submarine near Cuba. American aircraft and ships began using depth charges to signal the submarine that it should surface so it could be identified. With the submarine submerged too deep to monitor radio signals, the crew had no idea what was going on in the world above. The captain, Savitsky, decided the signal meant that war had broken out and he prepared to launch a nuclear torpedo. Everyone agreed with him—except Arkhipov. Had the torpedo launched, nuclear clouds would have hit Moscow, London, East Anglia and Germany, before wiping out half of the British population. The result could have been a worldwide nuclear holocaust, as countries retaliated and the conflict spread. Yet within an overheated underwater room, Arkhipov exercised his veto power and prevented a launch. Without the courage of one man, our world could be unimaginably different.

From these handful of examples, it is clear how fragile the world is, and how dire the effects of tiny events can be on starting conditions.

We like to think we can predict the future and exercise a degree of control over powerful systems such as the weather and the economy. Yet the butterfly effect shows that we cannot. The systems around us are chaotic and entropic, prone to sudden change. For some kinds of systems, we can try to create favorable starting conditions and be mindful of the kinds of catalysts that might act on those conditions – but that’s as far as our power extends. If we think that we can identify every catalyst and control or predict outcomes, we are only setting ourselves up for a fall.

115. Reciprocation Bias

“There are slavish souls who carry their appreciation for favors done them so far that they strangle themselves with the rope of gratitude.”

—Friedrich Nietzsche

If you are like me, whenever receiving a favor, you too feel an immense need, almost an obligation, to pay it back in kind.

If a friend invites you over for dinner, you are almost sure to invite them over to your place for dinner as well. It almost seems as if we were meant to do each other favors and, more important, return them.

Have you ever wondered why?

A large part of the reason is that this behavior seems to have strong evolutionary benefits. It's so pervasive in human culture, it's believed that there is no society that does not feel reciprocation's pull. The archaeologist Richard Leakey believes reciprocation is the foundation on which we have evolved: “We are human because our ancestors learned to share their food and their skills in an honored network of obligation.”

The web of indebtedness created by reciprocation allows for the division of tasks, eases the exchange of goods and services, and helps create interdependencies that bind us into units that are more productive than each of us is on our own. Reciprocation allows one person to give something to another with the expectation that the favor will be returned and the giver will not be taken advantage of.

Throughout human history, reciprocation lowered the cost of transactions, as almost everything begins with one person trusting another. Land could be farmed with one person lending seeds to another. Gifts could be given. Currency could be lent. Aid could be given to the weak. Moreover, reciprocation is not a human concept — it exists in the physical world. Newton's third law is that for every action there is an equal and opposite reaction. You might push on a wall, but the wall pushes back on you.

There is such an advantage to be gained from reciprocation that it's become imprinted onto our subconscious. For example, we teach our kids to invite others they may not like to their birthday parties because our kids were invited to those kids' parties. Deeper still, we negatively label people who violate the rule: untrustworthy, moocher, welsher. Because social sanctions can be tough on those who fail to cooperate, the rule of reciprocity often evokes guilt.

As with most things, however, reciprocation has a darker side. Just as we tend to reciprocate good behavior, sometimes we also pay back bad deeds. One of the most effective game-theory strategies is tit for tat.

“Pay every debt, as if God wrote the bill.”

— Ralph Waldo Emerson

Hate

The reciprocation of bad behavior is best evidenced in wars. Brutality escalates as each side feels obliged to return the violence it experienced from its counterpart. This spiral can lead to more mindlessly destructive behavior, including torture and mass deaths. There are plenty of examples of this negative reciprocation; consider World War II, the Crusades, and the Mongolian invasions led by Genghis Khan.

It might seem that we humans have exclusively caused much suffering in the world in a relatively short period of time. However, the reciprocation rule is overarching — the human species is not the only one capable of extreme cruelty. Charlie Munger believes that reciprocal aggression appears to be more of a rule rather than an exception among other species, too:

One interesting mental exercise is to compare Genghis Khan, who exercised extreme, lethal hostility toward other men, with ants that display extreme, lethal hostility toward members of their own species that are not part of their breeding colony. Genghis looks sweetly lovable when compared to the ants. The ants are more disposed to fight and fight with more extreme cruelty.

If the reciprocation rule is so overpowering, the natural question here would be, is there a way we can still control our response to it?

Munger advises us to train our patience.

The standard antidote to one's overactive hostility is to train oneself to defer reaction. As my smart friend Tom Murphy so frequently says, "You can always tell the man off tomorrow if it is such a good idea."

There's also another way. Because the reciprocation tendency is so extreme, we can reverse the course of events by doing good rather than harm to the other party.

Particularly in WWI, the fighting sometimes paused after a positive feedback loop of less severe damage occurred. Here is how a British staff officer described his surprise about the degree of trust between the British and German soldiers:

[I was] astonished to observe German soldiers walking about within rifle range behind their own line. Our men appeared to take no notice. I privately made up my mind to do away with that sort of thing when we took over; such things should not be allowed. These people evidently did not know there was a war on. Both sides apparently believed in the policy of "live and let live." (Dugdale 1932, p. 94)

Such behavior was not restricted to this one case, but was rather common in trench warfare during the later stages of the war.

And this makes me think that if such things could happen even during a war, there is little doubt that we could improve our relationships by doing a little undeserved good for the other person.

Love

Reciprocation is just as important in breeding love as it is in breeding hate.

Andy Warhol said, in *The Philosophy of Andy Warhol (From A to B and Back Again)*:

Love affairs get too involved, and they're not really worth it. But if, for some reason, you feel that they are, you should put in exactly as much time and energy as the other person. In other words, "I'll pay you if you pay me."

This is the reciprocation tendency at its finest. Truth is, love and marriage would lose much of their allure if there were no reciprocation tendency among partners. By loving, we literally may become loved.

As lovers and spouses, we promise loyalty to our partners and we expect it to be returned. We are encouraged to practice the virtues of marriage in front of not only our partners, but also society. These effects reinforcing each other can be thought of as the fabric of many of today's relationships.

Furthermore, reciprocation not only holds us together, but can also bring us together in the first place. Displaying generosity can be a powerful way to advance a relationship by setting up implicit expectations of compliance from the other person.

Women, in particular, often report on the pressure they feel after receiving expensive gifts or dinners. In *Influence*, professor of psychology Robert Cialdini quotes the words of one of his (female) students:

After learning the hard way, I no longer let a guy I meet in a club buy me a drink because I don't want either of us to feel that I am obligated sexually.

Perhaps the key to genuine relationships lies at least partially in each party being kind without expectations. Indeed, in communal relationships like marriage, friendship, and the parent-child relationship, the accounting is unnecessary, and if you think about it, you'll see that it is hardly ever practiced.

What is exchanged reciprocally instead is the near-unconditional willingness to provide what the other side needs, when it is needed. Still, some symmetry seems to be best; even in close friendships, strong inequalities will eventually make themselves noticed.

Abusing Reciprocity

As with any human tendency, reciprocity holds a great potential for abuse. Charlie Munger recalls how the eccentric hedge-fund manager Victor Niederhoffer managed to get good grades with an impressive course load when he was an undergraduate student at Harvard. Contrary to what one may expect, Niederhoffer was not a very hard-working student. Instead of studying, he liked spending his time playing world-class checkers, gambling in high-stakes card games, and playing amateur-level tennis and professional-level squash. So how did he manage to get those good grades?

Munger explains:

He thought he was up to outsmarting the Harvard Economics Department. And he was. He noticed that the graduate students did most of the boring work that would otherwise go to the professors, and he noticed that because it was so hard to get to be a graduate student at Harvard, they were all very brilliant and organized and hard working, as well as much needed by grateful professors.

And therefore, by custom, and as would be predicted from the psychological force called reciprocity tendency, in a really advanced graduate course, the professors always gave an A. So Victor Niederhoffer signed up for nothing but the most advanced graduate courses in the Harvard Economics Department, and of course, he got A, after A, after A, after A, and was hardly ever near a class. And for a while, some people at Harvard may have thought it had a new prodigy on its hands. That's a ridiculous story, but the scheme will work still.

And Niederhoffer is famous: they call his style "Niederhofferizing the curriculum."

There are cases that are less innocent than Niederhoffer's gaming the system. For example, when a salesman offers us a cup of coffee with cookies, we are likely to be subconsciously tricked into compliance by even such a minor favor, which combines reciprocity and association. Buying can be just as much about the actual experience as it is about acquiring goods at an optimal price, and salesmen know this.

Your Costs Are My Benefits

In our personal expenses, we are the ones suffering from our follies, but an important problem arises when we buy on someone else's behalf. Imagine that you are the purchasing agent for an employer. Now the extra costs that are paid in return for the minor favor you receive are incurred not by you but by your employer.

Gifts and favors tend to create perverse incentives on the purchaser's part and allow the seller to maximize his advantage. Smart employers know this and therefore do not allow their purchasing personnel to accept gifts. Sam Walton is one notable example; he wouldn't let Walmart's purchasing agents accept even a hot dog from a vendor.

The exchange of favors at another's expense is not restricted to purchasing on someone's behalf.

Munger notes that the reciprocation tendency can also be held responsible for some wicked pay dynamics in the boardroom of public companies:

It's incredible the reciprocity that happens when CEOs keep recommending that directors get paid more, and then the directors raise the CEO's pay — it's a big game of pitty pat. And then they hire compensation consultants to make sure no-one else is getting paid more. This is true even if the CEO is a klutz and a little dishonorable. I think the existing system is very bad and my system would work better, but it's not going to happen.

In order to prevent these dynamics, he suggests that the board of directors does not get paid at all.

I think tons of eminent people would serve on boards of companies like Exxon without being paid. The lower courts in England are run by unpaid magistrates. And Harvard is run by boards of people who don't get paid — in fact, they have to pay [in the form of

donations to the school]. I think boards would be better if they were run like Berkshire Hathaway's.

For these same reasons, Munger believes that the reciprocity tendency should be part of the compulsory law curriculum; otherwise, students may unknowingly steer away from representing their clients' best interests. Ignorance of the reciprocation rule may explain why malpractice still occurs even among lawyers with the best intentions. The law schools simply don't know, or care to teach, what Sam Walton knew so well.

The Concession

Besides the obvious doing of favors, there is a more subtle technique that may lure us into reciprocal and cooperative behavior. Rob Cialdini recalls an incident that made him aware of the technique:

I was walking down the street when I was approached by an 11- or 12-year-old boy. He introduced himself and said he was selling tickets to the annual Boy Scouts Circus to be held on the upcoming Saturday night. He asked if I wished to buy any tickets at \$5 apiece. Since one of the last places I wanted to spend Saturday evening was with the Boy Scouts, I declined. "Well," he said, "if you don't want to buy any tickets, how about buying some of our chocolate bars? They're only \$1 each."

Cialdini automatically bought two chocolates and immediately realized that something was wrong:

I knew that to be the case because (a) I do not like chocolate bars; (b) I do like dollars; (c) I was standing there with two of his chocolate bars; and (d) he was walking away with two of my dollars.

After meeting with his research assistants and conducting experiments with a similar setup on his students, Cialdini arrived at a rule that explains this behavior: The person who acts in a certain way toward us is entitled to a similar return action.

[quote]The person who acts in a certain way toward us is entitled to a similar return action.
[/quote]

This rule has two consequences:

1. We feel obliged to repay favors we have received.
2. We feel obliged to make a concession to someone who has made a concession to us.

As Cialdini and his research group reflected, they increasingly saw that the Boy Scout had brought him under the rule. The request to purchase the chocolates was introduced as a concession — a retreat from the request that Cialdini buy some \$5 tickets.

If Cialdini was to live up to the dictates of the reciprocation rule, there had to be a concession on his part. And there was — after all, Cialdini moved from rejection to compliance after the boy had moved from a larger to a smaller request. The remarkable thing, and this is where bias comes in, was that Cialdini was not at all interested in either of the things the boy had offered.

Why would this rule be so important? Because it can lead to a lot of unnecessary trouble. Both Cialdini and Munger believe that a subconscious reciprocation tendency was an important lever that allowed Watergate, one of the biggest political scandals in history, to occur.

Breaking into the Watergate offices of the Democratic party was a plan that was conceived by G. Gordon Liddy, an aggressive subordinate with a questionable reputation. Liddy pulled the same trick on his superiors that the twelve-year-old boy did on Cialdini. The \$250,000 break-in plan was not the first that Liddy proposed — it was a significant concession from the previous two. The first of these plans, for \$1 million, entailed a program that included a specially equipped "chase plane," break-ins, kidnapping and

mugging squads, and a yacht featuring “high-class call girls,” all meant to blackmail the Democratic politicians.

The second plan was a little more modest, at half of the initial price and reductions in the program. After the two initial plans were rejected by his superiors, Liddy submitted the third, “bare bones” plan, which was a little less stupid and cost “a mere” quarter of the initial price.

Do you see what Liddy did there?

Unsurprisingly, his superiors gave in; eventually, the plan was approved and it started the snowball that caused Nixon to resign. As the Watergate example illustrates, an unwatched reciprocation tendency may subtly cause mindless behavior with many extreme or dangerous consequences.

One of the reasons reciprocation can be used so effectively as a device for gaining another’s compliance is that it combines power and subtlety. Especially in its concessionary form, the reciprocation rule often produces a yes response to a request that otherwise would surely have been refused.

I hope that the next time you come across a situation where you feel the need to return a favor, you will think twice about the possible consequences of accepting it in the first place. You may think, for example, that someone offering you a free pen will not influence you at all, but there is an entire human history arguing otherwise. Perhaps Sam Walton’s policy, of not accepting favors at all in matters where impartiality is preferred, is best.

Yet there is some truth to saying that reciprocal behavior also represents the best part of human nature. There are times when successful trade, good friendships, and even romantic relationships develop out of the need to feel symmetrical in our relationships. Indeed, it could well be that the very best parts of our lives lie in relationships of affection in which both we and the other party want to please each other.

116. Complex Adaptive Cities

Complex adaptive systems are hard to understand. Messy and complicated, they cannot be broken down into smaller bits. It would be easier to ignore them, or simply leave them as mysteries. But given that we are living in one such system, it might be more useful to buckle down and sort it out. That way, we can make choices that are aligned with how the world actually operates.

In his book *Diversity and Complexity*, Scott E. Page explains, “Complexity can be loosely thought of as interesting structures and patterns that are not easily described or predicted. Systems that produce complexity consist of diverse rule-following entities whose behaviors are interdependent. Those entities interact over a contact structure or network. In addition, the entities often adapt.”

Understanding complexity is important, because sometimes things are not further reducible. While the premise of Occam’s Razor is that things should be made as simple as possible but not simpler, sometimes there are things that cannot be reduced. There is, in fact, an irreducible minimum. Certain things can be properly contemplated only in all their complicated, interconnected glory.

Take, for example, cities.

[quote]Cities cannot be created for success from the top down by the imposition of simple rules.[/quote]

For those of us who live in cities, we all know what makes a particular neighborhood great. We can get what we need and have the interactions we want, and that’s ultimately because we feel safe there.

But how is this achieved? What magic combination of people and locations, uses and destinations, makes a vibrant, safe neighborhood? Is there a formula for, say, the ratio of houses to businesses, or of children to workers?

No. Cities are complex adaptive systems. They cannot be created for success from the top down by the imposition of simple rules.

In her seminal book *The Death and Life of Great American Cities*, Jane Jacobs approached the city as a complex adaptive system, turned city planning on its head, and likely saved many North American cities by taking them apart and showing that they cannot be reduced to a series of simple behavioral interactions.

Cities fall exactly into the definition of complexity given above by Page. They are full of rule-following humans, cars, and wildlife, the behaviors of which are interdependent on the other entities and respond to feedback.

These components of a city interact over multiple interfaces in a city network and will adapt easily, changing their behavior based on food availability, road closures, or perceived safety. But the city itself cannot be understood by looking at just one of these behaviors.

Jacobs starts with “the kind of problem which cities pose — a problem in handling organized complexity” — and a series of observations about that common, almost innocuous, part of all cities: the sidewalk.

What makes a particular neighborhood safe?

Jacobs argues that there is no one factor but rather a series of them. In order to understand how a city street can be safe, you must examine the full scope of interactions that occur on its sidewalk. “The trust of a city street is formed over time from many, many little public sidewalk contacts.” Nodding to people you know, noticing people you don’t. Recognizing which parent goes with which kid, or whose business seems to be thriving. People create safety.

Given that most of them are strangers to each other, how do they do this? How come these strangers are not all perceived as threats?

Safe streets are streets that are used by many different types of people throughout the 24-hour day. Children, workers, caregivers, tourists, diners — the more people who use the sidewalk, the more eyes that participate in the safety of the street.

Safety on city streets is “kept primarily by an intricate, almost unconscious, network of voluntary controls and standards among the people themselves, and enforced by the people themselves.” Essentially, we all contribute to safety because we all want safety. It increases our chances of survival.

Jacobs brings an amazing eye for observational detail in describing neighborhoods that work and those that don't. In describing sidewalks, she explains that successful, safe neighborhoods are orderly. “But there is nothing simple about that order itself, or the bewildering number of components that go into it. Most of those components are specialized in one way or another. They unite in their joint effect upon the sidewalk, which is not specialized in the least. That is its strength.” For example, restaurant patrons, shopkeepers, loitering teenagers, etc. — some of whom belong to the area and some of whom are transient — all use the sidewalk and in doing so contribute to the interconnected and interdependent relationships that produce the perception of safety on that street. And real safety will follow perceived safety.

To get people participating in this unorganized street safety, you have to have streets that are desirable. “You can't make people use streets they have no reason to use. You can't make people watch streets they do not want to watch.” But Jacobs points out time and again that there is no predictable prescription for how to achieve this mixed use where people are unconsciously invested in the maintenance of safety.

This is where considering the city as a complex adaptive system is most useful.

Each individual component has a part to play, so a top-down imposition of theory that doesn't allow for the unpredictable behavior of each individual is doomed to fail. “Orthodox planning is much imbued with puritanical and Utopian conceptions of how people should spend their free time, and in planning, these moralisms on people's private lives are deeply confused with concepts about the workings of cities.” A large, diverse group of people is not going to conform to only one way of living. And it's the diversity that offers the protection.

For example, a city planner might decide to not have bars in residential neighborhoods.

The noise might keep people up, or there will be a negative moral impact on the children who are exposed to the behavior of loud, obnoxious drunks. But as Jacobs reveals, safe city areas can't be built on the basis of this type of simplistic assumption.

By stretching the use of a street through as many hours of the day as possible, you might create a safer neighborhood. I say “might” because in this complex system, other factors might connect to manifest a different reality.

[quote]Planning that doesn't respect the spectrum of diverse behavior and instead aims to insist on an ideal based on a few simple concepts will hinder the natural ability of a system to adapt.[/quote]

As Scott Page explains, “Creating a complex system from scratch takes skill (or evolution). Therefore, when we see diverse complex systems in the real world, we should not assume that they've been assembled from whole cloth. Far more likely, they've been constructed bit by bit.”

Urban planning that doesn't respect the spectrum of diverse behavior and instead aims to insist on an ideal based on a few simple concepts (fresh air, more public space, large private space) will hinder the natural ability of a city system to adapt in a way that suits the residents. And it is this ability to adapt that is the cornerstone requirement of this type of complex system. Inhibit the adaptive property and you all but ensure the collapse of the system.

As Jacobs articulates:

Under the seeming disorder of the old city, wherever the old city is working successfully, is a marvelous order for maintaining the safety of the streets and the freedom of the city. It is a complex order. Its essence is intricacy of sidewalk use, bringing with it a constant succession of eyes. This order is all composed of movement and change, and although it is life, not art, we may fancifully call it the art form of the city and liken it to the dance — ... to an intricate ballet in which the individual dancers and ensembles all have distinctive parts which miraculously reinforce each other and compose an orderly whole. The ballet of the good city sidewalk never repeats itself from place to place, and in any one place is always replete with new improvisations.

This is the essence of complexity. As Scott Page argues, “Adaptation occurs at the level of individuals or of types. The system itself doesn’t adapt. The parts do; they alter their behaviors leading to system level adaptation.”

Jacobs maintains that “the sight of people attracts still other people.” We feel more secure when we know there are multiple eyes on us, eyes that are concerned only with the immediate function that might affect them and are not therefore invasive.

Our complex behavior as individuals in cities, interacting with various components in any given day, is multiplied by everyone, so a city that produces a safe environment seems to be almost miraculous. But ultimately our behavior is governed by certain rules — not rules that are imposed by theory or external forces, but rules that we all feel are critical to our well-being and success in our city.

Thus, the workings of a desirable city are produced by a multitude of small interactions that have evolved and adapted as they have promoted the existence of the things that most support the desires of individuals.

“The look of things and the way they work are inextricably bound together, and in no place more so than cities,” claims Jacobs. Use is not independent of form. That is why we must understand the system as a whole. No matter how many components and unpredictable potential interactions there are, they are all part of what makes the city function.

As Jacobs concludes, “There is no use wishing it were a simpler problem, because in real life it is not a simpler problem. No matter what you try to do to it, a city park behaves like a problem in organized complexity, and that is what it is. The same is true of all other parts or features of cities. Although the inter-relations of their many factors are complex, there is nothing accidental or irrational about the ways in which these factors affect each other.”

117. The Power of Incentives: The Hidden Forces That Shape Behavior

Incentives are what drive human behavior. Understanding incentives is the key to understanding people. Conversely, failing to recognize the importance of incentives often leads us to make major errors.

“Never, ever, think about something else when you should be thinking about the power of incentives.”

— Charlie Munger

According to Charlie Munger, there are only a few forces more powerful than incentives. In his speech *The Psychology of Human Misjudgment*, he reflects on how the power of incentives never disappoints him:

Well, I think I’ve been in the top 5% of my age cohort all my life in understanding the power of incentives, and all my life I’ve underestimated it. And never a year passes but I get some surprise that pushes my limit a little farther.

Sometimes the solution to a behavior problem is simply to revisit incentives and make sure they align with the desired goal. Munger talks about Federal Express, which is one of his favorite examples of the power of incentives:

The heart and soul of the integrity of the system is that all the packages have to be shifted rapidly in one central location each night. And the system has no integrity if the whole shift can’t be done fast. And Federal Express had one hell of a time getting the thing to work. And they tried moral suasion, they tried everything in the world, and finally somebody got the happy thought that they were paying the night shift by the hour, and that maybe if they paid them by the shift, the system would work better. And lo and behold, that solution worked.

If you’re trying to change a behavior, reason will take you only so far. Reflecting on another example where misaligned incentives hampered the sales of a superior product, Munger said:

Early in the history of Xerox, Joe Wilson, who was then in the government, had to go back to Xerox because he couldn’t understand how their better, new machine was selling so poorly in relation to their older and inferior machine. Of course when he got there, he found out that the commission arrangement with the salesmen gave a tremendous incentive to the inferior machine.

Ignoring incentives almost never works out well. Thinking about the incentives of others is necessary to create win-win relationships.

We can turn to psychology to obtain a more structured and thorough understanding of how incentives shape our actions.

The Science of Reinforcement

The science of reinforcement was furthered by Burrhus Frederic Skinner (usually called B.F. Skinner), a professor of psychology at Harvard from 1958 to 1974.

Skinner, unlike his contemporaries, refused to hypothesize about what happened on the inside (what people or animals thought and felt) and preferred to focus on what we can observe. To him, focusing on how much people ate meant more than focusing on subjective measures, like how hungry people were or how much pleasure they got from eating. He wanted to find out how environmental variables affected behavior, and he believed that behavior is shaped by its consequences.

If we don’t like the consequences of an action we’ve taken, we’re less likely to do it again; if we do like the consequences, we’re more likely to do it again. That assumption is the basis of operant conditioning, “a type of learning in which the strength of a behavior is modified by [its] consequences, such as reward or punishment.” ¹

One of Skinner's most important inventions was the operant conditioning chamber, also known as a "Skinner box," which was used to study the effects of reinforcers on lab animals. The rats in the box had to figure out how to do a task (such as pushing a lever) that would reward them with food. Such an automated system allowed Skinner and thousands of successors to study conditioned behavior in a controlled setting.

What years of studies on reinforcement have revealed is that consistency and timing play important roles in shaping new behaviors. Psychologists argue that the best way for us to learn complex behaviors is via continuous reinforcement, in which the desired behavior is reinforced every time it's performed.

If you want to teach your dog a new trick, for example, it is smart to reward him for every correct response. At the very beginning of the learning curve, your failure to immediately respond to a positive behavior might be misinterpreted as a sign of incorrect behavior from the dog's perspective.

Intermittent reinforcement is reinforcement that is given only some of the times that the desired behavior occurs, and it can be done according to various schedules, some predictable and some not (see "Scheduling Reinforcement," below). Intermittent reinforcement is argued to be the most efficient way to maintain an already learnt behavior. This is due to three reasons.

First, rewarding the behavior takes time away from the behavior's continuation. Paying a worker after each piece is assembled on the assembly line simply does not make sense. Second, intermittent reinforcement is better from an economic perspective. Not only is it cheaper not to reward every instance of a desired behavior, but by making the rewards unpredictable, you trigger excitement and thus get an increase in response without increasing the amount of reinforcement. Intermittent reinforcement is how casinos work; they want people to gamble, but they can't afford to have people win large amounts very often.

Finally, intermittent reinforcement can induce resistance to extinction (stopping the behavior when reinforcement is removed). Consider the example of resistance outlined in the textbook Psychology: Core Concepts:

Imagine two gamblers and two slot machines. One machine inexplicably pays off on every trial and another, a more usual machine, pays on an unpredictable, intermittent schedule. Now, suppose that both devices suddenly stop paying. Which gambler will catch on first? Most of us would probably guess it right:

The one who has been rewarded for each pull of the lever (continuous reinforcement) will quickly notice the change, while the gambler who has won only occasionally (on partial reinforcement) may continue playing unrewarded for a long time.

Scheduling Reinforcement

Intermittent reinforcement can be used on various schedules, each with its own degree of effectiveness and situations to which it can be appropriately applied. Ratio schedules are based on the number of responses (the amount of work done), whereas interval schedules are based on the amount of time spent.

- Fixed-ratio schedules are used when you pay your employees based on the amount of work they do. Fixed-ratio schedules are common in freelancing, where contractors are paid on a piecework basis. Managers like fixed-ratio schedules because the response to reinforcement is usually very high (if you want to get paid, you do the work).
- Variable-ratio schedules are unpredictable because the number of responses between reinforcers varies. Telemarketers, salespeople, and slot machine players are on this schedule because they never know when the next sale or the next big win will occur. Skinner himself demonstrated the power of this schedule by showing that a hungry pigeon would peck a disk 12,000 times an hour while being rewarded

on average for only every 110 pecks. Unsurprisingly, this is the type of reinforcement that normally produces more responses than any other schedule. (Varying the intervals between reinforcers is another way of making reinforcement unpredictable, but if you want people to feel appreciated, this kind of schedule is probably not the one to use.)

- Fixed-interval schedules are the most common type of payment — they reward people for the time spent on a specific task. You might have already guessed that the response rate on this schedule is very low. Even a rat in a Skinner box programmed for a fixed-interval schedule learns that lever presses beyond the required minimum are just a waste of energy. Ironically, the “9-5 job” is a preferred way to reward employees in business.

While the design of scheduling can be a powerful technique for continuing or amplifying a specific behavior, we may still fail to recognize an important aspect of reinforcement — individual preferences for specific rewards.

Experience suggests that survival is propelled by our need for food and water. However, most of us don't live in conditions of extreme scarcity and thus the types of reinforcement appealing to us will differ.

Culture plays an important role in determining effective reinforcers. And what's reinforced shapes culture. Offering tickets to a cricket match might serve as a powerful reward for someone in a country where cricket is a big deal, but would be meaningless to most Americans. Similarly, an air-conditioned office might be a powerful incentive for employees in Indonesia, but won't matter as much to employees in a more temperate area.

What About Punishment?

So far we've talked about positive reinforcement — the carrot, if you will. However, there is also a stick.

There is no doubt that our society relies heavily on threat and punishment as a way to keep ourselves in line. Still, we keep arriving late, forgetting birthdays, and receiving parking fines, even though we know there is the potential to be punished.

There are several reasons that punishment might not be the best way to alter someone's behavior.

First of all, Skinner observed that the power of punishment to suppress behavior usually disappears when the threat of punishment is removed. Indeed, we all refrain from using social networks during work hours, when we know our boss is around, and we similarly adhere to the speed limit when we know we are being watched by a police patrol.

Second, punishment often triggers a fight-or-flight response and renders us aggressive. When punished, we seek to flee from further punishment, and when the escape is blocked, we may become aggressive. This punishment-aggression link may also explain why abusing parents come from abusing families themselves.

Third, punishment inhibits the ability to learn new and better responses. Punishment leads to a variety of responses — such as escape, aggression, and learned helplessness — none of which aid in the subject's learning process. Punishment also fails to show subjects what exactly they must do and instead focuses on what not to do. This is why environments that forgive failure are so important in the learning process.

Finally, punishment is often applied unequally. We are ruled by bias in our assessment of who deserves to be punished. We scold boys more often than girls, physically punish grade-schoolers more often than adults, and control members of racial minorities more often (and more harshly) than whites.

What Should I Do Instead?

There are three alternatives that you can try the next time you feel tempted to punish someone.

The first we already touched upon — extinction. A response will usually diminish or disappear if it ceases to produce the rewards it once did. However, it is important that all possible reinforcements are withheld. This is far more difficult to do in real life than in a lab setting.

What makes it especially difficult is that during the extinction process, organisms tend to look for novel techniques to obtain reinforcement. This means that a whining child will either redouble her efforts or change tactics to regain the parent's attention before ceasing the behavior. In this case, a better extinction strategy is to combine methods by withholding attention after whining occurs and rewarding more desirable behaviors with attention before the whining occurs.

The second alternative is positively reinforcing preferred activities. For example, people who exercise regularly (and enjoy it) might use a daily run as a reward for getting other tasks done. Similarly, young children learn to sit still by being rewarded with occasional permission to run around and make noise. The main principle of this idea is that a preferred activity, such as running around, can be used to reinforce a less preferred activity. This idea is also called the Premack principle.

Finally, prompting and shaping are two actions we can use together to change behavior in an iterative manner. A prompt is a cue or stimulus that encourages the desired behavior. When shaping begins, any approximation of the target response is reinforced. Once you see the approximation occurring regularly, you can make the criterion for the target more strict (the actual behavior has to match the desired behavior more closely), and you continue narrowing the criteria until the specific target behavior is performed. This tactic is often the preferred method of developing a habit gradually and of training animals to perform a specific behavior.

I hope that you are now better equipped to recognize incentives as powerful forces shaping the way we and others behave. The next time you wish someone would change the way they behave, think about changing their incentives.

Like any parent, I experiment with my kids all the time. One of the most effective things I do when one of them has misbehaved is to acknowledge my child's feelings and ask him what he was trying to achieve.

When one kid hits the other, for example, I ask him what he was trying to accomplish.

Usually, the response is "He hit me. (So I hit him back.)" I know this touches on an automatic human response that many adults can't control. Which makes me wonder how I can change my kids' behavior to be more effective.

"So, you were angry and you wanted him to know?"

"Yes."

"People are not for hitting. If you want, I'll help you go tell him why you're angry."

Tensions dissipate. And I'm (hopefully) starting to get my kids thinking about effective and ineffective ways to achieve their goals.

[quote]Punishment works best to prevent actions whereas incentives work best to encourage them.[/quote]

Let's end with an excellent piece of advice that has been given regarding incentives. Here is Charlie Munger, speaking at the University South California commencement:

You do not want to be in a perverse incentive system that's causing you to behave more and more foolishly or worse and worse — incentives are too powerful a control over human cognition or human behavior. If you're in one [of these systems], I don't have a solution for you. You'll have to figure it out for yourself, but it's a significant problem.

118. The Fairness Principle: How the Veil of Ignorance Helps Test Fairness

The Basics

If you could redesign society from scratch, what would it look like?

How would you distribute wealth and power?

Would you make everyone equal or not? How would you define fairness and equality?

And — here's the kicker — what if you had to make those decisions without knowing who you would be in this new society?

“But the nature of man is sufficiently revealed for him to know something of himself and sufficiently veiled to leave much impenetrable darkness, a darkness in which he ever gropes, forever in vain, trying to understand himself.”

— Alexis de Tocqueville, *Democracy in America*

Philosopher John Rawls asked just that in a thought experiment known as “the Veil of Ignorance” in his 1971 book, *Theory of Justice*.

Like many thought experiments, the Veil of Ignorance could never be carried out in the literal sense, nor should it be. Its purpose is to explore ideas about justice, morality, equality, and social status in a structured manner.

The Veil of Ignorance, a component of social contract theory, allows us to test ideas for fairness.

Behind the Veil of Ignorance, no one knows who they are. They lack clues as to their class, their privileges, their disadvantages, or even their personality. They exist as an impartial group, tasked with designing a new society with its own conception of justice.

As a thought experiment, the Veil of Ignorance is powerful because our usual opinions regarding what is just and unjust are informed by our own experiences. We are shaped by our race, gender, class, education, appearance, sexuality, career, family, and so on. On the other side of the Veil of Ignorance, none of that exists. Technically, the resulting society should be a fair one.

In *Ethical School Leadership*, Spencer J. Maxcy writes:

Imagine that you have set for yourself the task of developing a totally new social contract for today's society. How could you do so fairly? Although you could never actually eliminate all of your personal biases and prejudices, you would need to take steps at least to minimize them. Rawls suggests that you imagine yourself in an original position behind a veil of ignorance. Behind this veil, you know nothing of yourself and your natural abilities, or your position in society. You know nothing of your sex, race, nationality, or individual tastes. Behind such a veil of ignorance all individuals are simply specified as rational, free, and morally equal beings. You do know that in the “real world,” however, there will be a wide variety in the natural distribution of natural assets and abilities, and that there will be differences of sex, race, and culture that will distinguish groups of people from each other. “The Fairness Principle: When contemplating a moral action, imagine that you do not know if you will be the moral doer or receiver, and when in doubt err on the side of the other person.”

— Michael Shermer, *The Moral Arc: How Science and Reason Lead Humanity Toward Truth, Justice, and Freedom*

The Purpose of the Veil of Ignorance

Because people behind the Veil of Ignorance do not know who they will be in this new society, any choice they make in structuring that society could either harm them or benefit them.

If they decide men will be superior, for example, they must face the risk that they will be women. If they decide that 10% of the population will be slaves to the others, they cannot be surprised if they find themselves to be slaves. No one wants to be part of a disadvantaged group, so the logical belief is that the Veil of Ignorance would produce a fair, egalitarian society.

Behind the Veil of Ignorance, cognitive biases melt away. The hypothetical people are rational thinkers. They use probabilistic thinking to assess the likelihood of their being affected by any chosen measure. They possess no opinions for which to seek confirmation. Nor do they have any recently learned information to pay undue attention to. The sole incentive they are biased towards is their own self-preservation, which is equivalent to the preservation of the entire group. They cannot stereotype any particular group as they could be members of it. They lack commitment to their prior selves as they do not know who they are.

So, what would these people decide on? According to Rawls, in a fair society all individuals must possess the following:

- Rights and liberties (including the right to vote, the right to hold public office, free speech, free thought, and fair legal treatment)
- Power and opportunities
- Income and wealth sufficient for a good quality of life (Not everyone needs to be rich, but everyone must have enough money to live a comfortable life.)
- The conditions necessary for self-respect

For these conditions to occur, the people behind the Veil of Ignorance must figure out how to achieve what Rawls regards as the two key components of justice:

- Everyone must have the best possible life which does not cause harm to others.
- Everyone must be able to improve their position, and any inequalities must be present solely if they benefit everyone.

However, the people behind the Veil of Ignorance cannot be completely blank slates or it would be impossible for them to make rational decisions. They understand general principles of science, psychology, politics, and economics. Human behavior is no mystery to them. Neither are key economic concepts, such as comparative advantage and supply and demand. Likewise, they comprehend the deleterious impact of social entropy, and they have a desire to create a stable, ordered society. Knowledge of human psychology leads them to be cognizant of the universal desire for happiness and fulfillment. Rawls considered all of this to be the minimum viable knowledge for rational decision-making.

Ways of Understanding the Veil of Ignorance

One way to understand the Veil of Ignorance is to imagine that you are tasked with cutting up a pizza to share with friends. You will be the last person to take a slice. Being of sound mind, you want to get the largest possible share, and the only way to ensure this is to make all the slices the same size. You could cut one huge slice for yourself and a few tiny ones for your friends, but one of them might take the large slice and leave you with a meager share. (Not to mention, your friends won't think very highly of you.)

Another means of appreciating the implications of the Veil of Ignorance is by considering the social structures of certain species of ants. Even though queen ants are able to form colonies alone, they will band together to form stronger, more productive colonies. Once the first group of worker ants reaches maturity, the queens fight to the death until one remains. When they first form a colony, the queen ants are behind a Veil of Ignorance. They do not know if they will be the sole survivor or not. All they know, on an

instinctual level, is that cooperation is beneficial for their species. Like the people behind the Veil of Ignorance, the ants make a decision which, by necessity, is selfless.

The Veil of Ignorance, as a thought experiment, shows us that ignorance is not always detrimental to a society. In some situations, it can create robust social structures. In the animal kingdom, we see many examples of creatures that cooperate even though they do not know if they will suffer or benefit as a result. In a paper entitled "The Many Selves of Social Insects," Queller and Strassmann write of bees:

...social insect colonies are so tightly integrated that they seem to function as single organisms, as a new level of self. The honeybees' celebrated dance about food location is just one instance of how their colonies integrate and act on information that no single individual possesses. Their unity of purpose is underscored by the heroism of workers, whose suicidal stinging attacks protect the single reproducing queen.

We can also consider the Tragedy of the Commons. Introduced by ecologist Garrett Hardin, this mental model states that shared resources will be exploited if no system for fair distribution is implemented. Individuals have no incentive to leave a share of free resources for others. Hardin's classic example is an area of land which everyone in a village is free to use for their cattle. Each person wants to maximize the usefulness of the land, so they put more and more cattle out to graze. Yet the land is finite and at some point will become too depleted to support livestock. If the people behind the Veil of Ignorance had to choose how the common land should be shared, the logical decision would be to give each person an equal part and forbid them from introducing too many cattle.

As N. Gregory Mankiw writes in Principles of Microeconomics:

The Tragedy of the Commons is a story with a general lesson: when one person uses a common resource, he diminishes other people's enjoyment of it. Because of this negative externality, common resources tend to be used excessively. The government can solve the problem by reducing use of the common resource through regulation or taxes. Alternatively, the government can sometimes turn the common resource into a private good.

This lesson has been known for thousands of years. The ancient Greek philosopher Aristotle pointed out the problem with common resources: "What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others."

In The Case for Meritocracy, Michael Faust uses other thought experiments to support the Veil of Ignorance:

Let's imagine another version of the thought experiment. If inheritance is so inherently wonderful — such an intrinsic good — then let's collect together all of the inheritable money in the world. We shall now distribute this money in exactly the same way it would be distributed in today's world... but with one radical difference. We are going to distribute it by lottery rather than by family inheritance, i.e., anyone in the world can receive it. So, in these circumstances, how many people who support inheritance would go on supporting it? Note that the government wouldn't be getting the money... just lucky strangers. Would the advocates of inheritance remain as fiercely committed to their cherished principle? Or would the entire concept instantly be exposed for the nonsense it is?

If inheritance were treated as the lottery it is, no one would stand by it.

[...]

In the world of the 1% versus the 99%, no one in the 1% would ever accept a lottery to decide inheritance because there would be a 99% chance they would end up as schmucks, exactly like the rest of us.

And a further surrealistic thought experiment:

Imagine that on a certain day of the year, each person in the world randomly swaps bodies with another person, living anywhere on earth. Well, for the 1%, there's a 99% chance that they will be swapped from heaven to hell. For the 99%, 1% might be swapped from hell to

heaven, while the other 98% will stay the same as before. What kind of constitution would the human race adopt if annual body swapping were a compulsory event?! They would of course choose a fair one.

"In the immutability of their surroundings the foreign shores, the foreign faces, the changing immensity of life, glide past, veiled not by a sense of mystery but by a slightly disdainful ignorance."

— Joseph Conrad, *Heart of Darkness*

The History of Social Contract Theory

Although the Veil of Ignorance was first described by Rawls in 1971, many other philosophers and writers have discussed similar concepts in the past. Philosophers discussed social contract theory as far back as ancient Greece.

In *Crito*, Plato describes a conversation in which Socrates discusses the laws of Athens and how they are responsible for his existence. Finding himself in prison and facing the death penalty, Socrates rejects Crito's suggestion that he should escape. He states that further injustice is not an appropriate response to prior injustice. Crito believes that by refusing to escape, Socrates is aiding his enemies, as well as failing to fulfil his role as a father. But Socrates views the laws of Athens as a single entity that has always protected him. He describes breaking any of the laws as being like injuring a parent. Having lived a long, fulfilling life as a result of the social contract he entered at birth, he has no interest in now turning away from Athenian law. Accepting death is essentially a symbolic act that Socrates intends to use to illustrate rationality and reason to his followers. If he were to escape, he would be acting out of accord with the rest of his life, during which he was always concerned with justice.

Social contract theory is concerned with the laws and norms a society decides on and the obligation individuals have to follow them. Socrates' dialogue with Plato has similarities with the final scene of Arthur Miller's *The Crucible*. At the end of the play, John Proctor is hung for witchcraft despite having the option to confess and avoid death. In continuing to follow the social contract of Salem and not confessing to a crime he obviously did not commit, Proctor believes that his death will redeem his earlier mistakes. We see this in the final dialogue between Reverend Hale and Elizabeth (Proctor's wife):

HALE: Woman, plead with him! [...] Woman! It is pride, it is vanity. [...] Be his helper! What profit him to bleed? Shall the dust praise him? Shall the worms declare his truth? Go to him, take his shame away!

ELIZABETH: [...] He have his goodness now. God forbid I take it from him!

In these two situations, individuals allow themselves to be put to death in the interest of following the social contract they agreed upon by living in their respective societies. Earlier in their lives, neither person knew what their ultimate fate would be. They were essentially behind the Veil of Ignorance when they chose (consciously or unconsciously) to follow the laws enforced by the people around them. Just as the people behind the Veil of Ignorance must accept whatever roles they receive in the new society, Socrates and Proctor followed social contracts. To modern eyes, the decision both men make to abandon their children in the interest of proving a point is not easily defensible.

Immanuel Kant wrote about justice and freedom in the late 1700s. Kant believed that fair laws should not be based on making people happy or reflecting the desire of individual policymakers, but should be based on universal moral principles:

Is it not of the utmost necessity to construct a pure moral philosophy which is completely freed from everything that may be only empirical and thus belong to anthropology? That there must be such a philosophy is self-evident from the common idea of duty and moral laws. Everyone must admit that a law, if it is to hold morally, i.e., as a ground of obligation,

must imply absolute necessity; he must admit that the command, "Then shalt not lie," does not apply to men only, as if other rational beings had no need to observe it. The same is true for all other moral laws properly so called. He must concede that the ground of obligation here must not be sought in the nature of man or in the circumstances in which he is placed, but sought *a priori* solely in the concepts of pure reason, and that every other precept which is in certain respects universal, so far as it leans in the least on empirical grounds (perhaps only in regard to the motive involved), may be called a practical rule but never a moral law.

How We Can Apply This Concept

We can use the Veil of Ignorance to test whether a certain issue is fair.

When my kids are fighting over the last cookie, which happens more often than you'd imagine, I ask them to determine who will spilt the cookie. The other person picks. This is the old playground rule, "you split, I pick." Without this rule, one of them would surely give the other a smaller portion. With it, the halves are as equal as they would be with sensible adults.

When considering whether we should endorse a proposed law or policy, we can ask: if I did not know if this would affect me or not, would I still support it? Those who make big decisions that shape the lives of large numbers of people are almost always those in positions of power. And those in positions of power are almost always members of privileged groups. As Benjamin Franklin once wrote: "Justice will not be served until those who are unaffected are as outraged as those who are."

Laws allowing or prohibiting abortion have typically been made by men, for example. As the issue lacks real significance in their personal lives, they are free to base decisions on their own ideological views, rather than consider what is fair and sane. However, behind the Veil of Ignorance, no one knows their sex. Anyone deciding on abortion laws would have to face the possibility that they themselves will end up as a woman with an unwanted pregnancy.

In *Justice as Fairness: A Restatement*, Rawls writes:

So what better alternative is there than an agreement between citizens themselves reached under conditions that are fair for all?

[...]

[T]hreats of force and coercion, deception and fraud, and so on must be ruled out.

And:

Deep religious and moral conflicts characterize the subjective circumstances of justice.

Those engaged in these conflicts are surely not in general self-interested, but rather, see themselves as defending their basic rights and liberties which secure their legitimate and fundamental interests. Moreover, these conflicts can be the most intractable and deeply divisive, often more so than social and economic ones.

In *Ethics: Studying the Art of Moral Appraisal*, Ronnie Littlejohn explains:

We must have a mechanism by which we can eliminate the arbitrariness and bias of our "situation in life" and insure that our moral standards are justified by the one thing all people share in common: reason. It is the function of the veil of ignorance to remove such bias.

When we have to make decisions that will affect other people, especially disadvantaged groups (such as when a politician decides to cut benefits or a CEO decides to outsource manufacturing to a low-income country), we can use the Veil of Ignorance as a tool for making fair choices.

As Robert F. Kennedy (the younger brother of John F. Kennedy) said in the 1960s:

Few will have the greatness to bend history itself, but each of us can work to change a small portion of events. It is from numberless diverse acts of courage and belief that human history is shaped. Each time a man stands up for an ideal, or acts to improve the

lot of others, or strikes out against injustice, he sends forth a tiny ripple of hope, and crossing each other from a million different centers of energy and daring, those ripples build a current which can sweep down the mightiest walls of oppression and resistance. When we choose to position ourselves behind the Veil of Ignorance, we have a better chance of creating one of those all-important ripples.

119. Power Laws: How Nonlinear Relationships Amplify Results

“The greatest shortcoming of the human race is our inability to understand the exponential function.”

— Albert Allen Bartlett

Defining A Power Law

Consider a person who begins weightlifting for the first time.

During their initial sessions, they can lift only a small amount of weight. But as they invest more time, they find that for each training session, their strength increases a surprising amount.

For a while, they make huge improvements. Eventually, however, their progress slows down. At first, they could increase their strength by as much as 10% per session; now it takes months to improve by even 1%. Perhaps they resort to taking performance-enhancing drugs or training more often. Their motivation is sapped, and they find themselves getting injured, without any real change in the amount of weight they can lift. Now, let's imagine that our frustrated weightlifter decides to take up running instead. Something similar happens. While the first few runs are incredibly difficult, the person's endurance increases rapidly with the passing of each week, until it levels off and diminishing returns set in again.

Both of these situations are examples of *power laws* — a relationship between two things in which a change in one thing can lead to a large change in the other, regardless of the initial quantities. In both of our examples, a small investment of time at the beginning of the endeavor leads to a large increase in performance.

Power laws are interesting because they reveal surprising correlations between disparate factors. As a mental model, power laws are versatile, with numerous applications in different fields of knowledge.

If parts of this post look intimidating to non-mathematicians, bear with us. Understanding the math behind power laws is worthwhile to grasp their many applications. Invest a little time in reading this and reap the value — which is in itself an example of a power-law!

A power law is often represented by an equation with an exponent:

$$Y=MX^B$$

Each letter represents a number. Y is a function (the result); X is the variable (the thing you can change); B is the order of scaling (the exponent), and M is a constant (unchanging).

If M is equal to 1, the equation is then $Y=X^B$. If $B=2$, the equation becomes $Y=X^2$ ($Y=X$ squared). If X is 1, Y is also 1. But if $X=2$, then $Y=4$; if $X=3$, then $Y=9$, and so on. A small change in the value of X leads to a proportionally large change in the value of Y.

$B=1$ is known as the linear scaling law.

To double a cake recipe, you need twice as much flour. To drive twice as far will take twice as long. (Unless you have kids, in which case you need to factor in bathroom breaks that seemingly have little to do with distance.) Linear relationships, in which twice-as-big requires twice-as-much, are simple and intuitive.

Nonlinear relationships are more complicated. In these cases, you don't need twice as much of the original value to get twice the increase in some measurable characteristic. For example, an animal that's twice our size requires only about 75% more food than we do. This means that on a per-unit-of-size basis, larger animals are more energy-efficient than smaller ones. As animals get bigger, the energy required to support each unit decreases. One of the characteristics of a complex system is that the behavior of the system differs from the simple addition of its parts. This characteristic is called emergent behavior. “In many instances,” write Geoffrey West in *Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organisms, Cities, Economies, and Companies*, “the

whole seems to take on a life of its own, almost dissociated from the specific characteristics of its individual building blocks.”

This collective outcome, in which a system manifests significantly different characteristics from those resulting from simply adding up all of the contributions of its individual constituent parts, is called an emergent behavior.

When we set out to understand a complex system, our intuition tells us to break it down into its component pieces. But that’s *linear* thinking, and it explains why so much of our thinking about complexity falls short. Small changes in a complex system can cause sudden and large changes. Small changes cause cascades among the connected parts, like knocking over the first domino in a long row.

Let’s return to the example of our hypothetical weightlifter-turned-runner. As they put in more time on the road, constraints will naturally arise on their progress.

Recall our exponential equation: $Y=MX^B$. Try applying it to the runner. (We’re going to simplify running, but stick with it.)

Y is the distance the runner can run before becoming exhausted. That’s what we’re trying to calculate. M, the constant, represents their running ability: some combination of their natural endowment and their training history. (Think of it this way: Olympic champion Usain Bolt has a high M; film director Woody Allen has a low M.)

That leaves us with the final term: X^B . The variable X represents the thing we have control over: in this case, our training mileage. If B, the exponent, is between 0 and 1, then the relationship between X and Y— between training mileage and endurance — becomes progressively less proportional. All it takes is plugging in a few numbers to see the effect. Let’s set M to 1 for the sake of simplicity. If $B=0.5$ and $X=4$, then $Y=2$. Four miles on the road gives the athlete the ability to run two miles at a clip.

Increase X to 16, and Y increases only to 4. The runner has to put in four times the road mileage to merely double their running endurance.

Here’s the kicker: With both running and weightlifting, as we increase X, *we’re likely to see the exponent, B, decline!* Quadrupling our training mileage from 16 to 64 miles is unlikely to double our endurance again. It might take a 10x increase in mileage to do that.

Eventually, the ratio of training mileage to endurance will become nearly infinite.

We know this state, of course, as diminishing returns: the point where more input yields progressively less output. Not only is the relationship between training mileage and endurance not linear to begin with, but it also gets *less* linear as we increase our training.

And what about negative exponents?

It gets even more interesting. If $B=-0.5$ and $X=4$, then $Y=0.5$. Four miles on the road gets us a half-mile of endurance. If X is increased to 16, Y declines to 0.25. More training, *less* endurance! This is akin to someone putting in way too much mileage, way too soon: the training is less than useful as injuries pile up.

With negative numbers, the more X increases, the more Y *shrinks*. This relationship is known as an *inverse* power law. $B=-2$, for example, is known as the *inverse square law* and is an important equation in physics.

The relationship between gravity and distance follows an inverse power law. G is the gravitational constant; it’s the constant in Newton’s law of gravitation, relating gravity to the masses and separation of particles, equal to:

$$6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$$

Any force radiating from a single point — including heat, light intensity, and magnetic and electrical forces — follows the inverse square law. At 1m away from a fire, 4 times as much heat is felt as at 2m, and so on.

Higher-Order Power Laws

When B is a positive integer (a whole number larger than zero), there are names for the power laws.

When B is equal to 1, we have a linear relationship, as we discussed above. This is also known as a first-order power law.

Things really get interesting after that.

When B is 2, we have a second-order power law. A great example of this is kinetic energy.

Kinetic energy = $\frac{1}{2} mv^2$

When B is 3, we have a third-order power law. An example of this is the power converted from the wind into rotational energy.

Power Available = $\frac{1}{2} (\text{Air Density}) (\pi r^2) (\text{Windspeed}^3) (\text{Power Coefficient})$

(There is a natural limit here. Albert Betz concluded in 1919 that wind turbines cannot convert more than 59.3% of the kinetic energy of the wind into mechanical energy. This number is called the Betz Limit and represents the power coefficient above.)[1]

The law of heat radiation is a fourth-order power law. Derived first by the Austrian physicist Josef Stefan in 1879 and separately by Austrian physicist Ludwig Boltzmann, the law works like this: the radiant heat energy emitted from a unit area in one second is equal to the constant of proportionality (the Stefan-Boltzmann constant) times the absolute temperature to the fourth power.[2]

There is only one power-law with a variable exponent, and it's considered to be one of the most powerful forces in the universe. It's also the most misunderstood. We call it compounding. The formula looks like this:

Future Value = $(\text{Present Value})(1+i)^n$

where i is the interest rate, and n is the number of years.

Unlike in the other equations, the relationship between X and Y is potentially limitless. As long as B is positive, Y will increase as X does.

Non-integer power laws (where B is a fraction, as with our running example above) are also of great use to physicists. Formulas in which $B=0.5$ are common.

Imagine a car driving at a certain speed. A non-integer power law applies. V is the speed of the car, P is the petrol burnt per second to reach that speed, and A is the air resistance. For the car to go twice as fast, it must use 4 times as much petrol, and to go 3 times as fast, it must use 9 times as much petrol. Air resistance increases as speed increases, and that is why faster cars use such ridiculous amounts of petrol. It might seem logical to think that a car going from 40 miles an hour to 50 miles an hour would use a quarter more fuel. That is incorrect, though, because the relationship between air resistance and speed is itself a power law.

Another instance of a power law is the area of a square. Double the length of two parallel sides and the area quadruples. Do the same for a 3D cube, and the area increases by a factor of eight. It doesn't matter if the length of the square went from 1cm to 2cm, or from 100m to 200m; the area still quadruples. We are all familiar with second-order (or square) power laws. This name comes from squares since the relationship between length and area reflects the way second-order power laws change a number. Third-order (or cubic) power laws are likewise named due to their relationship to cubes.

Using Power Laws in Our Lives

Now that we've gotten through the complicated part let's take a look at how power laws crop up in many fields of knowledge. Most careers involve an understanding of them, even if it might not be so obvious.

"What's the most powerful force in the universe? Compound interest. It builds on itself. Over time, a small amount of money becomes a large amount of money. Persistence is similar. A little bit improves performance, which encourages greater persistence, which improves persistence even more. And on and on it goes."

— Daniel H. Pink, *The Adventures of Johnny Bunko*
The Power Behind Compounding

Compounding is one of our most important mental models and is absolutely vital to understand for investing, personal development, learning, and other crucial areas of life. In economics, we calculate compound interest by using an equation with these variables: P is the original sum of money. P' is the resulting sum of money, r is the annual interest rate, n is the compounding frequency, and t is the length of time. Using an equation, we can illustrate the power of compounding.

If a person deposits \$1000 in a bank for five years, at a quarterly interest rate of 4%, the equation becomes this:

Future Value = Present Value * ((1 + Quarterly Interest Rate) ^ Number of Quarters)

This formula can be used to calculate how much money will be in the account after five years. The answer is \$2,220.20.

Compound interest is a power law because the relationship between the amount of time a sum of money is left in an account and the amount accumulated at the end is non-linear.

In *A Random Walk Down Wall Street*, Burton Malkiel gives the example of two brothers, William and James. Beginning at age 20 and stopping at age 40, William invests \$4,000 per year. Meanwhile, James invests the same amount per year between the ages of 40 and 65. By the time William is 65, he has invested less money than his brother but has allowed it to compound for 25 years. As a result, when both brothers retire, William has 600% more money than James — a gap of \$2 million. One of the smartest financial choices we can make is to start saving as early as possible: by harnessing power laws, we increase the exponent as much as possible.

Compound interest can help us achieve financial freedom and wealth, without the need for a large annual income. Members of the financial independence movement (such as the blogger Mr. Money Mustache) are living examples of how we can apply power laws to our lives.

As far back as the 1800s, Robert G. Ingersoll emphasized the importance of compound interest:

One dollar at compound interest, at twenty-four per cent., for one hundred years, would produce a sum equal to our national debt. Interest eats night and day, and the more it eats the hungrier it grows. The farmer in debt, lying awake at night, can, if he listens, hear it gnaw. If he owes nothing, he can hear his corn grow. Get out of debt as soon as possible. You have supported idle avarice and lazy economy long enough.

Compounding can apply to areas beyond finance — personal development, health, learning, relationships, and more. For each area, a small input can lead to large output, and the results build upon themselves.

Nonlinear Language Learning

When we learn a new language, it's always a good idea to start by learning the 100 or so most used words.

In all known languages, a small percentage of words make up the majority of usage. This is known as Zipf's law, after George Kingsley Zipf, who first identified the phenomenon.

The most used word in a language may make up as much as 7% of all words used, while the second-most-used word is used half as much, and so on. As few as 135 words can together form half of a language (as used by native speakers).

Why Zipf's law holds true is unknown, although the concept is logical. Many languages include a large number of specialist terms that are rarely needed (including legal or anatomy terms). A small change in the frequency ranking of a word means a huge change in its usefulness.

Understanding Zipf's law is a central component of accelerated language learning. Each new word we learn from the most common 100 words will have a huge impact on our ability to communicate. As we learn less-common words, diminishing returns set in. If each word in a language were listed in order of frequency of usage, the further we moved down the list, the less useful a word would be.

Power Laws in Business, Explained by Peter Thiel

Peter Thiel, the founder of PayPal (as well as an early investor in Facebook and Palantir), considers power laws to be a crucial concept for all businesspeople to understand. In his fantastic book, *Zero to One*, Thiel writes:

Indeed, the single most powerful pattern I have noticed is that successful people find value in unexpected places, and they do this by thinking about business from first principles instead of formulas.

And:

In 1906, economist Vilfredo Pareto discovered what became the “Pareto Principle,” or the 80-20 rule, when he noticed that 20% of the people owned 80% of the land in Italy—a phenomenon that he found just as natural as the fact that 20% of the peapods in his garden produced 80% of the peas. This extraordinarily stark pattern, when a small few radically outstrip all rivals, surrounds us everywhere in the natural and social world. The most destructive earthquakes are many times more powerful than all smaller earthquakes combined. The biggest cities dwarf all mere towns put together. And monopoly businesses capture more value than millions of undifferentiated competitors. Whatever Einstein did or didn’t say, the power law—so named because exponential equations describe severely unequal distributions—is the law of the universe. It defines our surroundings so completely that we usually don’t even see it.

... [I]n venture capital, where investors try to profit from exponential growth in early-stage companies, a few companies attain exponentially greater value than all others. ... [W]e don’t live in a normal world; we live under a power law.

... The biggest secret in venture capital is that the best investment in a successful fund equals or outperforms the entire rest of the fund combined.

This implies two very strange rules for VCs. First, only invest in companies that have the potential to return the value of the entire fund. ... This leads to rule number two: because rule number one is so restrictive, there can’t be any other rules.

...[L]ife is not a portfolio: not for a startup founder, and not for any individual. An entrepreneur cannot “diversify” herself; you cannot run dozens of companies at the same time and then hope that one of them works out well. Less obvious but just as important, an individual cannot diversify his own life by keeping dozens of equally possible careers in ready reserve.

Thiel teaches a class called Startup at Stanford, where he hammers home the value of understanding power laws. In his class, he imparts copious wisdom. From Blake Masters’ notes on Class 7:

Consider a prototypical successful venture fund. A number of investments go to zero over a period of time. Those tend to happen earlier rather than later. The investments that succeed do so on some sort of exponential curve. Sum it over the life of a portfolio and you get a J curve. Early investments fail. You have to pay management fees. But then the exponential growth takes place, at least in theory. Since you start out underwater, the big question is when you make it above the water line. A lot of funds never get there.

To answer that big question you have to ask another: what does the distribution of returns in [a] venture fund look like? The naïve response is just to rank companies from best to worst according to their return in multiple of dollars invested. People tend to group investments into three buckets. The bad companies go to zero. The mediocre ones do maybe 1x, so you don’t lose much or gain much. And then the great companies do maybe 3-10x.

But that model misses the key insight that actual returns are incredibly skewed. The more a VC understands this skew pattern, the better the VC. Bad VCs tend to think the dashed line is flat, i.e. that all companies are created equal, and some just fail, spin wheels, or grow. In reality you get a power law distribution.

Thiel explains how investors can apply the mental model of power laws (more from Masters' notes on Class 7):

...Given a big power law distribution, you want to be fairly concentrated. ... There just aren't that many businesses that you can have the requisite high degree of conviction about. A better model is to invest in maybe 7 or 8 promising companies from which you think you can get a 10x return. ...

Despite being rooted in middle school math, exponential thinking is hard. We live in a world where we normally don't experience anything exponentially. Our general life experience is pretty linear. We vastly underestimate exponential things.

He also cautions against over-relying on power laws as a strategy (an assertion that should be kept in mind for all mental models). From Masters' notes:

One shouldn't be mechanical about this heuristic, or treat it as some immutable investment strategy. But it actually checks out pretty well, so at the very least it compels you to think about power law distribution.

Understanding exponents and power law distributions isn't just about understanding VC. There are important personal applications too. Many things, such as key life decisions or starting businesses, also result in similar distributions.

Thiel then explains why founders should focus on one key revenue stream, rather than trying to build multiple equal ones:

Even within an individual business, there is probably a sort of power law as to what's going to drive it. It's troubling if a startup insists that it's going to make money in many different ways. The power law distribution on revenues says that one source of revenue will dominate everything else.

For example, if you're an entrepreneur who opens a coffee shop, you'll have a lot of ways you can make money. You can sell coffee, cakes, paintings, merchandise, and more. But each of those things will not contribute to your success in an equal way. While there is value in the discovery process, once you've found the variable that matters most, you should place more time on that one and less on the others. The importance of finding this variable cannot be overstated.

He also acknowledges that power laws are one of the great secrets of investing success. From Masters' notes on Class 11:

On one level, the anti-competition, power law, and distribution secrets are all secrets about nature. But they're also secrets hidden by people. That is crucial to remember. Suppose you're doing an experiment in a lab. You're trying to figure out a natural secret. But every night another person comes into the lab and messes with your results. You won't understand what's going on if you confine your thinking to the nature side of things. It's not enough to find an interesting experiment and try to do it. You have to understand the human piece too.

... We know that, per the power law secret, companies are not evenly distributed. The distribution tends to be bimodal; there are some great ones, and then there are a lot of ones that don't really work at all. But understanding this isn't enough. There is a big difference between understanding the power law secret in theory and being able to apply it in practice.

The key to all mental models is knowing the facts and being able to use the concept. As George Box said, "all models are false but some are useful." Once we grasp the basics, the best next step is to start figuring out how to apply it.

The metaphor of an unseen person sabotaging laboratory results is an excellent metaphor for how cognitive biases and shortcuts cloud our judgment.

Natural Power Laws

Anyone who has kept a lot of pets will have noticed the link between an animal's size and its lifespan. Small animals, like mice and hamsters, tend to live for a year or two. Larger

ones, like dogs and cats, can live to 10-20 years, or even older in rare cases. Scaling up, even more, some whales can live for 200 years. This comes down to power laws. Biologists have found clear links between an animal's size and its metabolism. Kleiber's law (identified by Max Kleiber) states that an animal's metabolic rate increases at three-fourths of the power of the animal's weight (mass). If an average rabbit (2 kg) weighs one hundred times as much as an average mouse (20g), the rabbit's metabolic rate will be 32 times the mouse's. In other words, the rabbit's structure is more efficient. It all comes down to the geometry behind their mass.

This leads us to another biological power law: Smaller animals require more energy per gram of body weight, meaning that mice eat around half their body weight in dense foods each day. The reason is that, in terms of the percentage of mass, larger animals have more structure (bones, etc.) and fewer reserves (fat stores).

Research has illustrated how power laws apply to blood circulation in animals. The end units through which oxygen, water, and nutrients enter cells from the bloodstream are the same size in all animals. Only the number per animal varies. The relationship between the total area of these units and the size of the animal is a third-order power law. The distance blood travels to enter cells, and the actual volume of blood is also subject to power laws.

The Law of Diminishing Returns

As we have seen, a small change in one area can lead to a huge change in another. However, past a certain point, diminishing returns set in and more is worse. Working an hour extra per day might mean more gets done, whereas working three extra hours is likely to lead to less getting done due to exhaustion. Going from a sedentary lifestyle to running two days a week may result in greatly improved health, but stepping up to seven days a week will cause injuries. Overzealousness can turn a positive exponent into a negative exponent. For a busy restaurant, hiring an extra chef will mean that more people can be served, but hiring two new chefs might spoil the proverbial broth.

Perhaps the most underappreciated diminishing return, the one we never want to end up on the wrong side of, is the one between money and happiness.

In *David and Goliath*, Malcolm Gladwell discusses how diminishing returns relate to family incomes. Most people assume that the more money they make, the happier they and their families will be. This is true — up to a point. An income that's too low to meet basic needs makes people miserable, leading to far more physical and mental health problems. A person who goes from earning \$30,000 a year to earning \$40,000 is likely to experience a dramatic boost in happiness. However, going from \$100,000 to \$110,000 leads to a negligible change in well-being.

Gladwell writes:

The scholars who research happiness suggest that more money stops making people happier at a family income of around seventy-five thousand dollars a year. After that, what economists call "diminishing marginal returns" sets in. If your family makes seventy-five thousand and your neighbor makes a hundred thousand, that extra twenty-five thousand a year means that your neighbor can drive a nicer car and go out to eat slightly more often. But it doesn't make your neighbor happier than you, or better equipped to do the thousands of small and large things that make for being a good parent.

120. The Code of Hammurabi: The Best Rule To Manage Risk

Almost 4,000 years ago, King Hammurabi of Babylon, Mesopotamia, laid out one of the first sets of laws.

Hammurabi's Code is among the oldest translatable writings. It consists of 282 laws, most concerning punishment. Each law takes into account the perpetrator's status. The code also includes the earliest known construction laws, designed to align the incentives of builder and occupant to ensure that builders created safe homes:

- 229. *If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the death of the owner of the house, that builder shall be put to death.*
- 230. *If it causes the death of the son of the owner of the house, they shall put to death a son of that builder.*
- 231. *If it causes the death of a slave of the owner of the house, he shall give to the owner of the house a slave of equal value.*
- 232. *If it destroys property, he shall restore whatever it destroyed, and because he did not make the house which he builds firm and it collapsed, he shall rebuild the house which collapsed at his own expense.*
- 233. *If a builder builds a house for a man and does not make its construction meet the requirements and a wall falls in, that builder shall strengthen the wall at his own expense.*

Hammurabi became ruler of Babylon in 1792 BC and held the position for 43 years. In the era of city-states, Hammurabi grew his modest kingdom (somewhere between 60 and 160 square kilometers) by conquering several neighboring states. Satisfied, then, with the size of the area he controlled, Hammurabi settled down to rule his people.

"This world of ours appears to be separated by a slight and precarious margin of safety from a most singular and unexpected danger."

— Arthur Conan Doyle

Hammurabi was a fair leader (from the little we know about him) and concerned with the well-being of his people. He transformed the area, ordering the construction of irrigation ditches to improve agricultural productivity, as well as supplying cities with protective walls and fortresses. Hammurabi also renovated temples and religious sites.

By today's standards, Hammurabi was a dictator. Far from abusing his power, however, he considered himself the "shepherd" of his people. Although the Babylonians kept slaves, they too had rights. Slaves could marry other people of any status, start businesses, and purchase their freedom, and they were protected from mistreatment.

At first glance, it might seem as if we have little to learn from Hammurabi. I mean, why bother learning about the ancient Babylonians? They were just barbaric farmers, right? It seems we're not as different as it appears. Our modern beliefs are not separate from those of people in Hammurabi's time; they are a continuation of them. Early legal codes are the ancestors of the ones we now put our faith in.

Whether a country is a dictatorship or democracy, one of the keys to any effective legal system is the ability for anyone to understand its laws. We're showing cracks in ours and we can learn from the simplicity of Hammurabi's Code, which concerned itself with practical justice and not lofty principles. To even call it a set of laws is misleading. The ancient Babylonians did not appear to have an equivalent term.

Three important concepts are implicit in Hammurabi's Code: reciprocity, accountability, and incentives.

We have no figures for how often Babylonian houses fell down before and after the implementation of the Code. We have no idea how many (if any) people were put to death as a result of failing to adhere to Hammurabi's construction laws. But we do know that human self-preservation instincts are strong. More than strong, they underlie most of our behavior. Wanting to avoid death is the most powerful incentive we have. If we assume that people felt and thought the same way 4000 years ago, we can guess at the impact of the Code.

Imagine yourself as a Babylonian builder. Each time you construct a house, there is a risk it will collapse if you make any mistakes. So, what do you do? You allow for the widest possible margin of safety. You plan for any potential risks. You don't cut corners or try to save a little bit of money. No matter what, you are not going to allow any known flaws in the construction. It wouldn't be worth it. You want to walk away certain that the house is solid.

Now contrast that with modern engineers or builders.

They don't have much skin in the game. The worst they face if they cause a death is a fine. We saw this in Hurricane Katrina — 1600 people died due to flooding caused in part by the poor design of hurricane protection systems in New Orleans. Hindsight analysis showed that the city's floodwalls, levees, pumps, and gates were ill designed and maintained. The death toll was worse than it would otherwise have been. And yet, no one was held accountable.

Hurricane Katrina is regarded as a disaster that was part natural and part man-made. In recent months, in the Grenfell Tower fire in London, we saw the effects of negligent construction. At least 80 people died in a blaze that is believed to have started accidentally but that, according to expert analysis, was accelerated by the conscious use of cheap building materials that had failed safety tests.

The portions of Hammurabi's Code that deal with construction laws, as brutal as they are (and as uncertain as we are of their short-term effects) illustrate an important concept: margins of safety. When we construct a system, ensuring that it can handle the expected pressures is insufficient.

A Babylonian builder would not have been content to make a house that was strong enough to handle just the anticipated stressors. A single Black Swan event — such as abnormal weather — could cause its collapse and in turn the builder's own death, so builders had to allow for a generous margin of safety. The larger the better. In 59 mph winds, we do not want to be in a house built to withstand 60 mph winds.

But our current financial systems do not incentivize people to create wide margins of safety. Instead, they do the opposite — they encourage dangerous risk-taking.

Nassim Taleb referred to Hammurabi's Code in a *New York Times* opinion piece in which he described a way to prevent bankers from threatening the public well-being. His solution? Stop offering bonuses for the risky behavior of people who will not be the ones paying the price if the outcome is bad. Taleb wrote:

...it's time for a fundamental reform: Any person who works for a company that, regardless of its current financial health, would require a taxpayer-financed bailout if it failed should not get a bonus, ever. In fact, all pay at systemically important financial institutions — big banks, but also some insurance companies and even huge hedge funds — should be strictly regulated.

The issue, in Taleb's opinion, is not the usual complaint of income inequality or overpay. Instead, he views bonuses as asymmetric incentives. They reward risks but do not punish the subsequent mistakes that cause "hidden risks to accumulate in the financial system and become a catalyst for disaster." It's a case of "heads, I win; tails, you lose."

Bonuses encourage bankers to ignore the potential for Black Swan events, with the 2008 financial crisis being a prime (or rather, subprime) example. Rather than ignoring these events, banks should seek to minimize the harm caused.

Some career fields have a strict system of incentives and disincentives, both official and unofficial. Doctors get promotions and respect if they do their jobs well, and risk heavy penalties for medical malpractice. With the exception of experiments in which patients are fully informed of and consent to the risks, doctors don't get a free pass for taking risks that cause harm to patients.

The same goes for military and security personnel. As Taleb wrote, "we trust the military and homeland security personnel with our lives, yet we don't give them lavish bonuses. They get promotions and the honor of a job well done if they succeed, and the severe disincentive of shame if they fail."

Hammurabi and his advisors were unconcerned with complex laws and legalese. Instead, they wanted the Code to produce results and to be understandable by everyone. And Hammurabi understood how incentives work — a lesson we'd be well served to learn. When you align incentives of everyone in both positive and negative ways, you create a system that takes care of itself. Taleb describes Law 229 of Hammurabi's Code as "the best risk-management rule ever." Although barbaric to modern eyes, it took into account certain truisms. Builders typically know more about construction than their clients do and can take shortcuts in ways that aren't obvious. After completing construction, a builder can walk away with a little extra profit, while the hapless client is unknowingly left with an unsafe house.

The little extra profit that builders can generate is analogous to the bonus system in some of today's industries. It rewards those who take unwise risks, trick their customers, and harm other people for their own benefit. Hammurabi's system had the opposite effect; it united the interests of the person getting paid and the person paying. Rather than the builder being motivated to earn as much profit as possible and the homeowner being motivated to get a safe house, they both shared the latter goal.

The Code illustrates the efficacy of using self-preservation as an incentive. We feel safer in airplanes that are flown by a person and not by a machine because, in part, we believe that pilots want to protect their own lives along with ours.

When we lack an incentive to protect ourselves, we are far more likely to risk the safety of other people. This is why bankers are willing to harm their customers if it means the bankers get substantial bonuses. This is why companies that market harmful products, such as fast food and tobacco, are content to play down the risks. Or why the British initiative to reduce the population of Indian cobras by compensating those who caught the snakes had the opposite effect. Or why Wells Fargo employees opened millions of fake accounts to reach sales targets.

Incentives backfire when there are no negative consequences for those who exploit them. External incentives are based on extrinsic motivation, which easily goes awry.

When we have real skin in the game—when we have upsides and downsides—we care about outcomes in a way that we wouldn't otherwise. We act in a different way. We take our time. We use second-order thinking and inversion. We look for evidence or a way to disprove it.

Four thousand years ago, the Babylonians understood the power of incentives, yet we seem to have since forgotten about the flaws in human nature that make it difficult to resist temptation.

121. Complexity Bias: Why We Prefer Complicated to Simple

Complexity bias is a logical fallacy that leads us to give undue credence to complex concepts.

Faced with two competing hypotheses, we are likely to choose the most complex one. That's usually the option with the most assumptions and regressions. As a result, when we need to solve a problem, we may ignore simple solutions — thinking “that will never work” — and instead favor complex ones.

To understand complexity bias, we need first to establish the meaning of three key terms associated with it: complexity, simplicity, and chaos.

The Cambridge Dictionary defines complexity as “the state of having many parts and being difficult to understand or find an answer to.” The definition of simplicity is the inverse: “something [that] is easy to understand or do.” Chaos is defined as “a state of total confusion with no order.”

“Life is really simple, but we insist on making it complicated.”

— Confucius

Complex systems contain individual parts that combine to form a collective that often can't be predicted from its components. Consider humans. We are complex systems. We're made of about 100 trillion cells and yet we are so much more than the aggregation of our cells. You'd never predict what we're like or who we are from looking at our cells.

Complexity bias is our tendency to look at something that is easy to understand, or look at it when we are in a state of confusion, and view it as having many parts that are difficult to understand.

We often find it easier to face a complex problem than a simple one.

A person who feels tired all the time might insist that their doctor check their iron levels while ignoring the fact that they are unambiguously sleep deprived. Someone experiencing financial difficulties may stress over the technicalities of their telephone bill while ignoring the large sums of money they spend on cocktails.

Marketers make frequent use of complexity bias.

They do this by incorporating confusing language or insignificant details into product packaging or sales copy. Most people who buy “ammonia-free” hair dye, or a face cream which “contains peptides,” don't fully understand the claims. Terms like these often mean very little, but we see them and imagine that they signify a product that's superior to alternatives.

How many of you know what probiotics really are and how they interact with gut flora?

Meanwhile, we may also see complexity where only chaos exists. This tendency manifests in many forms, such as conspiracy theories, superstition, folklore, and logical fallacies. The distinction between complexity and chaos is not a semantic one. When we imagine that something chaotic is in fact complex, we are seeing it as having an order and more predictability than is warranted. In fact, there is no real order, and prediction is incredibly difficult at best.

Complexity bias is interesting because the majority of cognitive biases occur in order to save mental energy. For example, confirmation bias enables us to avoid the effort associated with updating our beliefs. We stick to our existing opinions and ignore information that contradicts them. Availability bias is a means of avoiding the effort of considering everything we know about a topic. It may seem like the opposite is true, but complexity bias is, in fact, another cognitive shortcut. By opting for impenetrable solutions, we sidestep the need to understand. Of the fight-or-flight responses, complexity bias is the flight response. It is a means of turning away from a problem or concept and labeling it as too confusing. If you think something is harder than it is, you surrender your responsibility to understand it.

“Most geniuses—especially those who lead others—prosper not by deconstructing intricate complexities but by exploiting unrecognized simplicities.”

— Andy Benoit

Faced with too much information on a particular topic or task, we see it as more complex than it is. Often, understanding the fundamentals will get us most of the way there. Software developers often find that 90% of the code for a project takes about half the allocated time. The remaining 10% takes the other half. Writing — and any other sort of creative work — is much the same. When we succumb to complexity bias, we are focusing too hard on the tricky 10% and ignoring the easy 90%.

Research has revealed our inherent bias towards complexity.

In a 1989 paper entitled “Sensible reasoning in two tasks: Rule discovery and hypothesis evaluation,” Hilary F. Farris and Russell Revlin evaluated the topic. In one study, participants were asked to establish an arithmetic rule. They received a set of three numbers (such as 2, 4, 6) and tried to generate a hypothesis by asking the experimenter if other number sequences conformed to the rule. Farris and Revlin wrote, “This task is analogous to one faced by scientists, with the seed triple functioning as an initiating observation, and the act of generating the triple is equivalent to performing an experiment.” The actual rule was simple: list any three ascending numbers.

The participants could have said anything from “1, 2, 3” to “3, 7, 99” and been correct. It should have been easy for the participants to guess this, but most of them didn’t. Instead, they came up with complex rules for the sequences. (Also see [Falsification of Your Best Loved Ideas](#).)

A [paper](#) by Helena Matute looked at how intermittent reinforcement leads people to see complexity in chaos. Three groups of participants were placed in rooms and told that a loud noise would play from time to time. The volume, length, and pattern of the sound were identical for each group. Group 1 (Control) was told to sit and listen to the noises. Group 2 (Escape) was told that there was a specific action they could take to stop the noises. Group 3 (Yoked) was told the same as Group 2, but in their case, there was actually nothing they could do.

Matute wrote:

Yoked participants received the same pattern and duration of tones that had been produced by their counterparts in the Escape group. The amount of noise received by Yoked and Control subjects depends only on the ability of the Escape subjects to terminate the tones. The critical factor is that Yoked subjects do not have control over reinforcement (noise termination) whereas Escape subjects do, and Control subjects are presumably not affected by this variable.

The result? Not one member of the Yoked group realized that they had no control over the sounds. Many members came to repeat particular patterns of “superstitious” behavior. Indeed, the Yoked and Escape groups had very similar perceptions of task controllability. Faced with randomness, the participants saw complexity.

Does that mean the participants were stupid? Not at all. We all exhibit the same superstitious behavior when we believe we can influence chaotic or simple systems.

Funnily enough, animal studies have revealed much the same. In particular, consider B.F. Skinner’s well-known research on the effects of random rewards on pigeons. Skinner placed hungry pigeons in cages equipped with a random-food-delivery mechanism. Over time, the pigeons came to believe that their behavior affected the food delivery. Skinner described this as a form of superstition. One bird spun in counterclockwise circles. Another butted its head against a corner of the cage. Other birds swung or bobbed their heads in specific ways. Although there is some debate as to whether “superstition” is an appropriate

term to apply to birds, Skinner's research shed light on the human tendency to see things as being more complex than they actually are.

Skinner wrote (in "'Superstition' in the Pigeon," *Journal of Experimental Psychology*, 38): *The bird behaves as if there were a causal relation between its behavior and the presentation of food, although such a relation is lacking. There are many analogies in human behavior. Rituals for changing one's fortune at cards are good examples. A few accidental connections between a ritual and favorable consequences suffice to set up and maintain the behavior in spite of many unreinforced instances. The bowler who has released a ball down the alley but continues to behave as if he were controlling it by twisting and turning his arm and shoulder is another case in point. These behaviors have, of course, no real effect upon one's luck or upon a ball half way down an alley, just as in the present case the food would appear as often if the pigeon did nothing—or, more strictly speaking, did something else.*

The world around us is a chaotic, entropic place. But it is rare for us to see it that way. In *Living with Complexity*, Donald A. Norman offers a perspective on why we need complexity:

We seek rich, satisfying lives, and richness goes along with complexity. Our favorite songs, stories, games, and books are rich, satisfying, and complex. We need complexity even while we crave simplicity... Some complexity is desirable. When things are too simple, they are also viewed as dull and uneventful. Psychologists have demonstrated that people prefer a middle level of complexity: too simple and we are bored, too complex and we are confused. Moreover, the ideal level of complexity is a moving target, because the more expert we become at any subject, the more complexity we prefer. This holds true whether the subject is music or art, detective stories or historical novels, hobbies or movies.

As an example, Norman asks readers to contemplate the complexity we attach to tea and coffee. Most people in most cultures drink tea or coffee each day. Both are simple beverages, made from water and coffee beans or tea leaves. Yet we choose to attach complex rituals to them. Even those of us who would not consider ourselves to be connoisseurs have preferences. Offer to make coffee for a room full of people, and we can be sure that each person will want it made in a different way.

Coffee and tea start off as simple beans or leaves, which must be dried or roasted, ground and infused with water to produce the end result. In principle, it should be easy to make a cup of coffee or tea. Simply let the ground beans or tea leaves [steep] in hot water for a while, then separate the grounds and tea leaves from the brew and drink. But to the coffee or tea connoisseur, the quest for the perfect taste is long-standing. What beans? What tea leaves? What temperature water and for how long? And what is the proper ratio of water to leaves or coffee?

The quest for the perfect coffee or tea maker has been around as long as the drinks themselves. Tea ceremonies are particularly complex, sometimes requiring years of study to master the intricacies. For both tea and coffee, there has been a continuing battle between those who seek convenience and those who seek perfection.

Complexity, in this way, can enhance our enjoyment of a cup of tea or coffee. It's one thing to throw some instant coffee in hot water. It's different to select the perfect beans, grind them ourselves, calculate how much water is required, and use a fancy device. The question of whether this ritual makes the coffee taste better or not is irrelevant. The point is the elaborate surrounding ritual. Once again, we see complexity as superior.

"Simplicity is a great virtue but it requires hard work to achieve it and education to appreciate it. And to make matters worse: complexity sells better."

— Edsger W. Dijkstra
The Problem with Complexity

Imagine a person who sits down one day and plans an elaborate morning routine. Motivated by the routines of famous writers they have read about, they lay out their ideal morning. They decide they will wake up at 5 a.m., meditate for 15 minutes, drink a liter of lemon water while writing in a journal, read 50 pages, and then prepare coffee before planning the rest of their day.

The next day, they launch into this complex routine. They try to keep at it for a while. Maybe they succeed at first, but entropy soon sets in and the routine gets derailed. Sometimes they wake up late and do not have time to read. Their perceived ideal routine has many different moving parts. Their actual behavior ends up being different each day, depending on random factors.

Now imagine that this person is actually a famous writer. A film crew asks to follow them around on a “typical day.” On the day of filming, they get up at 7 a.m., write some ideas, make coffee, cook eggs, read a few news articles, and so on. This is not really a routine; it is just a chaotic morning based on reactive behavior. When the film is posted online, people look at the morning and imagine they are seeing a well-planned routine rather than the randomness of life.

This hypothetical scenario illustrates the issue with complexity: it is unsustainable without effort.

The more individual constituent parts a system has, the greater the chance of its breaking down. Charlie Munger once said that “Where you have complexity, by nature you can have fraud and mistakes.” Any complex system — be it a morning routine, a business, or a military campaign — is difficult to manage. Addressing one of the constituent parts inevitably affects another (see [the Butterfly Effect](#)). Unintended and unexpected consequences are likely to occur.

As Daniel Kahneman and Amos Tversky wrote in 1974 (in [Judgment Under Uncertainty: Heuristics and Biases](#)): “A complex system, such as a nuclear reactor or the human body, will malfunction if any of its essential components fails. Even when the likelihood of failure in each component is slight, the probability of an overall failure can be high if many components are involved.”

This is why complexity is less common than we think. It is unsustainable without constant maintenance, self-organization, or adaptation. Chaos tends to disguise itself as complexity. *“Human beings are pattern-seeking animals. It’s part of our DNA. That’s why conspiracy theories and gods are so popular: we always look for the wider, bigger explanations for things.”*

— Adrian McKinty, *The Cold Cold Ground*
Complexity Bias and Conspiracy Theories

A musician walks barefoot across a zebra-crossing on an album cover. People decide he died in a car crash and was replaced by a lookalike. A politician’s eyes look a bit odd in a blurry photograph. People conclude that he is a blood-sucking reptilian alien taking on a human form. A photograph shows an indistinct shape beneath the water of a Scottish lake. The area floods with tourists hoping to glimpse a surviving prehistoric creature. A new technology overwhelms people. So, they deduce that it is the product of a government mind-control program.

Conspiracy theories are the ultimate symptom of our desire to find complexity in the world. We don’t want to acknowledge that the world is entropic. Disasters happen and chaos is our natural state. The idea that hidden forces animate our lives is an appealing one. It seems rational. But as we know, we are all much less rational and logical than we think. Studies have shown that a high percentage of people believe in some sort of conspiracy. It’s not a fringe concept. According to research by Joseph E. Uscinski and Joseph M. Parent, about one-third of Americans believe the notion that Barack Obama’s birth

certificate is fake. Similar numbers are convinced that 9/11 was an inside job orchestrated by George Bush. Beliefs such as these are present in all types of people, regardless of class, age, gender, race, socioeconomic status, occupation, or education level.

Conspiracy theories are invariably far more complex than reality. Although education does reduce the chances of someone's believing in conspiracy theories, one in five Americans with postgraduate degrees still hold conspiratorial beliefs.

Uscinski and Parent found that, just as uncertainty led Skinner's pigeons to see complexity where only randomness existed, a sense of losing control over the world around us increases the likelihood of our believing in conspiracy theories. Faced with natural disasters and political or economic instability, we are more likely to concoct elaborate explanations. In the face of horrific but chaotic events such as Hurricane Katrina, or the recent Grenfell Tower fire, many people decide that secret institutions are to blame.

Take the example of the "Paul McCartney is dead" conspiracy theory. Since the 1960s, a substantial number of people have believed that McCartney died in a car crash and was replaced by a lookalike, usually said to be a Scottish man named William Campbell. Of course, conspiracy theorists declare, The Beatles wanted their most loyal fans to know this, so they hid clues in songs and on album covers.

The beliefs surrounding the Abbey Road album are particularly illustrative of the desire to spot complexity in randomness and chaos. A police car is parked in the background — an homage to the officers who helped cover up the crash. A car's license plate reads "LMW 28IF" — naturally, a reference to McCartney being 28 if he had lived (although he was 27) and to Linda McCartney (whom he had not met yet). Matters were further complicated once The Beatles heard about the theory and began to intentionally plant "clues" in their music. The song "I'm So Tired" does in fact feature backwards mumbling about McCartney's supposed death. The 1960s were certainly a turbulent time, so is it any wonder that scores of people pored over album art or played records backwards, looking for evidence of a complex hidden conspiracy?

As Henry Louis Gates Jr. wrote, "Conspiracy theories are an irresistible labor-saving device in the face of complexity."

Complexity Bias and Language

We have all, at some point, had a conversation with someone who speaks like philosopher Theodor Adorno wrote: using incessant jargon and technical terms even when simpler synonyms exist and would be perfectly appropriate. We have all heard people say things which we do not understand, but which we do not question for fear of sounding stupid.

Jargon is an example of how complexity bias affects our communication and language usage. When we use jargon, especially out of context, we are putting up unnecessary semantic barriers that reduce the chances of someone's challenging or refuting us.

In an article for *The Guardian*, James Gingell describes his work translating scientific jargon into plain, understandable English:

It's quite simple really. The first step is getting rid of the technical language. Whenever I start work on refining a rough-hewn chunk of raw science into something more pleasant I use David Dobbs' (rather violent) aphorism as a guiding principle: "Hunt down jargon like a mercenary possessed, and kill it." I eviscerate acronyms and euthanise decrepit Latin and Greek. I expunge the esoteric. I trim and clip and pare and hack and burn until only the barest, most easily understood elements remain.

[...]

Jargon...can be useful for people as a shortcut to communicating complex concepts. But it's intrinsically limited: it only works when all parties involved know the code. That may be an obvious point but it's worth emphasising — to communicate an idea to a broad, non-specialist audience, it doesn't matter how good you are at embroidering your prose with evocative imagery and clever analogies, the jargon simply must go."

Gingell writes that even the most intelligent scientists struggle to differentiate between thinking (and speaking and writing) like a scientist, and thinking like a person with minimal scientific knowledge.

Unnecessarily complex language is not just annoying. It's outright harmful. The use of jargon in areas such as politics and economics does real harm. People without the requisite knowledge to understand it feel alienated and removed from important conversations. It leads people to believe that they are not intelligent enough to understand politics, or not educated enough to comprehend economics. When a politician talks of fiscal charters or rolling four-quarter growth measurements in a public statement, they are sending a crystal clear message to large numbers of people whose lives will be shaped by their decisions: this is not about you.

Complexity bias is a serious issue in politics. For those in the public eye, complex language can be a means of minimizing the criticism of their actions. After all, it is hard to dispute something you don't really understand. Gingell considers jargon to be a threat to democracy:

If we can't fully comprehend the decisions that are made for us and about us by the government then how can we possibly revolt or react in an effective way? Yes, we have a responsibility to educate ourselves more on the big issues, but I also think it's important that politicians and journalists meet us halfway.

[...]

Economics and economic decisions are more important than ever now, too. So we should implore our journalists and politicians to write and speak to us plainly. Our democracy depends on it.

In his essay "Politics and the English Language," George Orwell wrote:

In our time, political speech and writing are largely the defence of the indefensible. ... Thus, political language has to consist largely of euphemism, question-begging and sheer cloudy vagueness. Defenceless villages are bombarded from the air, the inhabitants driven out into the countryside, the cattle machine-gunned, the huts set on fire with incendiary bullets: this is called pacification. Millions of peasants are robbed of their farms and sent trudging along the roads with no more than they can carry: this is called transfer of population or rectification of frontiers. People are imprisoned for years without trial, or shot in the back of the neck or sent to die of scurvy in Arctic lumber camps: this is called elimination of unreliable elements.

An example of the problems with jargon is the Sokal affair. In 1996, Alan Sokal (a physics professor) submitted a fabricated scientific paper entitled "Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity." The paper had absolutely no relation to reality and argued that quantum gravity is a social and linguistic construct. Even so, the paper was published in a respected journal. Sokal's paper consisted of convoluted, essentially meaningless claims, such as this paragraph:

Secondly, the postmodern sciences deconstruct and transcend the Cartesian metaphysical distinctions between humankind and Nature, observer and observed, Subject and Object. Already quantum mechanics, earlier in this century, shattered the ingenious Newtonian faith in an objective, pre-linguistic world of material objects "out there"; no longer could we ask, as Heisenberg put it, whether "particles exist in space and time objectively."

(If you're wondering why no one called him out, or more specifically why we have a bias to not call BS out, check out pluralistic ignorance).

Jargon does have its place. In specific contexts, it is absolutely vital. But in everyday communication, its use is a sign that we wish to appear complex and therefore more intelligent. Great thinkers throughout the ages have stressed the crucial importance of using simple language to convey complex ideas. Many of the ancient thinkers whose work we still reference today — people like Plato, Marcus Aurelius, Seneca, and Buddha —

were known for their straightforward communication and their ability to convey great wisdom in a few words.

“Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius — and a lot of courage — to move in the opposite direction.”

— Ernst F. Schumacher

How Can We Overcome Complexity Bias?

The most effective tool we have for overcoming complexity bias is Occam's razor. Also known as the principle of parsimony, this is a problem-solving principle used to eliminate improbable options in a given situation. Occam's razor suggests that the simplest solution or explanation is usually the correct one. When we don't have enough empirical evidence to disprove a hypothesis, we should avoid making unfounded assumptions or adding unnecessary complexity so we can make quick decisions or establish truths.

An important point to note is that Occam's razor does not state that the simplest hypothesis is the correct one, but states rather that it is the best option before the establishment of empirical evidence. It is also useful in situations where empirical data is difficult or impossible to collect. While complexity bias leads us towards intricate explanations and concepts, Occam's razor can help us to trim away assumptions and look for foundational concepts.

Returning to Skinner's pigeons, had they known of Occam's razor, they would have realized that there were two main possibilities:

- Their behavior affects the food delivery.

Or:

- Their behavior is irrelevant because the food delivery is random or on a timed schedule.

Using Occam's razor, the head-bobbing, circles-turning pigeons would have realized that the first hypothesis involves numerous assumptions, including:

- There is a particular behavior they must enact to receive food.
- The delivery mechanism can somehow sense when they enact this behavior.
- The required behavior is different from behaviors that would normally give them access to food.
- The delivery mechanism is consistent.

And so on. Occam's razor would dictate that because the second hypothesis is the simplest, involving the fewest assumptions, it is most likely the correct one.

So many geniuses, are really good at eliminating unnecessary complexity. Einstein, for instance, was a master at sifting the essential from the non-essential. Steve Jobs was the same.

122. Sifting the Essential from the Non-Essential

The most essential skill we've never been taught is learning what to ignore.

The person who can focus their attention on what matters goes further than the person who can't.

When we don't know what to ignore, everything assumes equal importance. Time is wasted on things that don't move us forward.

You can focus your time on the non-essential or the essential, but not both. All the time you spend on the non-essentials comes at the expense of the essentials.

Knowing what to ignore allows you to focus your time on what matters. Of course, this is harder than it seems.

Let me tell you a story about Albert Einstein.

A lot of people think Einstein's greatest ability was his mathematical mind. It wasn't.

Granted it's probably better than yours or mine, but most people in the know consider his mathematical gifts average at best.

How does someone with average mathematical gifts rise to the top?

He had another skill. A skill most people don't even think about.

Einstein's greatest skill was keeping things simple by knowing what mattered and what didn't. When everyone else was lost in complexity, he could keep things simple. He knew what to ignore.

In his short biographical memoir on Einstein, John Wheeler points out that Einstein didn't understand more complicated things than others; he appreciated the value of simplicity more than others.

Many a man in the street thinks of Einstein as a man who could only make headway in his work by dint of pages of complicated mathematics; the truth is the direct opposite. As Hilbert put it, "Every boy in the streets of our mathematical Gottingen understands more about four-dimensional geometry than Einstein. Yet, despite that, Einstein did the work and not the mathematicians." Time and again, in the photoelectric effect, in relativity, in gravitation, the amateur grasped the simple point that had eluded the expert.

While it's tempting to think that Einstein was born with this skill, that would be a lie. He intentionally developed it as an adult.

"I soon learned," Einstein wrote, "to scent out what was able to lead to fundamentals and to turn aside from everything else, from the multitude of things that clutter up the mind."

Where did Einstein acquire this ability to sift the essential from the non-essential?

In the view of many, the position of clerk of the Swiss patent office was no proper job at all, but it was the best job available to anyone with (Einstein's) unpromising university record.

He served in the Bern office for seven years, from June 23, 1902 to July 6, 1909. Every morning he faced his quota of patent applications. Those were the days when a patent application had to be accompanied by a working model. Over and above the applications and the models was the boss, a kind man, a strict man, a wise man. He gave strict instructions: explain very briefly, if possible in a single sentence, why the device will work or why it won't; why the application should be granted or why it should be denied.

Day after day Einstein had to distill the central lesson out of objects of the greatest variety that man has power to invent. Who knows a more marvelous way to acquire a sense of what physics is and how it works? It is no wonder that Einstein always delighted in the machinery of the physical world—from the action of a compass needle to the meandering of a river, and from the perversities of a gyroscope to the drive of Flettner's rotor ship.

Who else but a patent clerk could have discovered the theory of relativity? "Who else,"

Wheeler writes, "could have distilled this simple central point from all the clutter of electromagnetism than someone whose job it was over and over to extract simplicity out of complexity."

We have a passion for keeping things simple.

Charlie Munger

Most of us don't know what to ignore. Because of that, we try to consume more information, thinking it will help us. If you find yourself searching for more information and you're not quite sure what you're looking for, it's a strong indication you don't understand the problem. If you understood the problem, you'd know what information to hone in on. When all information is valued equally, irrelevant information is over-valued, and relevant information is under-valued.

The best in the world have an uncanny ability to focus on the few variables that matter and ignore the rest.

What can I take away from this article?

Most information is irrelevant. Most of our time spent chasing it is wasted. Knowing what to ignore saves us from wasting time, and it helps us spend more time on the things that matter. The more time we spend on what matters, the better the results we get.

Developing the skills of sifting the essential from the non-essential is within our grasp. Try these five things:

1. Focus on understanding basic, timeless, general principles of the world and use them to help filter people, ideas, and projects;
2. Take time to think about what we're doing by writing it out;
3. Keep it simple. There is a natural entropy to life that nudges us towards complexity. Remove everything inessential;
4. Think backwards about what we want to avoid;
5. Think long and hard about the voices and information you let into your mind. Think about who you follow on social media. Think about the books you read. The newsletter you subscribe to.

123. Poker, Speeding Tickets, and Expected Value: Making Decisions in an Uncertain World

You can train your brain to think like CEOs, professional poker players, investors, and others who make tricky decisions in an uncertain world by weighing probabilities.

All decisions involve potential tradeoffs and opportunity costs. The question is, how can we make the best possible choices when the factors involved are often so complicated and confusing? How can we determine which statistics and metrics are worth paying attention to? How do we think about averages?

Expected value is one of the simplest tools you can use to think better. While not a natural way of thinking for most people, it instantly turns the world into shades of grey by forcing us to weigh probabilities and outcomes. Once we've mastered it, our decisions become supercharged. We know which risks to take, when to quit projects, and when to go all in.

"Take the probability of loss times the amount of possible loss from the probability of gain times the amount of possible gain. That is what we're trying to do. It's imperfect but that's what it's all about."

— Warren Buffett

Expected value refers to the long-run average of a random variable.

If you flip a fair coin ten times, the heads-to-tails ratio will probably not be exactly equal. If you flip it one hundred times, the ratio will be closer to 50:50, though again not exactly. But for a huge number of iterations, you can expect heads to come up half the time and tails the other half. The law of large numbers dictates that the values will, in the long term, regress to the mean, even if the first few flips seem unequal.

The more coin flips, the closer you get to the 50:50 ratio. If you bet a sum of money on a coin flip, the potential winnings on a fair coin have to be bigger than your potential loss to make the expected value positive.

We make many expected-value calculations without even realizing it. If we decide to stay up late and have a few drinks on a Tuesday, we regard the expected value of an enjoyable evening as higher than the expected costs the following day. If we decide to always leave early for appointments, we weigh the expected value of being on time against the frequent instances when we arrive early. When we take on work, we view the expected value in terms of income and other career benefits as higher than the cost in terms of time and/or sanity.

Likewise, anyone who reads a lot knows that most books they choose will have minimal impact on them, while a few books will change their lives and be of tremendous value.

Looking at the required time and money as an investment, books have a positive expected value (provided we choose them with care and make use of the lessons they teach).

These decisions might seem obvious. But the math behind them would be somewhat complicated if we tried to sit down and calculate it. Who pulls out a calculator before deciding whether to open a bottle of wine (certainly not me) or walk into a bookstore?

The factors involved are impossible to quantify in a non-subjective manner – like trying to explain how to catch a baseball. We just have a feel for them. This expected-value analysis is unconscious – something to consider if you have ever labeled yourself as “bad at math.”

Parking Tickets

Another example of the expected value is parking tickets. Let's say that a parking spot costs \$5, and the fine for not paying is \$10. If you can expect to be caught one-third of the time, why pay for parking? The expected value of doing so is negative. It's a disincentive. You can park without paying three times and pay only \$10 in fines, instead of paying \$15 for three parking spots. But if the fine is \$100, the probability of getting caught would have to be higher than one in twenty for it to be worthwhile. This is why fines tend to seem

excessive. They cover the people who are not caught while giving an incentive for everyone to pay.

Consider speeding tickets. Here, the expected value can be more abstract, encompassing different factors. If speeding on the way to work saves 15 minutes, then a monthly \$100 fine might seem worthwhile to some people. For most of us, though, a weekly fine would mean that speeding has a negative expected value. Add in other disincentives (such as the loss of your driver's license), and speeding is not worth it. So the calculation is not just financial; it takes into account other tradeoffs as well.

The same goes for free samples and trial periods on subscription services. Many companies (such as Graze, Blue Apron, and Amazon Prime) offer generous free trials. How can they afford to do this? Again, it comes down to expected value. The companies know how much the free trials cost them. They also know the probability of someone paying afterward and the lifetime value of a customer. Basic math reveals why free trials are profitable. Say that a free trial costs the company \$10 per person, and one in ten people then sign up for the paid service, going on to generate \$150 in profits. The expected value is positive. If only one in twenty people sign up, the company needs to find a cheaper free trial or scrap it.

Similarly, expected value applies to services that offer a free "lite" version (such as Buffer and Spotify). Doing so costs them a small amount or even nothing. Yet it increases the chance of someone's deciding to pay for the premium version. For the expected value to be positive, the combined cost of the people who never upgrade needs to be lower than the profit from the people who do pay.

Lottery tickets prove useless when viewed through the lens of expected value. If a ticket costs \$1 and there is a possibility of winning \$500,000, it might seem as if the expected value of the ticket is positive. But it is almost always negative. If one million people purchase a ticket, the expected value is \$0.50. That difference is the profit that lottery companies make. Only on sporadic occasions is the expected value positive, even though the probability of winning remains minuscule.

Failing to understand expected value is a common logical fallacy. Getting a grasp of it can help us to overcome many limitations and cognitive biases.

"Constantly thinking in expected value terms requires discipline and is somewhat unnatural. But the leading thinkers and practitioners from somewhat varied fields have converged on the same formula: focus not on the frequency of correctness, but on the magnitude of correctness."

— Michael Mauboussin

Expected Value and Poker

Let's look at poker. How do professional poker players manage to win large sums of money and hold impressive track records? Well, we can be certain that the answer isn't all luck, although there is some of that involved.

Professional players rely on mathematical mental models that create order among random variables. Although these models are basic, it takes extensive experience to create the *fingerspitzengefühl* ("fingertips feeling," or instinct) necessary to use them.

A player needs to make correct calculations every minute of a game with an automaton-like mindset. Emotions and distractions can corrupt the accuracy of raw math.

In a game of poker, the expected value is the average return on each dollar invested in the pot. Each time a player makes a bet or call, they are taking into account the probability of making more money than they invest. If a player is risking \$100, with a 1 in 5 probability of success, the pot must contain at least \$500 for the bet to be safe. The expected value per call is at least equal to the amount the player stands to lose. If the pot contains \$300 and

the probability is 1 in 5, the expected value is negative. The idea is that even if this tactic is unsuccessful at times, in the long run, the player will profit.

Expected-value analysis gives players a clear idea of probabilistic payoffs. Successful poker players can win millions one week, then make nothing or lose money the next, depending on the probability of winning. Even the best possible hands can lose due to simple probability. With each move, players also need to use Bayesian updating to adapt their calculations, because sticking with a prior figure could prove disastrous. Casinos make their fortunes from people who bet on situations with a negative expected value.

Expected Value and the Ludic Fallacy

In *The Black Swan*, Nassim Taleb explains the difference between everyday randomness and randomness in the context of a game or casino. Taleb coined the term “ludic fallacy” to refer to “the misuse of games to model real-life situations.” (Or, as the website logicallyfallacious.com puts it: the assumption that flawless statistical models apply to situations where they don’t actually apply.)

In Taleb’s words, gambling is “*sterilized* and domesticated uncertainty. In the casino, you know the rules, you can calculate the odds... ‘The casino is the only human venture I know where the probabilities are known, Gaussian (i.e., bell-curve), and almost computable.’ You cannot expect the casino to pay out a million times your bet, or to change the rules abruptly during the game....”

Games like poker have a defined, calculable expected value. That’s because we know the outcomes, the cards, and the math. Most decisions are more complicated. If you decide to bet \$100 that it will rain tomorrow, the expected value of the wager is incalculable. The factors involved are too numerous and complex to compute. Relevant factors do exist; you are more likely to win the bet if you live in England than if you live in the Sahara, for example. But that doesn’t rule out Black Swan events, nor does it give you the neat probabilities which exist in games. In short, there is a key distinction between Knightian risks, which are computable because we have enough information to calculate the odds, and Knightian uncertainty, which is non-computable because we don’t have enough information to calculate odds accurately. (This distinction between risk and uncertainty is based on the writings of economist Frank Knight.) Poker falls into the former category. Real-life is in the latter. If we take the concept literally and only plan for the expected, we will run into some serious problems.

As Taleb writes in *Fooled By Randomness*:

Probability is not a mere computation of odds on the dice or more complicated variants; it is the acceptance of the lack of certainty in our knowledge and the development of methods for dealing with our ignorance. Outside of textbooks and casinos, probability almost never presents itself as a mathematical problem or a brain teaser. Mother nature does not tell you how many holes there are on the roulette table, nor does she deliver problems in a textbook way (in the real world one has to guess the problem more than the solution).

The Monte Carlo Fallacy

Even in the domesticated environment of a casino, probabilistic thinking can go awry if the principle of expected value is forgotten. This famously occurred in Monte Carlo Casino in 1913. A group of gamblers lost millions when the roulette table landed on black 26 times in a row. The probability of this occurring is no more or less likely than the other 67,108,863 possible permutations, but the people present kept thinking, “It has to be red next time.” They saw the likelihood of the wheel landing on red as higher each time it landed on black. In hindsight, what sense does that make? A roulette wheel does not remember the color it landed on last time. The likelihood of either outcome is exactly 50% with each spin, regardless of the previous iteration. So the potential winnings for each spin need to be at least twice the bet a player makes, or the expected value is negative.

“A lot of people start out with a 400-horsepower motor but only get 100 horsepower of output. It’s way better to have a 200-horsepower motor and get it all into output.”

— Warren Buffett

Given all the casinos and roulette tables in the world, the Monte Carlo incident had to happen at some point. Perhaps some day a roulette wheel will land on red 26 times in a row and the incident will repeat. The gamblers involved did not consider the negative expected value of each bet they made. We know this mistake as the Monte Carlo fallacy (or the “gambler’s fallacy” or “the fallacy of the maturity of chances”) – the assumption that prior independent outcomes influence future outcomes that are actually also independent. In other words, people assume that “a random process becomes less random and more predictable as it is repeated”¹.

It’s a common error. People who play the lottery for years without success think that their chance of winning rises with each ticket, but the expected value is unchanged between iterations. Amos Tversky and Daniel Kahneman consider this kind of thinking a component of the representativeness heuristic, stating that the more we believe we control random events, the more likely we are to succumb to the Monte Carlo fallacy.

Magnitude over Frequency

Steven Crist, in his book *Bet with the Best*, offers an example of how an expected-value mindset can be applied. Consider a hypothetical race with four horses. If you’re trying to maximize return on investment, you might want to avoid the horse with a high likelihood of winning. Crist writes,

*The point of this exercise is to illustrate that even a horse with a very high likelihood of winning can be either a very good or a very bad bet, and that the difference between the two is determined by only one thing: the odds.”*²

Everything comes down to payoffs. A horse with a 50% chance of winning might be a good bet, but it depends on the payoff. The same holds for a 100-to-1 longshot. It’s not the frequency of winning but the magnitude of the win that matters.

Error Rates, Averages, and Variability

When Bill Gates walks into a room with 20 people, the average wealth per person in the room quickly goes beyond a billion dollars. It doesn’t matter if the 20 people are wealthy or not; Gates’s wealth is off the charts and distorts the results.

An old joke tells of the man who drowns in a river which is, on average, three feet deep. If you’re deciding to cross a river and can’t swim, the range of depths matters a heck of a lot more than the average depth.

The Use of Expected Value: How to Make Decisions in an Uncertain World

Thinking in terms of expected value requires discipline and practice. And yet, the top performers in almost any field think in terms of probabilities. While this isn’t natural for most of us, once you implement the discipline of the process, you’ll see the quality of your thinking and decisions improve.

In poker, players can predict the likelihood of a particular outcome. In the vast majority of cases, we cannot predict the future with anything approaching accuracy. So what use is the expected value outside gambling? It turns out, quite a lot. Recognizing how expected value works puts any of us at an advantage. We can mentally leap through various scenarios and understand how they affect outcomes.

Expected value takes into account wild deviations. Averages are useful, but they have limits, as the man who tried to cross the river discovered. When making predictions about the future, we need to consider the range of outcomes. The greater the possible variance from the average, the more our decisions should account for a wider range of outcomes.

There’s a saying in the design world: when you design for the average, you design for no one. Large deviations can mean more risk—which is not always a bad thing. So expected-

value calculations take into account the deviations. If we can make decisions with a positive expected value and the lowest possible risk, we are open to large benefits. Investors use expected value to make decisions. Choices with a positive expected value and minimal risk of losing money are wise. Even if some losses occur, the net gain should be positive over time. In investing, unlike in poker, the potential losses and gains cannot be calculated in exact terms. Expected-value analysis reveals opportunities that people who just use probabilistic thinking often miss. A trade with a low probability of success can still carry a high expected value. That's why it is crucial to have a large number of robust mental models. As useful as probabilistic thinking can be, it has far more utility when combined with expected value.

Understanding expected value is also an effective way to overcome the sunk costs fallacy. Many of our decisions are based on non-recoverable past investments of time, money, or resources. These investments are irrelevant; we can't recover them, so we shouldn't factor them into new decisions. Sunk costs push us toward situations with a negative expected value. For example, consider a company that has invested considerable time and money in the development of a new product. As the launch date nears, they receive irrefutable evidence that the product will be a failure. Perhaps research shows that customers are disinterested, or a competitor launches a similar, better product. The sunk costs fallacy would lead them to release their product anyway. Even if they take a loss. Even if it damages their reputation. After all, why waste the money they spent developing the product? Here's why: Because the product has a negative expected value, which will only worsen their losses. An escalation of commitment will only increase sunk costs.

When we try to justify a prior expense, calculating the expected value can prevent us from worsening the situation. The sunk costs fallacy robs us of our most precious resource: time. Each day we are faced with the choice between continuing and quitting numerous endeavors. Expected-value analysis reveals where we should continue, and where we should cut our losses and move on to a better use of time and resources. It's an efficient way to work smarter, and not engage in unnecessary projects.

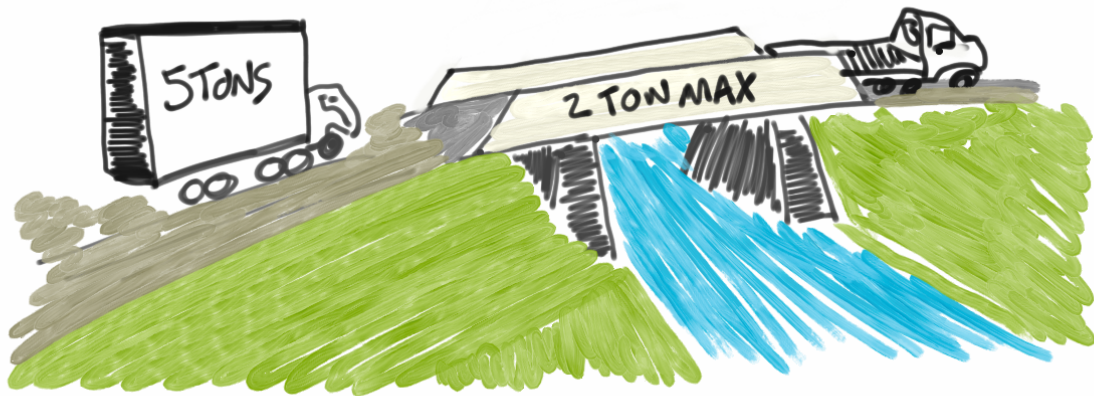
Thinking in terms of expected value will make you feel awkward when you first try it. That's the hardest thing about it; you need to practice it a while before it becomes second nature. Once you get the hang of it, you'll see that it's valuable in almost every decision. That's why the most rational people in the world constantly think about expected value. They've uncovered the key insight that the magnitude of correctness matters more than its frequency. And yet, human nature is such that we're happier when we're frequently right.

124. Making the Most of Second Chances

We all get lucky. Once in a while we do something really stupid that could have resulted in death, but didn't. Just the other day, I saw someone who was texting walk out into oncoming traffic, narrowly avoiding the car whose driver slammed on the brakes. As the adrenaline starts to dissipate, we realize that we don't ever want to be in that situation again. What can we do? We can make the most of our second chances by building margins of safety into our lives.

What is a margin of safety and where can I get one?

The concept is a cornerstone of engineering. Engineers design systems to withstand significantly more emergencies, unexpected loads, misuse, or degradation than would normally be expected.



Take a bridge. You are designing a bridge to cross just under two hundred feet of river. The bridge has two lanes going in each direction. Given the average car size, the bridge could reasonably carry 50 to 60 cars at a time. At 4,000 pounds per car, your bridge needs to be able to carry at least 240,000 pounds of weight; otherwise, don't bother building it. So that's the minimum consideration for safety — but only the worst engineer would stop there.

Can anyone walk across your bridge? Can anyone park their car on the shoulder? What if cars get heavier? What if 20 cement trucks are on the bridge at the same time? How does the climate affect the integrity of your materials over time? You don't want the weight capacity of the bridge to ever come close to the actual load. Otherwise, one seagull decides to land on the railing and the whole structure collapses.

Considering these questions and looking at the possibilities is how you get the right information so you can adjust your specs to build in a margin of safety. That's the difference between what your system is expected to withstand and what it actually could. So when you are designing a bridge, the first step is to figure out the maximum load it should ever see (bumper-to-bumper vehicles, hordes of tourist groups, and birds perched wing to wing), and then you design for at least double that load.

Knowing that the infrastructure was designed to withstand significantly more than the anticipated maximum load makes us happy when we are on bridges, or in airplanes, or jumping on the bed in our second-story bedroom. We feel confident that many smart people have conspired to make these activities as safe as possible. We're so sure of this

that it almost never crosses our minds. Sure, occasional accidents happen. But it is remarkably reassuring that these structures can withstand quite a bit of the unexpected. So how do we make ourselves a little more resilient? Less susceptible to the vagaries of change? Turns out that engineers aren't the only ones obsessed with building in margins of safety. Spies are pretty good at it, too, and we can learn a lot from them.

Operation Kronstadt, by Harry Ferguson, chronicles the remarkable story of Paul Dukes, the only British secret agent working in Russia in 1919, and the equally amazing adventures of the small team that was sent in to rescue him.

Paul Dukes was not an experienced spy. He was actually a pianist. It was his deep love of Russian culture that led to him to approach his government and volunteer for the mission of collecting information on Bolshevik activities in St. Petersburg. As Ferguson writes, "Paul had no military experience, let alone any experience of intelligence work and yet they were going to send him back into one of the toughest espionage environments in the world."

However, MI6, the part of British Intelligence that Paul worked for, wasn't exactly the powerful and well-prepared agency that it's portrayed as today. Consider this description by Ferguson: "having dragged Paul out of Russia, MI6 did not appear to have given much thought to how he should get back or how he would survive once he got there: 'As to the means whereby you gain access to the country, under what cover you will live there, and how you will send out reports, we shall leave it to you, being best informed as to the conditions'."

So off went Paul into Russia, not as a musician but as a spy. No training, no gadgets, no emergency network, no safe houses. Just a bunch of money and sentiments of 'good luck'. So it is all the more amazing that Paul Dukes turned out to be an excellent spy. After reading his story, I think the primary reason for this is that he learned extremely quickly from his experiences. One of the things he learned quickly was how to build margins of safety into his tradecraft.

There is no doubt that the prospect of death wakes us up. We don't often think about how dangerous something can be until we almost die doing it. Then, thanks to our big brains that let us learn from experience, we adapt. We recognize that if we don't, we might not be so lucky next time. And no one wants to rely on luck as a survival strategy.

This is where margins of safety come in. We build them to reduce the precariousness of chance.

Imagine you are in St. Petersburg in 1919. What you have going for you is that you speak the language, understand the culture, and know the streets. Your major problem is that you have no idea how to start this spying thing. How do you get contacts and build a network in a city that is under psychological siege? The few names you have been given come from dubious sources at the border, and the people attached to those names may have been compromised, arrested, or both. You have nowhere to sleep at night, and although you have some money, it can't buy anything, not even food, because there is nothing for sale. The whole country is on rations.

Not to mention, if by some miracle you actually get a few good contacts who give you useful information, how do you get it home? There are no cell phones or satellites. Your passport is fake and won't hold up to any intense scrutiny, yet all your intelligence has to be taken out by hand from a country that has sealed its borders. And it's 1919. You can't hop on a plane or drive a car. Train or foot are your only options.

This is what Paul Dukes faced. Daunting to be sure. Which is why his ultimate success reads like the improbable plot of a Hollywood movie. Although he made mistakes, he learned from them as they were happening.

Consider this tense moment as described by Ferguson:

The doorbell in the flat rang loudly and Paul awoke with a start.

He had slept late. Stepanova had kindly allowed him sleep in one of the spare beds and she had even found him an old pair of Ivan's pyjamas. There were no sheets, but there were plenty of blankets and Paul had been cosy and warm. Now it was 7.45 a.m., and here he was half-asleep and without his clothes. Suppose it was the Cheka [Russian Bolshevik Police] at the door? In a panic he realised that he had no idea what to do. The windows of the apartment were too high for him to jump from and like a fool he had chosen a hiding place with no other exits. ... He was reduced to waiting nervously as he stood in Ivan's pyjamas whilst Stepanova shuffled to the door to find out who it was. As he stood there with his stomach in knots, Paul swore that he would never again sleep in a place from which there was only one exit.

One exit was good enough for normal, anticipated use. But one exit wouldn't allow him to adapt to the unexpected, the unusual load produced by the appearance of the state police. So from then on, his sleeping accommodations were chosen with a minimum margin of safety of two exits.

This type of thinking dictated a lot of his actions. He never stayed at the same house more than two nights in a row, and often moved after just one night. He arranged for the occupants to signal him, such as by placing a plant in the window, if they believed the house was unsafe. He siloed knowledge as much as he could, never letting the occupants of one safe house know about the others. Furthermore, as Ferguson writes:

He also arranged a back-up plan in case the Cheka finally got him. He had to pick one trustworthy agent ... and soon Paul began entrusting her with all the details of his movements and told her at which safe house he would be sleeping so that if he did disappear MI6 would have a better idea of who had betrayed him. He even used her as part of his courier service and she hid all his reports in the float while he was waiting for someone who could take them out of the country.

Admittedly this plan didn't provide a large margin of safety, but at least he wasn't so arrogant as to assume he was never going to get captured.

Large margins of safety are not always possible. Sometimes they are too expensive. Sometimes they are not available. Dukes liked to have an extra identity handy should some of his dubious contacts turn him in, but this wasn't always an option in a country that changed identity papers frequently. Most important, though, he was aware that planning for the unexpected was his best chance of staying alive, even if he couldn't always put in place as large a margin of safety as he would have liked. And survival was a daily challenge, not something to take for granted.

The disaster at the Fukushima nuclear power plant taught us a lot about being cavalier regarding margins of safety. The unexpected is just that: not anticipated. That doesn't mean it is impossible or even improbable. The unexpected is not the worst thing that has happened before. It is the worst thing, given realistic parameters such as the laws of physics, that could happen.

In the Fukushima case, the margin of safety was good enough to deal with the weather of the recent past. But preparing for the worst we have seen is not the same as preparing for the worst.

The Fukushima power plant was overwhelmed by a tsunami, creating a nuclear disaster on par with Chernobyl. Given the seismic activity in the area, although a tsunami wasn't predictable, it was certainly possible. The plant could have been designed with a margin of safety to better withstand a tsunami. It wasn't. Why? Because redundancy is expensive. That's the trade-off. You are safer, but it costs more money.

Sometimes when the stakes are low, we decide the trade-off isn't worth it. For instance, maybe we wouldn't pay to insure a wedding ring that wasn't expensive. You would think, however, that power plants wouldn't cut it close. The consequences of a lost ring are some emotional pain and the cost of a new one. The consequences of a nuclear accident are

exponentially higher. Lives are lost, and the environment corrupted. In the Fukushima case, the world will be dealing with the negative effects for a long time.

What decisions would you make differently if you were factoring safety margins into your life? To be fair, you can't put them everywhere. Otherwise, your life might be all margin and no living. But you can identify the maximum load your life is currently designed to withstand and figure out how close to it you are coming.

For example, having your expenses equal 100 percent of your income is allowing you no flexibility in the load you have to carry. A job loss, a bad flood in your neighborhood, or significant sickness are all unexpected events that would change the load your financial structure has to support. Without a margin of safety, such as a healthy savings or investment account, you could find your structure collapsing, compromising the roof over your head.

The idea is to identify the unlikely but possible risks to your survival and build margins of safety that will allow you to continue your lifestyle should these things come to pass. That way, a missed paycheck will be easily absorbed instead of jeopardizing your ability to put food on the table.

To figure out where else you should build margins of safety into your life, think of the times you've been terrified and desperate. Those might be good places to start learning from experience and making the most of your second chances.

125. Bayes and Deadweight: Using Statistics to Eject the Deadweight From Your Life

"[K]nowledge is indeed highly subjective, but we can quantify it with a bet. The amount we wager shows how much we believe in something."

— Sharon Bertsch McGrayne

The quality of your life will, to a large extent, be decided by whom you elect to spend your time with. Supportive, caring, and funny are great attributes in friends and lovers.

Unceasingly negative cynics who chip away at your self-esteem? We need to jettison those people as far and fast as we can.

The problem is, how do we identify these people who add nothing positive — or not enough positive — to our lives?

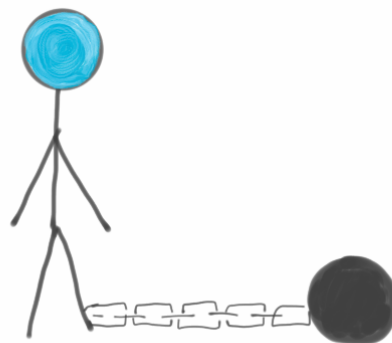
Few of us keep relationships with obvious assholes. There are always a few painfully terrible family members we have to put up with at weddings and funerals, but normally we choose whom we spend time with. And we've chosen these people because, at some point, our interactions with them felt good.

How, then, do we identify the deadweight? The people who are really dragging us down and who have a high probability of continuing to do so in the future? We can apply the general thinking tool called Bayesian Updating.

Bayes's theorem can involve some complicated mathematics, but at its core lies a very simple premise. Probability estimates should start with what we already know about the world and then be incrementally updated as new information becomes available. Bayes can even help us when that information is relevant but subjective.

How? As McGrayne explains in the quote above, from *The Theory That Would Not Die*, you simply ask yourself to wager on the outcome.

Let's take an easy example.



You are going on a blind date. You've been told all sorts of good things in advance — the person is attractive and funny and has a good job — so of course, you are excited. The date starts off great, living up to expectations. Halfway through you find out they have a cat. You hate cats. Given how well everything else is going, how much should this information affect your decision to keep dating?

Quantify your belief in the most probable outcome with a bet. How much would you wager that harmony on the pet issue is an accurate predictor of relationship success? Ten cents? Ten thousand dollars? Do the thought experiment. Imagine walking into a casino and placing a bet on the likelihood that this person's having a cat will ultimately destroy the relationship. How much money would you take out of your savings and lay on the table? Your answer will give you an idea of how much to factor the cat into your decision-making process. If you wouldn't part with a dime, then I wouldn't worry about it.

This kind of approach can help us when it comes to evaluating our interpersonal relationships. Deciding if someone is a good friend, partner, or co-worker is full of subjective judgments. There is usually some contradictory information, and ultimately no one is perfect. So how do you decide who is worth keeping around?

Let's start with friends. The longer a friendship lasts, the more likely it is to have ups and downs. The trick is to start quantifying these. A hit from a change in geographical proximity is radically different from a hit from betrayal — we need to factor these differences into our friendship formula.

This may seem obvious, but the truth is that we often give the same weight to a wide variety of behaviors. We'll say things like "yeah, she talked about my health problems when I asked her not to, but she always remembers my birthday." By treating all aspects of the friendship equally, we have a hard time making reasonable estimates about the future value of that friendship. And that's how we end up with deadweight.

For the friend who has betrayed your confidence, what you really want to know is the likelihood that she's going to do it again. Instead of trying to remember and analyze every interaction you've ever had, just imagine yourself betting on it. Go back to that casino and head to the friendship roulette wheel. Where would you put your money? All in on "She can't keep her mouth shut" or a few chips on "Not likely to happen again"?

Using a rough Bayesian model in our heads, we're forcing ourselves to quantify what "good" is and what "bad" is. How good? How bad? How likely? How unlikely? Until we do some (rough) guessing at these things, we're making decisions much more poorly than we need to be.

The great thing about using Bayes's theorem is that it encourages constant updating. It also encourages an open mind by giving us the chance to look at a situation from multiple angles. Maybe she really is sorry about the betrayal. Maybe she thought she was acting in your best interests. There are many possible explanations for her behavior and you can use Bayes's theorem to integrate all of her later actions into your bet. If you find yourself reducing the amount of money you'd bet on further betrayal, you can accurately assume that the probability she will betray your trust again has gone down.

Using this strategy can also stop the endless rounds of asking why. Why did that co-worker steal my idea? Who else do I have to watch out for? This what-if thinking is paralyzing. You end up self-justifying your behavior by anticipating the worst possible scenarios you can imagine. Thus, you don't change anything, and you step further away from a solution.

In reality, who cares? The why isn't important; the most relevant task for you is to figure out the probability that your coworker will do it again. Don't spend hours analyzing what to do, get upset over the doomsday scenarios you have come up with, or let a few glasses of wine soften the experience.

Head to your mental casino and place the bet, quantifying all the subjective information in your head that is messy and hard to articulate. You will cut through the endless "but maybes" and have a clear path forward that addresses the probable future. It may make sense to give him the benefit of the doubt. It may also be reasonable to avoid him as much as possible. When you figure out how much you would wager on the potential outcomes, you'll know what to do.

Sometimes we can't just get rid of people who aren't good for us — family being the prime example. But you can also use Bayes to test how your actions will change the probability of outcomes to find ways of keeping the negativity minimal. Let's say you have a cousin who always plans to visit but then cancels. You can't stop being his cousin and saying "you aren't welcome at my house" will cause a big family drama. So what else can you do? Your initial equation — your probability estimate — indicates that the behavior is likely to continue. In your casino, you would comfortably bet your life savings that it will happen again. Now imagine ways in which you could change your behavior. Which of these would reduce your bet? You could have an honest conversation with him, telling him how his actions make you feel. To know if he's able to openly receive this, consider whether your bet would change. Or would you wager significantly less after employing the strategy of always being busy when he calls to set up future visits? And you can dig even deeper. Which of your behaviors would increase the probability that he actually comes? Which behaviors would increase the probability that he doesn't bother making plans in the first place? Depending on how much you like him, you can steer your changes to the outcome you'd prefer. Quantifying the subjective and using Bayes's theorem can help us clear out some of the relationship negativity in our lives.

126. Pyrrhic Victory: Winning the Battle, Losing the War

“War ends at the moment when peace permanently wins out. Not when the articles of surrender are signed or the last shot is fired, but when the last shout of a sidewalk battle fades, when the next generation starts to wonder whether the whole thing ever really happened.”

— Lee Sandlin

The Basics

In a classic American folktale, a stubborn railroad worker decides to prove his skill by competing with a drilling machine. John Henry, enraged to hear that machines might take his job, claims that his digging abilities are superior. A contest is arranged. He goes head to head with the new drill. The result is impressive — the drill breaks after three meters, whereas John Henry makes it to four meters in the same amount of time. As the other workers begin to celebrate his victory, he collapses and dies of exhaustion.

John Henry might have been victorious against the drill, but that small win was meaningless in the face of his subsequent death. In short, we can say that he won the battle but lost the war.

Winning a battle but losing the war is a military mental model that refers to achieving a minor victory that ultimately results in a larger defeat, rendering the victory empty or hollow. It can also refer to gaining a small tactical advantage that corresponds to a wider disadvantage.

One particular type of hollow victory is the Pyrrhic victory, which Wikipedia defines as a victory that “inflicts such a devastating toll on the victor that it is tantamount to defeat.”

That devastating toll can come in the form of an enormous number of casualties, the wasting of resources, high financial costs, damage to land, and other losses. Or, in that folktale, the death of the railroad worker.

Another hollow victory occurs when you engage in a conventional war and prompt a response from an opponent who has significantly more firepower than you do. The attack on Pearl Harbor was considered a victory for the Japanese. However, by provoking an army with superior forces, they set something in motion they could not control.

While the concept of a hollow victory arises in military contexts, understanding the broader principle allows you to apply it to other areas of life. It can often be helpful in the context of non-zero-sum situations, in which both parties suffer even if one has technically succeeded.

[quote]We have won a battle but lost a war whenever we achieve some minor aim that leads to wider loss.[/quote]

We have won a battle but lost a war whenever we achieve some minor (or even major) aim that leads to wider loss. We might win an argument with a partner over a small infraction, only to come across as hostile and damage the relationship. We may achieve a short-term professional goal by working overtime, only to harm our health and reduce our long-term productivity. We might pursue a particular career for the sake of money, but feel unfulfilled and miserable in the process.

“Grand strategy is the art of looking beyond the present battle and calculating ahead. It requires that you focus on your ultimate goal and plot to reach it.”

— Robert Greene, *The 33 Strategies of War*

The Original Pyrrhic Victory

The term “Pyrrhic victory” is named after the Greek king Pyrrhus of Epirus. Between 280 and 279 BC, Pyrrhus’s army managed to defeat the Romans in two major battles. Striding into Italy with 25,000 men and 20 elephants — a new sight for the Romans — Pyrrhus was confident that he could extend his empire. However, the number of lives lost in the process

made the victory meaningless. According to Plutarch, Pyrrhus is said to have told a friend that another victory against the Romans would “utterly undo him.”

Pyrrhus did not have access to anywhere near enough potential recruits to replenish his army. He had, after all, lost most of his men, including the majority of his friends and commanders. Meanwhile, the Romans were only temporarily defeated. They could replace their lost soldiers with relative ease. Even worse, the two losses had enraged the Romans and made them *more* willing to continue fighting. The chastened king gathered his remaining troops and sailed back to Greece.

The Battle of Bunker Hill

A classic example of a Pyrrhic victory is the Battle of Bunker Hill, fought on June 17th, 1775, during the American Revolutionary War. Colonial and British troops grappled for control of the strategically advantageous Bunker Hill in Massachusetts.

Four days earlier, on June 13th, the colonial army received intelligence that the British were planning to take control of the hills around Boston, which would give them greater authority over the nearby harbor. About 1200 colonial soldiers situated themselves on the hills, while others spread throughout the surrounding area. The British army, realizing this, mounted an attack.

The British army succeeded in their aim after the colonial army ran out of ammunition. Yet the Battle of Bunker Hill was anything but a true victory, because the British lost a substantial number of men, including 100 of their officers. This left the British army depleted (having sustained 1000 casualties), low on resources, and without proper management.

This Pyrrhic victory was unexpected; the British troops had far more experience and outnumbered the colonial army by almost 2:1. The Battle of Bunker Hill sapped British morale but was somewhat motivating for the colonials, who had sustained less than half the number of casualties.

In *The American Revolutionary War and the War of 1812*, the situation is described this way:

... the British were stopped by heavy fire from the colonial troops barricaded behind rail fences that had been stuffed with grass, hay, and brush. On the second or third advance, however, the attackers carried the redoubt and forced the surviving defenders, mostly exhausted and weaponless, to flee. ...

If the British had followed this victory with an attack on Dorchester Heights to the South of Boston, it might have been worth the heavy cost. But, presumably, because of their severe losses and the fighting spirit displayed by the rebels, the British commanders abandoned or indefinitely postponed such a plan. Consequently, after Gen. George Washington took colonial command two weeks later, enough heavy guns and ammunition had been collected that he was able in March 1776 to seize and fortify Dorchester Heights and compel the British to evacuate Boston.... Also, the heavy losses inflicted on the British in the Battle of Bunker Hill bolstered the Americans' confidence and showed that the relatively inexperienced colonists could indeed fight on par with the mighty redcoats of the British army.

In *The War of the American Revolution*, Robert W. Coakley writes of the impact of Bunker Hill:

Bunker Hill was a Pyrrhic victory, its strategic effect practically nil since the two armies remained in virtually the same position they had held before. Its consequences, nevertheless, cannot be ignored. A force of farmers and townsmen, fresh from their fields and shops, with hardly a semblance of orthodox military organization, had met and fought on equal terms with a professional British army. ...[N]ever again would British commanders lightly attempt such an assault on Americans in fortified positions.

“I wish we could sell them another hill at the same price.”

— Nathanael Greene, leader of the colonial army

The Battle of Borodino

Fought on September 7, 1812, the Battle of Borodino was the bloodiest day of the Napoleonic Wars. The French army (led by Napoleon) sought to invade Russia. Roughly a quarter of a million soldiers fought at the Battle of Borodino, with more than 70,000 casualties. Although the French army succeeded in forcing the Russians into retreat, their victory was scarcely a triumphant one. Both sides ended up depleted and low on morale without having achieved their respective aims.

The Battle of Borodino is considered a Pyrrhic victory because the French army destroyed itself in the process of capturing Moscow. The Russians had no desire to surrender, and the conflict was more costly for the French than for their opponent.

By the time Napoleon's men began their weary journey back to France, they had little reason to consider themselves victorious. The Battle of Borodino had no clear purpose, as no tactical advantage was gained. Infighting broke out and Napoleon eventually lost both the war and his role as leader of France.

History has shown again and again that attempting to take over Russia is rarely a good idea. Napoleon was at a serious disadvantage to begin with. The country's size and climate made tactical movements difficult. Bringing supplies in proved nearly impossible, and the French soldiers easily succumbed to cold, starvation, and infectious diseases. Even as they hastened to retreat, the Russian army recovered its lost men quickly and continued to whittle away at the remaining French soldiers. Of the original 95,000 French troops, a mere 23,000 returned from Russia (exact figures are impossible to ascertain due to each side's exaggerating or downplaying the losses). The Russian approach to defeating the French is best described as attrition warfare – a stubborn, unending wearing down. Napoleon might have won the Battle of Borodino, but in the process he lost everything he had built during his time as a leader and his army was crushed.

[quote]Pyrrhic victories often serve as propaganda in the long term – for the losing side, not the victors.[/quote]

Something we can note from both Borodino and Bunker Hill is that Pyrrhic victories often serve as propaganda in the long term – for the losing side, not for the victors. As the adage goes, history is written by winners. A Latin saying, *ad victorem spolia* – to the victor belong the spoils – exemplifies this idea. Except that it doesn't quite ring true when it comes to Pyrrhic victories, which tend to be a source of shame for the winning side. In the case of Borodino, it became an emblem of patriotism and pride for the Russians.

"[I]t is much better to lose a battle and win the war than to win a battle and lose the war. Resolve to keep your eyes on the big ball."

— David J. Schwartz, *The Magic of Thinking Big*

Hollow Victories in Business

A company has won a Pyrrhic victory when it leverages all available resources to take over another company, only to be ruined by the financial costs and the loss of key employees. Businesses can also ruin themselves over lawsuits that drain resources, distract managers, and get negative attention in the press.

American Apparel is one instance of a company ending up bankrupt, partially as a result of mounting legal fees. The exact causes of the company's downfall are not altogether understood, though a number of lawsuits are believed to have been a major factor. It began with a series of sexual harassment lawsuits against founder Dov Charney.

American Apparel's board of directors fired Charney after the growing fees associated with defending him began harming the company's finances (as well as its reputation). Charney responded by attempting a hostile takeover, as unwilling to surrender control of the company he founded as Czar Alexander was to surrender Moscow to Napoleon. More

lawsuits followed as American Apparel shareholders and board members seemingly sued everyone in sight and were sued by suppliers, by more than 200 former employees, and by patent holders.

As everyone involved focused on winning their respective battles, the company ended up filing for bankruptcy and losing the war. In short, everyone suffered substantial losses, from Charney himself to the many factory workers who were made redundant.

Hollow Victories in Court Cases

Hollow victories are common in the legal system. For example, consider the following scenarios:

- A divorced couple engages in a lengthy, tedious legal battle over the custody of their children. Eventually, they are given shared custody. Yet the tense confrontations associated with the court case have alienated the children from their parents and removed tens of thousands of dollars from the collective purse.
- A man unknowingly puts up trees that slightly cross over into his neighbor's property. The man tries to come to a compromise by perhaps trimming the trees or allowing the neighbor to cross into his property in exchange for leaving the trees up. No dice; the neighbor sticks to his guns. Unable to resolve the matter, the neighbor sues the man and wins, forcing him to cut down the trees and pay all legal expenses. While the neighbor has technically won the case, he now has an enemy next door, and enemies up and down the street who think he's a Scrooge.
- A freelance illustrator discovers that her work has been used without permission or payment by a non-profit group that printed her designs on T-shirts and sold them, with the proceeds going to charity. The illustrator sues them and wins for copyright infringement, but costs herself and the charity substantial legal fees. Unhappy that the illustrator sued a charity instead of making a compromise, the public boycotts her and she has trouble selling her future work.
- A well-known business magnate discovers that his children are suing him for the release of trust fund money they believe they are owed. He counter-sues, arguing publicly that his children are greedy and don't deserve the money. He wins the case on a legal technicality, but both his public image and his relationships with his children are tarnished. He's kept his money, but not his happiness.

A notable instance of a legal Pyrrhic victory was the decade-long McLibel case, the longest running case in English history. The fast-food chain McDonald's attempted to sue two environmental activists, Helen Steel and David Morris, over leaflets they distributed. McDonald's claimed the contents of the leaflets were false. Steel and Morris claimed they were true.

Court hearings found that both parties were both wrong – some of the claims were verifiable; others were fabricated. After ten years of tedious litigation and negative media attention, McDonald's won the case, but it was far from worthwhile. The (uncollected) £40,000 settlement they were awarded was paltry compared to the millions the legal battle had cost the company. Meanwhile, Steel and Morris chose to represent themselves and spent only £30,000 (both had limited income and did not receive Legal Aid).

Although McDonald's did win the case, it came with enormous costs, both financially and in reputation. The case attracted a great deal of media attention as a result of its David-vs.-Goliath nature. The idea of two unemployed activists taking on an international corporation had an undeniable appeal, and the portrayals of McDonald's were unanimously negative. The case did far more harm to their reputation than a few leaflets distributed in London would have. At one point, McDonald's attempted to placate Steel and Morris by offering to donate money to a charity of their choice, provided that they stopped

criticizing the company publicly and did so only “in private with friends.” The pair responded that they would accept the terms if McDonald’s halted any form of advertising and staff recommended it only “in private with friends.”

“Do not be ashamed to make a temporary withdrawal from the field if you see that your enemy is stronger than you; it is not winning or losing a single battle that matters, but how the war ends.”

— Paulo Coelho, Warrior of the Light

Hollow Victories in Politics

Theresa May’s General Election win is a perfect example of a political Pyrrhic victory, as is the Brexit vote the year prior.

Much like Napoleon at Borodino, David Cameron achieved his aims, only to lose his role as a leader in the process. And much like the French soldiers who defeated the Russians at Borodino, only to find themselves limping home through snow and ice, the triumphant Leave voters now face a drop in wages and general quality of life, making the fulfilment of their desire to leave the European Union seem somewhat hollow. Elderly British people (the majority of whom voted to leave) must deal with dropping pensions and potentially worse healthcare due to reduced funding. Voters won the battle but at a cost that is unknown.

Even before the shock of the Brexit vote had worn off, Britain saw a second dramatic Pyrrhic victory: Theresa May’s train-wreck General Election. Amid soaring inflation, May aimed to win a clear majority and secure her leadership. Although she was not voted out of office, her failure to receive unanimous support only served to weaken her position.

Continued economic decline has weakened it further.

“Victorious warriors win first and then go to war, while defeated warriors go to war first and then seek to win.”

— Sun Tzu, The Art of War

How We Can Avoid Hollow Victories in Our Lives

One important lesson we can learn from hollow victories is the value of focusing on the bigger picture, rather than chasing smaller goals.

One way to avoid winning a battle but losing the war is to think in terms of opportunity costs. Charlie Munger has said that “All intelligent people use opportunity cost to make decisions”; maybe what he should have said is that “All intelligent people should use opportunity cost to make decisions.”

Consider a businessman, well versed in opportunity cost economics, who chooses to work late every night instead of spending time with his family, whom he then alienates and eventually becomes distanced from. The opportunity cost of the time spent at the office between 7-10 pm wasn’t just TV, or dinner, or any other thing he would have done were he at home. It was a good long-term relationship with his wife and children! Talk about opportunity costs! Putting in the late hours may have helped him with the “battle” of business, but what about the “war” of life? Unfortunately, many people realize too late that they paid too high a price for their achievements or victories.

Hollow victories can occur as a result of a person or party focusing on a single goal – winning a lawsuit, capturing a hill, winning an election – while ignoring the wider implications. It’s like looking at the universe by peering into one small corner of space with a telescope.

As was noted earlier, this mental model isn’t relevant just in military, legal, or political contexts; hollow victories can occur in every part of our lives, including relationships, health, personal development, and careers. Understanding military tactics and concepts

can teach us a great deal about being effective leaders, achieving our goals, maintaining relationships, and more.

It's obvious that we should avoid Pyrrhic victories wherever possible, but how do we do that? In spite of situations differing vastly, there are some points to keep in mind:

- Zoom out to see the big picture. By stepping back when we get too focused on minutiae, we can pay more attention to the war, not just the battle. Imagine that you are at the gym when you feel a sharp pain in your leg. You ignore it and finish the workout, despite the pain increasing with each rep. Upon visiting a doctor, you find you have a serious injury and will be unable to exercise until it heals. If you had focused on the bigger picture, you would have stopped the workout, preventing a minor injury from getting worse, and been able to get back to your workouts sooner.
- Keep in mind core principles and focus on overarching goals. When Napoleon sacrificed thousands of his men in a bid to take control of Moscow, he forgot his core role as the leader of the French people. His own country should have been the priority, but he chose to chase more power and ended up losing everything. When we risk something vital – our health, happiness, or relationships – we run the risk of a Pyrrhic victory.
- Recognize that we don't have to lose our minds just because everyone else has. As Warren Buffett once said, "be fearful when others are greedy and greedy when others are fearful." Or, as Nathan Rothschild wrote, "great fortunes are made when cannonballs fall in the harbor, not when violins play in the ballroom." When others are thrashing to win a battle, we would do well to pay attention to the war. What can we notice that they ignore? If we can't (or don't want to) resolve the turmoil, how can we benefit from it?
- Recognize when to give up. We cannot win every battle we engage in, but we can sometimes win the war. In some situations, the optimum choice is to withdraw or surrender to avoid irreparable problems. The goal is not the quick boost from a short-term victory; it is the valuable satisfaction of long-term success.
- Remember that underdogs can win – or at least put up a good fight. Remember what the British learned the hard way at Bunker Hill, and what it cost McDonald's to win the McLibel case. Even if we think we can succeed against a seemingly weaker party, that victory can come at a very high cost.

127. The Law of Unintended Consequences: Shakespeare, Cobra Breeding, and a Tower in Pisa

When we try to make a single change within a complex system, we often end up causing unintended consequences. These can be positive or negative. If we don't anticipate unintended consequences, we can't expect to achieve our desired outcomes.

In 1890, a New Yorker named Eugene Schieffelin took his intense love of Shakespeare's Henry VI to the next level.

Most Shakespeare fanatics channel their interest by going to see performances of the plays, meticulously analyzing them, or reading everything they can about the playwright's life. Schieffelin wanted more; he wanted to look out his window and see the same kind of birds in the sky that Shakespeare had seen.

Inspired by a mention of starlings in Henry VI, Schieffelin released 100 of the non-native birds in Central Park over two years. (He wasn't acting alone – he had the support of scientists and the American Acclimatization Society.) We can imagine him watching the starlings flutter off into the park and hoping for them to survive and maybe breed. Which they did. In fact, the birds didn't just survive; they thrived and bred like weeds.

Unfortunately, Schieffelin's plan worked too well. Far, far too well. The starlings multiplied exponentially, spreading across America at an astonishing rate. Today, we don't even know how many of them live in the U.S., with official estimates ranging from 45 million to 200 million. Most, if not all, of them are descended from Schieffelin's initial 100 birds. The problem is that as an alien species, the starlings wreak havoc because they were introduced into an ecosystem they were not naturally part of and the local species had (and still have) no defense against them.

If you live in an area with a starling population, you are doubtless familiar with the hardy, fearless nature of these birds. They gather in enormous flocks, destroying crops, snatching food supplies from native birds, and scavenging in cities. Starlings now consume millions of dollars' worth of crops each year and cause fatal airplane crashes. Starlings also spread diseases, including e. coli infections and salmonella.

"When we try to pick out anything by itself, we find it hitched to everything else in the universe"

— John Muir

Schieffelin's starlings are a prime example of unintended consequences. In *Best Laid Plans: The Tyranny of Unintended Consequences and How to Avoid Them*, William A. Sherden writes:

Sometimes unintended consequences are catastrophic, sometimes beneficial. Occasionally their impacts are imperceptible, at other times colossal. Large events frequently have a number of unintended consequences, but even small events can trigger them. There are numerous instances of purposeful deeds completely backfiring, causing the exact opposite of what was intended.

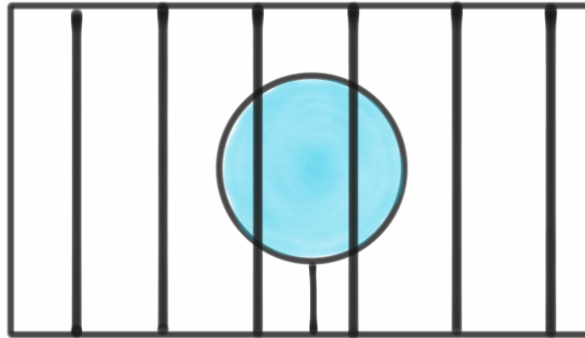
We all know that our actions and decisions can have surprising reverberations that have no relation to our initial intentions. This is why second-order thinking is so crucial.

Sometimes we can open a Pandora's box or kick a hornet's nest without realizing it. In a dynamic world, you can never do merely one thing.

Unintended consequences arise because of the chaotic nature of systems. When Schieffelin released the starlings, he did not know the minutiae of the ecological and social systems they would be entering. As the world becomes more complicated and interconnected, the potential for ever more serious unintended consequences grows.

All too often when we mess with complicated systems, we have no more control over the outcomes than we would if we performed shamanistic dances. The simple fact is that we

cannot predict how a system will behave through mathematical models or computer simulations or basic concepts like cause and effect or supply and demand.



In *The Gene: An Intimate History*, Siddhartha Mukherjee writes that unintended consequences can be the result of scientists failing to appreciate the complexity of systems:

The parables of such scientific overreach are well-known: foreign animals, introduced to control pests, become pests in their own right; the raising of smokestacks, meant to alleviate urban pollution, releases particulate effluents higher in the air and exacerbates pollution; stimulating blood formation, meant to prevent heart attacks, thickens the blood and results in an increased risk of blood clots to the heart.

Mukherjee notes that unintended consequences can also be the result of people thinking that something is more complex than it actually is:

... when nonscientists overestimate complexity—"No one can possibly crack this code"—they fall into the trap of unanticipated consequences. In the early 1950s, a common trope among some biologists was that the genetic code would be so context dependent—so utterly determined by a particular cell in a particular organism and so horribly convoluted—that deciphering it would be impossible. The truth turned out to be quite the opposite: just one molecule carries the code, and just one code pervades the biological world. If we know the code, we can intentionally alter it in organisms, and ultimately in humans.

As was mentioned in the quote from Sherden above, sometimes perverse unintended consequences occur when actions have the opposite of the desired effect. From *The Nature of Change or the Law of Unintended Consequences* by John Mansfield:

An example of the unexpected results of change is found in the clearing of trees to make available more agricultural land. This practice has led to rising water tables and increasing salinity that eventually reduces the amount of useable land.

Some additional examples:

- Suspending problematic children from school worsens their behavior, as they are more likely to engage in criminal behavior when outside school.
- Damage-control lawsuits can lead to negative media attention and cause more harm (as occurred in the notorious *McLibel* case).

- Banning alcohol has, time and time again, led to higher consumption and the formation of criminal gangs, resulting in violent deaths.
- Abstinence-based education invariably causes a rise in teenage pregnancies.
- Many people who experience a rodent infestation will stop feeding their cats, assuming that this will encourage them to hunt more. The opposite occurs: well-fed cats are better hunters than hungry ones.
- When the British government offered financial rewards for people who killed and turned in cobras in India, people, reacting to incentives, began breeding the snakes. Once the reward program was scrapped, the population of cobras in India rose as people released the ones they had raised. The same thing occurred in Vietnam with rats.

This phenomenon, of the outcome being the opposite of the intended one, is known as “blowback” or the Cobra effect, for obvious reasons. Just as with iatrogenics, interventions often lead to worse problems.

Sometimes the consequences are mixed and take a long time to appear, as with the famous Leaning Tower of Pisa. From The Nature of Change again:

When the tower was built, it was undoubtedly intended to stand vertical. It took about 200 years to complete, but by the time the third floor was added, the poor foundations and loose subsoil had allowed it to sink on one side. Subsequent builders tried to correct this lean and the foundations have been stabilised by 20th-century engineering, but at the present time, the top of the tower is still about 15 feet (4.5 meters) from the perpendicular. Along with the unexpected failure of the foundations is the unexpected consequence of the Leaning Tower of Pisa becoming a popular tourist attraction, bringing enormous revenue to the town.

It's important to note that unintended consequences can sometimes be positive. Someone might have a child because they think parenthood will be a fulfilling experience. If their child grows up and invents a drug that saves thousands of lives, that consequence is positive yet unplanned. Pokemon Go, strange as it seemed, encouraged players to get more exercise. The creation of No Man's Lands during conflicts can preserve the habitats of local wildlife, as has occurred around the Berlin Wall. Sunken ships form coral reefs where wildlife thrives. Typically, though, when we talk about the law of unintended consequences, we're talking about negative consequences.

“Any endeavor has unintended consequences. Any ill-conceived endeavor has more.”

— Stephen Tobolowsky, The Dangerous Animals Club

The Causes of Unintended Consequences

By their nature, unintended consequences can be a mystery. I'm not a fan of the term “unintended consequences,” though, as it's too often a scapegoat for poor thinking. There are always consequences, whether you see them or not.

When we reflect on the roots of consequences that we failed to see but could have, we are liable to build a narrative that packages a series of chaotic events into a neat chain of cause and effect. A chain that means we don't have to reflect on our decisions to see where we went wrong. A chain that keeps our egos intact.

Sociologist Robert K. Merton has identified five potential causes of consequences we failed to see:

1. Our ignorance of the precise manner in which systems work.
2. Analytical errors or a failure to use Bayesian updating (not updating our beliefs in light of new information).

3. Focusing on short-term gain while forgetting long-term consequences.
4. The requirement for or prohibition of certain actions, despite the potential long-term results.
5. The creation of self-defeating prophecies (for example, due to worry about inflation, a central bank announces that it will take drastic action, thereby accidentally causing crippling *deflation* amidst the panic).

[quote]Most unintended consequences are just unanticipated consequences.[/quote]
Using logical fallacies and mental models, and keeping Schieffelin's starlings in mind, we can identify several more possible causes of consequences that we likely should have seen in advance but didn't. Here they are:

Over-reliance on models and predictions—mistaking the map for the territory. Schieffelin could have made a predictive model of how his starlings would breed and would affect their new habitat. The issue is that models are not gospel and the outcomes they predict do not represent the real world. All models are wrong, but that doesn't mean they're not useful sometimes. You have to understand the model and the terrain it's based on. Schieffelin's predictive model might have told him that the starlings' breeding habits would have a very minor impact on their new habitat. But in reality, the factors involved were too diverse and complex to take into account. Schieffelin's starlings bred faster and interacted with their new environment in ways that would be hard to predict. We can assume that he based his estimations of the future of the starlings on their behavior in their native countries.

Survivorship bias. Unintended consequences can also occur when we fail to take into account all of the available information. When predicting an outcome, we have an inherent tendency to search for other instances in which the desired result occurred. Nowadays, when anyone considers introducing a species to a new area, they are likely to hear about Schieffelin's starlings. And Schieffelin was likely influenced by stories about, perhaps even personal experiences with, successfully introducing birds into new habitats, unaware of the many ecosystem-tampering experiments that had gone horribly wrong.

The compounding effect of consequences. Unintended results do not progress in a linear manner. Just as untouched money in a savings account compounds, the population of Schieffelin's starlings compounded over the following decades. Each new bird that was hatched meant more hatchlings in future generations. At some point, the bird populations reached critical mass and no attempts to check their growth could be successful. As people in one area shot or poisoned the starlings, the breeding of those elsewhere continued.

Denial. Just as we seek out confirmatory evidence, we are inclined to deny the existence of disconfirming information. We may be in denial about the true implications of actions. Governments, in particular, tend to focus on the positive consequences of legislation while ignoring the costs. Negative unintended consequences do not always result in changes being made. Open-plan offices are another instance; they were first designed to encourage collaboration and creativity. Even though research has shown that they have the opposite effect, many companies continue to opt for open offices. They sound like a good idea, and airy offices with beanbags and pot plants might look nice, but those who continue building them are in obvious denial.

Failure to account for base rates. When we neglect to consider how the past will affect the future, we are failing to account for base rates. Schieffelin likely failed to consider the base rates of successful species introduction.

Curiosity. We sometimes perform actions out of curiosity, without any idea of the potential consequences. The problem is that our curiosity can lead us to behave in reckless,

unplanned, or poorly thought-through ways. The release of Schieffelin's starlings was in part the result of widespread curiosity about the potential for introducing European species to America.

The tendency to want to do something. We are all biased towards action. We don't want to sit around — we want to act and make changes. The problem is that sometimes doing nothing is the best route to take. In the case of Schieffelin's starlings, he was biased towards making alterations to the wildlife around him to bring Shakespeare's world to life, even though leaving nature alone is usually preferable.

Mental Models for Avoiding or Minimizing Unintended Consequences

We cannot eliminate unintended consequences, but we can become more aware of them through rational thinking techniques. In this section, we will examine some ways of working with and understanding the unexpected. Note that the examples provided here are simplifications of complex issues. The observations made about them are those of armchair critics, not those involved in the actual decision making.

Inversion. When we invert our thinking, we consider what we want to avoid, not what we want to cause. Rather than seeking perfection, we should avoid stupidity. By considering potential unintended consequences, we can then work backward. For example, the implementation of laws which required cyclists to wear helmets at all times led to a rise in fatalities. (People who feel safer behave in a more risky manner.) If we use inversion, we know we do not want any change in road safety laws to cause more injuries or deaths. So, we could consider creating stricter laws surrounding risky cycling and enforcing penalties for those who fail to follow them.

Another example is laws which aim to protect endangered animals by preventing new developments on land where rare species live. Imagine that you are a landowner, about to close a lucrative deal. You look out at your land and notice a smattering of endangered wildflowers. Do you cancel the sale and leave the land to the flowers? Of course not. Unless you are exceptionally honest, you grab a spade, dig up the flowers, and keep them a secret. Many people shoot, poison, remove, or otherwise harm endangered animals and plants. If lawmakers used inversion, they would recognize that they want to avoid those consequences and work backward.

[quote]We have to focus on avoiding the worst unintended consequences, rather than on controlling everything.[/quote]

Looking for disconfirming evidence. Instead of looking for information that confirms that our actions will have the desired consequences, we should rigorously search for evidence that they will not. How did this go in the past? Take the example of laws regarding the minimum wage and worker rights. Every country has people pushing for a higher minimum wage and for more protection of workers. If we search for disconfirming evidence, we see that these laws can do more harm than good. The French appear to have perfected labor laws. All employees are, on the face of it, blessed with a minimum wage of 17,764 euros per year, a 35-hour work week, five weeks paid holiday, and strict protection against redundancy (layoffs). So, why don't we all just move to France? Because these measures result in a lot of negative unintended consequences. Unemployment rates are high, as many businesses cannot afford to hire many employees. Foreign companies are reluctant to hire French workers, as they can't fire them during tough economic times. Everyone deserves a fair minimum wage and protection from abuse of their rights, but France illustrates how taking this principle too far can have negative unintended consequences.

Understanding our circle of competence. Each of us has areas we understand well and are familiar with. When we act outside our circle of competence, we increase the risk of unintended consequences. If you decide to fix your boiler without consulting a plumber, you are acting outside of your circle of competence and have a good chance of making the problem worse. When the British government implemented bounties for dead cobras in India, their circle of competence did not include an understanding of the locals. Perhaps if

they had consulted some Indian people and asked how they would react to such a law, they could have avoided causing a rise in the cobra population.

Second-order thinking. We often forget that our actions can have two layers of consequences, of which the first might be intended and the second unintended. With Schieffelin's starlings, the first layer of consequences was positive and as intended. The birds survived and bred, and Shakespeare fans living in New York got to feel a bit closer to the iconic playwright. But the negative second layer of consequences dwarfed the first layer. For the parents of a child who grows up to invent a life-saving drug, the first layer of consequences is that those parents (presumably) have a fulfilling experience. The second layer of consequences is that lives are saved. When we use second-order thinking, we ask: what could happen? What if the opposite of what I expect happens? What might the results be a year, five years, or a decade from now?

Most unintended consequences are just unanticipated consequences. And in the world of consequences intentions often don't matter. Intentions, after all, only apply to *positive* anticipated consequences. Only in rare circumstances would someone intend to cause negative consequences.

So when we make decisions we must ask what the consequences be? This is where having a toolbox of mental models becomes helpful.

128. Half Life: The Decay of Knowledge and What to Do About It

Understanding the concept of a half-life will change what you read and how you invest your time. It will explain why our careers are increasingly specialized and offer a look into how we can compete more effectively in a very crowded world.

The Basics

A half-life is the time taken for something to halve its quantity. The term is most often used in the context of radioactive decay, which occurs when unstable atomic particles lose energy. Twenty-nine elements are known to be capable of undergoing this process. Information also has a half-life, as do drugs, marketing campaigns, and all sorts of other things. We see the concept in any area where the quantity or strength of something decreases over time.

Radioactive decay is random, and measured half-lives are based on the most probable rate. We know that a nucleus will decay at some point; we just cannot predict when. It could be anywhere between instantaneous and the total age of the universe. Although scientists have defined half-lives for different elements, the exact rate is completely random.

Half-lives of elements vary tremendously. For example, carbon takes millions of years to decay; that's why it is stable enough to be a component of the bodies of living organisms. Different isotopes of the same element can also have different half-lives.

Three main types of nuclear decay have been identified: alpha, beta, and gamma. Alpha decay occurs when a nucleus splits into two parts: a helium nucleus and the remainder of the original nucleus. Beta decay occurs when a neutron in the nucleus of an element changes into a proton. The result is that it turns into a different element, such as when potassium decays into calcium. Beta decay also releases a neutrino — a particle with virtually no mass. If a nucleus emits radiation without experiencing a change in its composition, it is subject to gamma decay. Gamma radiation contains an enormous amount of energy.

The Discovery of Half-Lives

The discovery of half-lives (and alpha and beta radiation) is credited to Ernest Rutherford, one of the most influential physicists of his time. Rutherford was at the forefront of this major discovery when he worked with physicist Joseph John Thompson on complementary experiments leading to the discovery of electrons. Rutherford recognized the potential of what he was observing and began researching radioactivity. Two years later, he identified the distinction between alpha and beta rays. This led to his discovery of half-lives, when he noticed that samples of radioactive materials took the same amount of time to decay by half. By 1902, Rutherford and his collaborators had a coherent theory of radioactive decay (which they called “atomic disintegration”). They demonstrated that radioactive decay enabled one element to turn into another — research which would earn Rutherford a Nobel Prize. A year later, he spotted the missing piece in the work of the chemist Paul Villard and named the third type of radiation gamma.

Half-lives are based on probabilistic thinking. If the half-life of an element is seven days, it is most probable that half of the atoms will have decayed in that time. For a large number of atoms, we can expect half-lives to be fairly consistent. It's important to note that radioactive decay is based on the element itself, not the quantity of it. By contrast, in other situations, the half-life may vary depending on the amount of material. For example, the half-life of a chemical someone ingests might depend on the quantity.

In biology, a half-life is the time taken for a substance to lose half its effects. The most obvious instance is drugs; the half-life is the time it takes for their effect to halve, or for half of the substance to leave the body. The half-life of caffeine is around 6 hours, but (as with most biological half-lives) numerous factors can alter that number. People with compromised liver function or certain genes will take longer to metabolize caffeine.

Consumption of grapefruit juice has been shown in some studies to slow caffeine metabolism. It takes around 24 hours for a dose of caffeine to fully leave the body. The half-lives of drugs vary from a few seconds to several weeks. To complicate matters, biological half-lives vary for different parts of the body. Lead has a half-life of around a month in the blood, but a decade in bone. Plutonium in bone has a half-life of a century — more than double the time for the liver.

Marketers refer to the half-life of a campaign — the time taken to receive half the total responses. Unsurprisingly, this time varies among media. A paper catalog may have a half-life of about three weeks, whereas a tweet might have a half-life of a few minutes. Calculating this time is important for establishing how frequently a message should be sent.

“Every day that we read the news we have the possibility of being confronted with a fact about our world that is wildly different from what we thought we knew.”

— Samuel Arbesman

The Half-Life of Facts

In *The Half-Life of Facts: Why Everything We Know Has an Expiration Date*, Samuel Arbesman (see our [Knowledge Project interview](#)) posits that facts decay over time until they are no longer facts or perhaps no longer complete. According to Arbesman, information has a predictable half-life: the time taken for half of it to be replaced or disproved. Over time, one group of facts replaces another. As our tools and knowledge become more advanced, we can discover more — sometimes new things that contradict what we thought we knew, sometimes nuances about old things. Sometimes we discover a whole area that we didn’t know about.

The rate of these discoveries varies. Our body of engineering knowledge changes more slowly, for example, than does our body of psychological knowledge.

Arbesman studied the nature of facts. The field was born in 1947, when mathematician Derek J. de Solla Price was arranging a set of philosophical books on his shelf. Price noted something surprising: the sizes of the books fit an exponential curve. His curiosity piqued, he began to see whether the same curve applied to science as a whole. Price established that the quantity of scientific data available was doubling every 15 years. This meant that some of the information had to be rendered obsolete with time.

Scientometrics shows us that facts are always changing, and much of what we know is (or soon will be) incorrect. Indeed, much of the available published research, however often it is cited, has never been reproduced and cannot be considered true. In a controversial paper entitled “Why Most Published Research Findings Are False,” John Ioannides covers the rampant nature of poor science. Many researchers are incentivized to find results that will please those giving them funding. Intense competition makes it essential to find new information, even if it is found in a dubious manner. Yet we all have a tendency to turn a blind eye when beliefs we hold dear are disproved and to pay attention only to information confirming our existing opinions.

As an example, Arbesman points to the number of chromosomes in a human cell. Up until 1965, 48 was the accepted number that medical students were taught. (In 1953, it had been declared an established fact by a leading cytologist). Yet in 1956, two researchers, Joe Hin Tjio and Albert Levan, made a bold assertion. They declared the true number to be 46. During their research, Tjio and Levan could never find the number of chromosomes they expected. Discussing the problem with their peers, they discovered they were not alone. Plenty of other researchers found themselves two chromosomes short of the expected 48. Many researchers even abandoned their work because of this perceived error. But Tjio and Levan were right (for now, anyway). Although an extra two chromosomes seems like a minor mistake, we don’t know the opportunity costs of the time

researchers invested in faulty hypotheses or the value of the work that was abandoned. It was an emperor's-new-clothes situation, and anyone counting 46 chromosomes assumed they were the ones making the error.

As Arbesman puts it, facts change incessantly. Many of us have seen the ironic (in hindsight) doctor-endorsed cigarette ads from the past. A glance at a newspaper will doubtless reveal that meat or butter or sugar has gone from deadly to saintly, or vice versa. We forget that laughable, erroneous beliefs people once held are not necessarily any different from those we now hold. The people who believed that the earth was the center of the universe, or that some animals appeared out of nowhere or that the earth was flat, were not stupid. They just believed facts that have since decayed. Arbesman gives the example of a dermatology test that had the same question two years running, with a different answer each time. This is unsurprising considering the speed at which our world is changing.

As Arbesman points out, in the last century the world's population has swelled from 2 billion to 7 billion, we have taken on space travel, and we have altered the very definition of science.

Our world seems to be in constant flux. With our knowledge changing all the time, even the most informed people can barely keep up. All this change may seem random and overwhelming (Dinosaurs have feathers? When did that happen?), but it turns out there is actually order within the shifting noise. This order is regular and systematic and is one that can be described by science and mathematics.

The order Arbesman describes mimics the decay of radioactive elements. Whenever new information is discovered, we can be sure it will break down and be proved wrong at some point. As with a radioactive atom, we don't know precisely when that will happen, but we know it will occur at some point.

If we zoom out and look at a particular body of knowledge, the random decay becomes orderly. Through probabilistic thinking, we can predict the half-life of a group of facts with the same certainty with which we can predict the half-life of a radioactive atom. The problem is that we rarely consider the half-life of information. Many people assume that whatever they learned in school remains true years or decades later. Medical students who learned in university that cells have 48 chromosomes would not learn later in life that this is wrong unless they made an effort to do so.

OK, so we know that our knowledge will decay. What do we do with this information? Arbesman says,

... simply knowing that knowledge changes like this isn't enough. We would end up going a little crazy as we frantically tried to keep up with the ever changing facts around us, forever living on some sort of informational treadmill. But it doesn't have to be this way because there are patterns. Facts change in regular and mathematically understandable ways. And only by knowing the pattern of our knowledge evolution can we be better prepared for its change.

Recent initiatives have sought to calculate the half-life of an academic paper. Ironically, academic journals have largely neglected research into how people use them and how best to fund the efforts of researchers. Research by Philip Davis shows the time taken for a paper to receive half of its total downloads. Davis's results are compelling. While most forms of media have a half-life measured in days or even hours, 97 percent of academic papers have a half-life longer than a year. Engineering papers have a slightly shorter half-life than other fields of research, with double the average (6 percent) having a half-life of under a year. This makes sense considering what we looked at earlier in this post. Health and medical publications have the shortest overall half-life: two to three years. Physics, mathematics, and humanities publications have the longest half-lives: two to four years.

The Half-Life of Secrets

According to Peter Swire, writing in "[The Declining Half-Life of Secrets](#)," the half-life of secrets (by which Swire generally means classified information) is shrinking. In the past, a government secret could be kept for over 25 years. Nowadays, hacks and leaks have shrunk that time considerably. Swire writes:

During the Cold War, the United States developed the basic classification system that exists today. Under Executive Order 13526, an executive agency must declassify its documents after 25 years unless an exception applies, with stricter rules if documents stay classified for 50 years or longer. These time frames are significant, showing a basic mind-set of keeping secrets for a time measured in decades.

Swire notes that there are three main causes: "the continuing effects of Moore's Law — or the idea that computing power doubles every two years, the sociology of information technologists, and the different source and methods for signals intelligence today compared with the Cold War." One factor is that spreading leaked information is easier than ever. In the past, it was often difficult to get information published. Newspapers feared legal repercussions if they shared classified information. Anyone can now release secret information, often anonymously, as with WikiLeaks. Governments cannot as easily rely on media gatekeepers to cover up leaks.

Rapid changes in technology or geopolitics often reduce the value of classified information, so the value of some, but not all, classified information also has a half-life. Sometimes it's days or weeks, and sometimes it's years. For some secrets, it's not worth investing the massive amount of computer time that would be needed to break them because by the time you crack the code, the information you wanted to know might have expired.

(As an aside, if you were to [invert the problem](#) of all these credit card and SSN leaks, you might conclude that reducing the value of possessing this information would be more effective than spending money to secure it.)

"Our policy (at Facebook) is literally to hire as many talented engineers as we can find. The whole limit in the system is that there are not enough people who are trained and have these skills today."

— Mark Zuckerberg

The Half-Lives of Careers and Business Models

The issue with information having a half-life should be obvious. Many fields depend on individuals with specialized knowledge, learned through study or experience or both. But what if those individuals are failing to keep up with changes and clinging to outdated facts? What if your doctor is offering advice that has been rendered obsolete since they finished medical school? What if your own degree or qualifications are actually useless? These are real problems, and knowing about half-lives will help you make yourself more adaptable. While figures for the half-lives of most knowledge-based careers are hard to find, we do know the half-life of an engineering career. A century ago, it would take 35 years for half of what an engineer learned when earning their degree to be disproved or replaced. By the 1960s, that time span shrank to a mere decade. Today that figure is probably even lower. In 1966 paper entitled "The Dollars and Sense of Continuing Education," Thomas Jones calculated the effort that would be required for an engineer to stay up to date, assuming a 10-year half-life. According to Jones, an engineer would need to devote at least five hours per week, 48 weeks a year, to stay up to date with new advancements. A typical degree requires about 4800 hours of work. Within 10 years, the information learned during 2400 of those hours would be obsolete. The five-hour figure does not include the time necessary to revise forgotten information that is still relevant. A 40-year career as an engineer would require 9600 hours of independent study.

Keep in mind that Jones made his calculations in the 1960s. Modern estimates place the half-life of an engineering degree at between 2.5 and 5 years, requiring between 10 and 20 hours of study per week. Welcome to the treadmill, where you have to run faster and faster so that you don't fall behind.

Unsurprisingly, putting in this kind of time is simply impossible for most people. The result is an ever-shrinking length of a typical engineer's career and a bias towards hiring recent graduates. A partial escape from this time-consuming treadmill that offers little progress is to recognize the continuous need for learning. If you agree with that, it becomes easier to place time and emphasis on developing heuristics and systems to foster learning. The faster the pace of knowledge change, the more valuable the skill of learning becomes. A study by PayScale found that the median age of workers in most successful technology companies is substantially lower than that of other industries. Of 32 companies, just six had a median worker age above 35, despite the average across all workers being just over 42. Eight of the top companies had a median worker age of 30 or below — 28 for Facebook, 29 for Google, and 26 for Epic Games. The upshot is that salaries are high for those who can stay current while gaining years of experience.

In a similar vein, business models have ever shrinking half-lives. The nature of capitalism is that you have to be better last year than you were this year — not to gain market share but to maintain what you already have. If you want to get ahead, you need asymmetry; otherwise, you get lost in trench warfare. How long would it take for half of Uber or Facebook's business models to be irrelevant? It's hard to imagine it being more than a couple of years or even months.

In *The Business Model Innovation Factory: How to Stay Relevant When the World Is Changing*, Saul Kaplan highlights the changing half-lives of business models. In the past, models could last for generations. The majority of CEOs oversaw a single business for their entire careers. Business schools taught little about agility or pivoting. Kaplan writes: *During the industrial era once the basic rules for how a company creates, delivers, and captures value were established[,] they became etched in stone, fortified by functional silos, and sustained by reinforcing company cultures. All of a company's DNA, energy, and resources were focused on scaling the business model and beating back competition attempting to do a better job executing the same business model. Companies with nearly identical business models slugged it out for market share within well-defined industry sectors.*

[...]

Those days are over. The industrial era is not coming back. The half-life of a business model is declining. Business models just don't last as long as they used to. In the twenty-first century business leaders are unlikely to manage a single business for an entire career. Business leaders are unlikely to hand down their businesses to the next generation of leaders with the same business model they inherited from the generation before.

The Burden of Knowledge

The flip side of a half-life is the time it takes to double something. A useful guideline to calculate the time it takes for something to double is to divide 70 by the rate of growth. This formula isn't perfect, but it gives a good indication. Known as the Rule of 70, it applies only to exponential growth when the relative growth rate remains consistent, such as with compound interest.

The higher the rate of growth, the shorter the doubling time. For example, if the population of a city is increasing by 2 percent per year, we divide 70 by 2 to get a doubling time of 35 years. The rule of 70 is a useful heuristic; population growth of 2 percent might seem low, but your perspective might change when you consider that the city's population could double in just 35 years. The Rule of 70 can also be used to calculate the time for an investment to double in value; for example, \$100 at 7 percent compound interest will double in just a decade and quadruple in 20 years. The average newborn baby doubles its

birth weight in under four months. The average doubling time for a tumor is also four months.

We can see how information changes in the figures for how long it takes for a body of knowledge to double in size. The figures quoted by Arbesman (drawn from *Little Science, Big Science ... and Beyond* by Derek J. de Solla Price) are compelling, including:

- Time for the number of entries in a dictionary of national biographies to double: 100 years
- Time for the number of universities to double: 50 years
- Time for the number of known chemical compounds to double: 15 years
- Time for the number of known asteroids to double: 10 years

Arbesman also gives figures for the time taken for the available knowledge in a particular field to double, including:

- Medicine: 87 years
- Mathematics: 63 years
- Chemistry: 35 years
- Genetics: 32 years

The doubling of knowledge increases the learning load over time. As a body of knowledge doubles so does the cost of wrapping your head around what we already know. This cost is the burden of knowledge. To be the best in a general field today requires that you know more than the person who was the best only 20 years ago. Not only do you have to be better to be the best, but you also have to be better just to stay in the game.

The corollary is that because there is so much to know, we specialize in very niche areas. This makes it easier to grasp the existing body of facts, keep up to date on changes, and rise to the level of expert. The problem is that specializing also makes it easier to see the world through the narrow focus of your specialty, makes it harder to work with other people (as niches are often dominated by jargon), and makes you prone to overvalue the new and novel.

Conclusion

As we have seen, understanding how half-lives work has numerous practical applications, from determining when radioactive materials will become safe to figuring out effective drug dosages. Half-lives also show us that if we spend time learning something that changes quickly, we might be wasting our time. Like Alice in Wonderland — and a perfect example of the Red Queen Effect — we have to run faster and faster just to keep up with where we are. So if we want our knowledge to compound, we'll need to focus on the invariant general principles.

129. First Principles: The Building Blocks of True Knowledge

First-principles thinking is one of the best ways to reverse-engineer complicated problems and unleash creative possibility. Sometimes called “reasoning from first principles,” the idea is to break down complicated problems into basic elements and then reassemble them from the ground up. It’s one of the best ways to learn to think for yourself, unlock your creative potential, and move from linear to non-linear results.

This approach was used by the philosopher Aristotle and is used now by Elon Musk and Charlie Munger. It allows them to cut through the fog of shoddy reasoning and inadequate analogies to see opportunities that others miss.

I don’t know what’s the matter with people: they don’t learn by understanding; they learn by some other way—by rote or something. Their knowledge is so fragile!

Richard Feynman

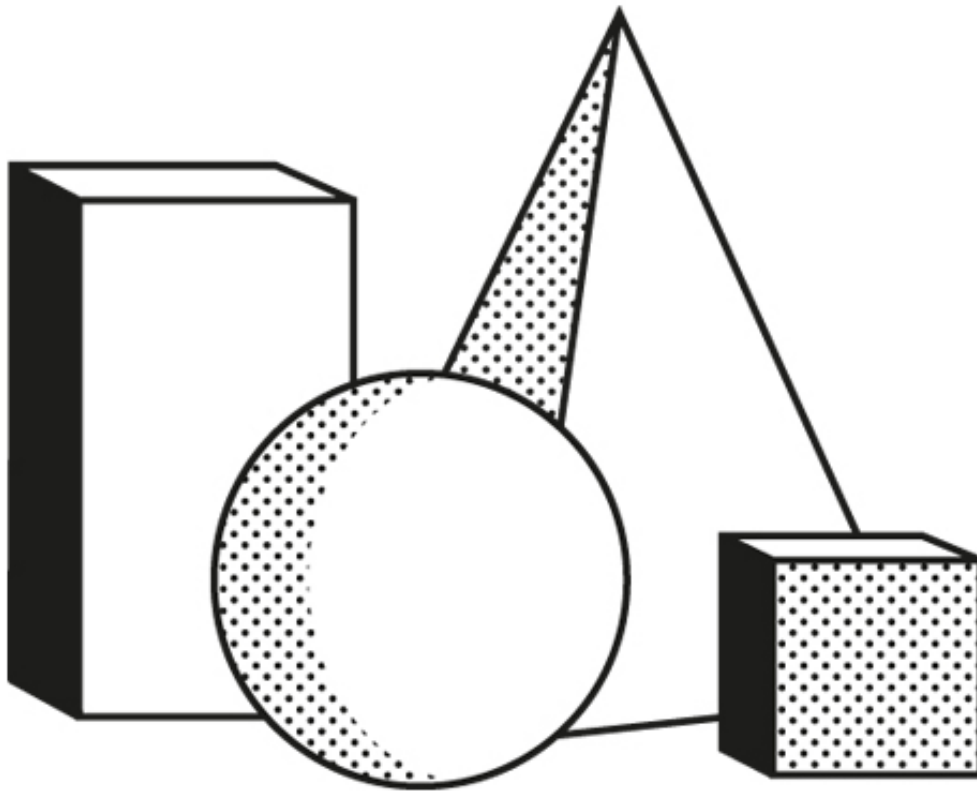
The Basics

A first principle is a foundational proposition or assumption that stands alone. We cannot deduce first principles from any other proposition or assumption.

Aristotle, writing^[1] on first principles, said:

In every systematic inquiry (methodos) where there are first principles, or causes, or elements, knowledge and science result from acquiring knowledge of these; for we think we know something just in case we acquire knowledge of the primary causes, the primary first principles, all the way to the elements.

Later he connected the idea to knowledge, defining first principles as “the first basis from which a thing is known.”^[2]



The search for first principles is not unique to philosophy. All great thinkers do it. Reasoning by first principles removes the impurity of assumptions and conventions. What remains is the essentials. It's one of the best mental models you can use to improve your thinking because the essentials allow you to see where reasoning by analogy might lead you astray.

The Coach and the Play Stealer

My friend Mike Lombardi (a former NFL executive) and I were having dinner in L.A. one night, and he said, "Not everyone that's a coach is really a coach. Some of them are just play stealers."

Every play we see in the NFL was at some point created by someone who thought, "What would happen if the players did this?" and went out and tested the idea. Since then, thousands, if not millions, of plays have been created. That's part of what coaches do.

They assess what's physically possible, along with the weaknesses of the other teams and the capabilities of their own players, and create plays that are designed to give their teams an advantage.

The coach reasons from first principles. The rules of football are the first principles: they govern what you can and can't do. Everything is possible as long as it's not against the rules.

The play stealer works off what's already been done. Sure, maybe he adds a tweak here or there, but by and large he's just copying something that someone else created.

While both the coach and the play stealer start from something that already exists, they generally have different results. These two people look the same to most of us on the sidelines or watching the game on the TV. Indeed, they look the same most of the time, but when something goes wrong, the difference shows. Both the coach and the play stealer call successful plays and unsuccessful plays. Only the coach, however, can determine why a play was successful or unsuccessful and figure out how to adjust it. The coach, unlike the play stealer, understands what the play was designed to accomplish and where it went wrong, so he can easily course-correct. The play stealer has no idea what's going on. He doesn't understand the difference between something that didn't work and something that played into the other team's strengths.

Musk would identify the play stealer as the person who reasons by analogy, and the coach as someone who reasons by first principles. When you run a team, you want a coach in charge and not a play stealer. (If you're a sports fan, you need only look at the difference between the Cleveland Browns and the New England Patriots.)

We're all somewhere on the spectrum between coach and play stealer. We reason by first principles, by analogy, or a blend of the two.

Another way to think about this distinction comes from another friend, Tim Urban. He says^[3] it's like the difference between the cook and the chef. While these terms are often used interchangeably, there is an important nuance. The chef is a trailblazer, the person who invents recipes. He knows the raw ingredients and how to combine them. The cook, who reasons by analogy, uses a recipe. He creates something, perhaps with slight variations, that's already been created.

The difference between reasoning by first principles and reasoning by analogy is like the difference between being a chef and being a cook. If the cook lost the recipe, he'd be screwed. The chef, on the other hand, understands the flavor profiles and combinations at such a fundamental level that he doesn't even use a recipe. He has real knowledge as opposed to know-how.

Authority

So much of what we believe is based on some authority figure telling us that something is true. As children, we learn to stop questioning when we're told "Because I said so." (More on this later.) As adults, we learn to stop questioning when people say "Because that's how it works." The implicit message is "understanding be damned — shut up and stop bothering me." It's not intentional or personal. OK, sometimes it's personal, but most of the time, it's not.

If you outright reject dogma, you often become a problem: a student who is always pestering the teacher. A kid who is always asking questions and never allowing you to cook dinner in peace. An employee who is always slowing things down by asking why. When you can't change your mind, though, you die. Sears was once thought indestructible before Wal-Mart took over. Sears failed to see the world change. Adapting to change is an incredibly hard thing to do when it comes into conflict with the very thing that caused so much success. As Upton Sinclair aptly pointed out, "It is difficult to get a man to understand something, when his salary depends on his not understanding it." Wal-Mart failed to see the world change and is now under assault from Amazon.

If we never learn to take something apart, test the assumptions, and reconstruct it, we end up trapped in what other people tell us — trapped in the way things have always been done. When the environment changes, we just continue as if things were the same.

First-principles reasoning cuts through dogma and removes the blinders. We can see the world as it is and see what is possible.

When it comes down to it, everything that is not a law of nature is just a shared belief.

Money is a shared belief. So is a border. So are bitcoins. The list goes on.

Some of us are naturally skeptical of what we're told. Maybe it doesn't match up to our experiences. Maybe it's something that used to be true but isn't true anymore. And maybe we just think very differently about something.

"To understand is to know what to do."

— Wittgenstein

Techniques for Establishing First Principles

There are many ways to establish first principles. Let's take a look at a few of them.

Socratic Questioning

Socratic questioning can be used to establish first principles through stringent analysis.

This a disciplined questioning process, used to establish truths, reveal underlying assumptions, and separate knowledge from ignorance. The key distinction between Socratic questioning and normal discussions is that the former seeks to draw out first principles in a systematic manner. Socratic questioning generally follows this process:

1. Clarifying your thinking and explaining the origins of your ideas (Why do I think this? What exactly do I think?)
2. Challenging assumptions (How do I know this is true? What if I thought the opposite?)
3. Looking for evidence (How can I back this up? What are the sources?)
4. Considering alternative perspectives (What might others think? How do I know I am correct?)
5. Examining consequences and implications (What if I am wrong? What are the consequences if I am?)
6. Questioning the original questions (Why did I think that? Was I correct? What conclusions can I draw from the reasoning process?)

This process stops you from relying on your gut and limits strong emotional responses.

This process helps you build something that lasts.

"Because I Said So" or "The Five Whys"

Children instinctively think in first principles. Just like us, they want to *understand* what's happening in the world. To do so, they intuitively break through the fog with a game some parents have come to hate.

"Why?"

"Why?"

"Why?"

Here's an example that has played out numerous times at my house:

"It's time to brush our teeth and get ready for bed."

"Why?"

"Because we need to take care of our bodies, and that means we need sleep."

"Why do we need sleep?"

"Because we'd die if we never slept."

"Why would that make us die?"

"I don't know; let's go look it up."

Kids are just trying to understand why adults are saying something or why they want them to do something.

The first time your kid plays this game, it's cute, but for most teachers and parents, it eventually becomes annoying. Then the answer becomes what my mom used to tell me: "Because I said so!" (Love you, Mom.)

Of course, I'm not always that patient with the kids. For example, I get testy when we're late for school, or we've been travelling for 12 hours, or I'm trying to fit too much into the time we have. Still, I try never to say "Because I said so."

People hate the "because I said so" response for two reasons, both of which play out in the corporate world as well. The first reason we hate the game is that we feel like it slows us down. We know what we want to accomplish, and that response creates unnecessary drag. The second reason we hate this game is that after one or two questions, we are often lost. We actually don't know why. Confronted with our own ignorance, we resort to self-defense.

I remember being in meetings and asking people why we were doing something this way or why they thought something was true. At first, there was a mild tolerance for this approach. After three "whys," though, you often find yourself on the other end of some version of "we can take this offline."

Can you imagine how that would play out with Elon Musk? Richard Feynman? Charlie Munger? Musk would build a billion-dollar business to prove you wrong, Feynman would think you're an idiot, and Munger would profit based on your inability to think through a problem.

"Science is a way of thinking much more than it is a body of knowledge."

— Carl Sagan

Examples of First Principles in Action

So we can better understand how first-principles reasoning works, let's look at four examples.

Elon Musk and SpaceX

Perhaps no one embodies first-principles thinking more than Elon Musk. He is one of the most audacious entrepreneurs the world has ever seen. My kids (grades 3 and 2) refer to him as a real-life Tony Stark, thereby conveniently providing a good time for me to remind them that by fourth grade, Musk was reading the Encyclopedia Britannica and not Pokemon.

What's most interesting about Musk is not what he thinks but how he thinks:

I think people's thinking process is too bound by convention or analogy to prior experiences. It's rare that people try to think of something on a first principles basis. They'll say, "We'll do that because it's always been done that way." Or they'll not do it because "Well, nobody's ever done that, so it must not be good. But that's just a ridiculous way to think. You have to build up the reasoning from the ground up—"from the first principles" is the phrase that's used in physics. You look at the fundamentals and construct your reasoning from that, and then you see if you have a conclusion that works or doesn't work, and it may or may not be different from what people have done in the past.[4]

His approach to understanding reality is to start with what is true — not with his intuition. The problem is that we don't know as much as we think we do, so our intuition isn't very good. We trick ourselves into thinking we know what's possible and what's not. The way Musk thinks is much different.

Musk starts out with something he wants to achieve, like building a rocket. Then he starts with the first principles of the problem. Running through how Musk would think, Larry Page said in an

interview, “What are the physics of it? How much time will it take? How much will it cost? How much cheaper can I make it? There’s this level of engineering and physics that you need to make judgments about what’s possible and interesting. Elon is unusual in that he knows that, and he also knows business and organization and leadership and governmental issues.”[5]

Rockets are absurdly expensive, which is a problem because Musk wants to send people to Mars. And to send people to Mars, you need cheaper rockets. So he asked himself, “What is a rocket made of? Aerospace-grade aluminum alloys, plus some titanium, copper, and carbon fiber. And ... what is the value of those materials on the commodity market? It turned out that the materials cost of a rocket was around two percent of the typical price.”

[6]

Why, then, is it so expensive to get a rocket into space? Musk, a notorious self-learner with degrees in both economics and physics, literally taught himself rocket science. He figured that the only reason getting a rocket into space is so expensive is that people are stuck in a mindset that doesn’t hold up to first principles. With that, Musk decided to create SpaceX and see if he could build rockets himself from the ground up.

In an interview with Kevin Rose, Musk summarized his approach:

I think it’s important to reason from first principles rather than by analogy. So the normal way we conduct our lives is, we reason by analogy. We are doing this because it’s like something else that was done, or it is like what other people are doing... with slight iterations on a theme. And it’s ... mentally easier to reason by analogy rather than from first principles. First principles is kind of a physics way of looking at the world, and what that really means is, you ... boil things down to the most fundamental truths and say, “okay, what are we sure is true?” ... and then reason up from there. That takes a lot more mental energy.[7]

Musk then gave an example of how Space X uses first principles to innovate at low prices: *Somebody could say — and in fact people do — that battery packs are really expensive and that’s just the way they will always be because that’s the way they have been in the past. ... Well, no, that’s pretty dumb... Because if you applied that reasoning to anything new, then you wouldn’t be able to ever get to that new thing.... you can’t say, ... “oh, nobody wants a car because horses are great, and we’re used to them and they can eat grass and there’s lots of grass all over the place and ... there’s no gasoline that people can buy....”*

He then gives a fascinating example about battery packs:

... they would say, “historically, it costs \$600 per kilowatt-hour. And so it’s not going to be much better than that in the future. ... So the first principles would be, ... what are the material constituents of the batteries? What is the spot market value of the material constituents? ... It’s got cobalt, nickel, aluminum, carbon, and some polymers for separation, and a steel can. So break that down on a material basis; if we bought that on a London Metal Exchange, what would each of these things cost? Oh, jeez, it’s ... \$80 per kilowatt-hour. So, clearly, you just need to think of clever ways to take those materials and combine them into the shape of a battery cell, and you can have batteries that are much, much cheaper than anyone realizes.

BuzzFeed

After studying the psychology of virality, Jonah Peretti founded BuzzFeed in 2006. The site quickly grew to be one of the most popular on the internet, with hundreds of employees and substantial revenue.

Peretti figured out early on the first principle of a successful website: wide distribution. Rather than publishing articles people should read, BuzzFeed focuses on publishing those that people want to read. This means aiming to garner maximum social shares to put distribution in the hands of readers.

Peretti recognized the first principles of online popularity and used them to take a new approach to journalism. He also ignored SEO, saying, “Instead of making content robots like, it was more satisfying to make content humans want to share.”[8] Unfortunately for us, we share a lot of cat videos.

A common aphorism in the field of viral marketing is, “content might be king, but distribution is queen, and she wears the pants” (or “and she has the dragons”; pick your metaphor). BuzzFeed’s distribution-based approach is based on obsessive measurement, using A/B testing and analytics.

Jon Steinberg, president of BuzzFeed, explains the first principles of virality:

Keep it short. Ensure [that] the story has a human aspect. Give people the chance to engage. And let them react. People mustn’t feel awkward sharing it. It must feel authentic. Images and lists work. The headline must be persuasive and direct.

Derek Sivers and CD Baby

When Sivers founded his company CD Baby, he reduced the concept down to first principles. Sivers asked, What does a successful business need? His answer was happy customers.

Instead of focusing on garnering investors or having large offices, fancy systems, or huge numbers of staff, Sivers focused on making each of his customers happy. An example of this is his famous order confirmation email, part of which reads:

Your CD has been gently taken from our CD Baby shelves with sterilized contamination-free gloves and placed onto a satin pillow. A team of 50 employees inspected your CD and polished it to make sure it was in the best possible condition before mailing. Our packing specialist from Japan lit a candle and a hush fell over the crowd as he put your CD into the finest gold-lined box money can buy.

By ignoring unnecessary details that cause many businesses to expend large amounts of money and time, Sivers was able to rapidly grow the company to \$4 million in monthly revenue. In *Anything You Want*, Sivers wrote:

Having no funding was a huge advantage for me.

A year after I started CD Baby, the dot-com boom happened. Anyone with a little hot air and a vague plan was given millions of dollars by investors. It was ridiculous. ...

Even years later, the desks were just planks of wood on cinder blocks from the hardware store. I made the office computers myself from parts. My well-funded friends would spend \$100,000 to buy something I made myself for \$1,000. They did it saying, “We need the very best,” but it didn’t improve anything for their customers. ...

It’s counterintuitive, but the way to grow your business is to focus entirely on your existing customers. Just thrill them, and they’ll tell everyone.

To survive as a business, you need to treat your customers well. And yet so few of us master this principle.

Employing First Principles in Your Daily Life

Most of us have no problem thinking about what we want to achieve in life, at least when we’re young. We’re full of big dreams, big ideas, and boundless energy. The problem is that we let others tell us what’s possible, not only when it comes to our dreams but also when it comes to how we go after them. And when we let other people tell us what’s possible or what the best way to do something is, we outsource our thinking to someone else.

The real power of first-principles thinking is moving away from incremental improvement and into possibility. Letting others think for us means that we’re using their analogies, their conventions, and their possibilities. It means we’ve inherited a world that conforms to what they think. This is incremental thinking.

When we take what already exists and improve on it, we are in the shadow of others. It’s only when we step back, ask ourselves what’s possible, and cut through the flawed analogies that we see what is possible. Analogies are beneficial; they make complex

problems easier to communicate and increase understanding. Using them, however, is not without a cost. They limit our beliefs about what's possible and allow people to argue without ever exposing our (faulty) thinking. Analogies move us to see the problem in the same way that someone else sees the problem.

The gulf between what people currently see because their thinking is framed by someone else and what is physically possible is filled by the people who use first principles to think through problems.

First-principles thinking clears the clutter of what we've told ourselves and allows us to rebuild from the ground up. Sure, it's a lot of work, but that's why so few people are willing to do it. It's also why the rewards for filling the chasm between possible and incremental improvement tend to be non-linear.

Let's take a look at a few of the limiting beliefs that we tell ourselves.

"I don't have a good memory." [10]

People have far better memories than they think they do. Saying you don't have a good memory is just a convenient excuse to let you forget. Taking a first-principles approach means asking how much information we can physically store in our minds. The answer is "a lot more than you think." Now that we know it's possible to put more into our brains, we can reframe the problem into finding the most optimal way to store information in our brains.

"There is too much information out there."

A lot of professional investors read Farnam Street. When I meet these people and ask how they consume information, they usually fall into one of two categories. The differences between the two apply to all of us. The first type of investor says there is too much information to consume. They spend their days reading every press release, article, and blogger commenting on a position they hold. They wonder what they are missing. The second type of investor realizes that reading everything is unsustainable and stressful and makes them prone to overvaluing information they've spent a great amount of time consuming. These investors, instead, seek to understand the variables that will affect their investments. While there might be hundreds, there are usually three to five variables that will really move the needle. The investors don't have to read everything; they just pay attention to these variables.

"All the good ideas are taken."

A common way that people limit what's possible is to tell themselves that all the good ideas are taken. Yet, people have been saying this for hundreds of years — literally — and companies keep starting and competing with different ideas, variations, and strategies.

"We need to move first."

I've heard this in boardrooms for years. The answer isn't as black and white as this statement. The iPhone wasn't first, it was better. Microsoft wasn't the first to sell operating systems; it just had a better business model. There is a lot of evidence showing that first movers in business are more likely to fail than latecomers. Yet this myth about the need to move first continues to exist.

Sometimes the early bird gets the worm and sometimes the first mouse gets killed. You have to break each situation down into its component parts and see what's possible. That is the work of first-principles thinking.

"I can't do that; it's never been done before."

People like Elon Musk are constantly doing things that have never been done before. This type of thinking is analogous to looking back at history and building, say, floodwalls, based on the worst flood that has happened before. A better bet is to look at what could happen and plan for that.

"As to methods, there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble."

— Harrington Emerson

Conclusion

The thoughts of others imprison us if we're not thinking for ourselves.

Reasoning from first principles allows us to step outside of history and conventional wisdom and see what is possible. When you really understand the principles at work, you can decide if the existing methods make sense. Often they don't.

Reasoning by first principles is useful when you are (1) doing something for the first time, (2) dealing with complexity, and (3) trying to understand a situation that you're having problems with. In all of these areas, your thinking gets better when you stop making assumptions and you stop letting others frame the problem for you.

Analogies can't replace understanding. While it's easier on your brain to reason by analogy, you're more likely to come up with better answers when you reason by first principles. This is what makes it one of the best sources of creative thinking. Thinking in first principles allows you to adapt to a changing environment, deal with reality, and seize opportunities that others can't see.

Many people mistakenly believe that creativity is something that only some of us are born with, and either we have it or we don't. Fortunately, there seems to be ample evidence that this isn't true.^[11] We're all born rather creative, but during our formative years, it can be beaten out of us by busy parents and teachers. As adults, we rely on convention and what we're told because that's easier than breaking things down into first principles and thinking for ourselves. Thinking through first principles is a way of taking off the blinders. Most things suddenly seem more possible.

"I think most people can learn a lot more than they think they can," says Musk. "They sell themselves short without trying. One bit of advice: it is important to view knowledge as sort of a semantic tree — make sure you understand the fundamental principles, i.e., the trunk and big branches, before you get into the leaves/details or there is nothing for them to hang on to."

130. Reversible and Irreversible Decisions

Making decisions, even in areas you know relatively well, usually involves an element of uncertainty. Sometimes decisions can be made quickly, and uncertainty is acceptable or desirable. Other times, decisions are made slowly and deliberately to remove as much uncertainty as possible.

Once you are faced with a decision, the question becomes whether you should make it fast or slow.

Do you gather as much information as possible, knowing the process of gathering information slows you down and carries a cost? Or do you make it quickly with imperfect information?

Jeff Bezos, the founder of Amazon.com, considers decisions like doors. He asks himself if the decision is a one-way door or a two-way door. What's the difference?

Once you walk through a one-way door, you can't come back. It's irreversible. With a two-way door, on the other hand, you can walk through, look around, and easily come back to where you started.

In a shareholder letter, Bezos wrote^[1]:

Some decisions are consequential and irreversible or nearly irreversible – one-way doors – and these decisions must be made methodically, carefully, slowly, with great deliberation and consultation. If you walk through and don't like what you see on the other side, you can't get back to where you were before. We can call these Type 1 decisions. But most decisions aren't like that – they are changeable, reversible – they're two-way doors. If you've made a suboptimal Type 2 decision, you don't have to live with the consequences for that long. You can reopen the door and go back through. Type 2 decisions can and should be made quickly by high judgment individuals or small groups.

As organizations get larger, there seems to be a tendency to use the heavy-weight Type 1 decision-making process on most decisions, including many Type 2 decisions. The end result of this is slowness, unthoughtful risk aversion, failure to experiment sufficiently, and consequently diminished invention. We'll have to figure out how to fight that tendency.

Reversible to Irreversible

Decisions fall somewhere on the continuum from reversible to irreversible. You can tell where a decision lies on this spectrum by asking how much it would cost to undo. The higher the cost to undo, the more irreversible it is. The lower the cost, the more reversible it is.

Perhaps an example will help illustrate the point. After brushing your teeth this morning, you run to the store to grab some toothpaste. However, they are out of your usual brand. Since the decision is easily reversible, you quickly grab a package that looks decent and take it home. If the toothpaste is terrible, you can easily get another type tomorrow. Now consider an irreversible decision. Imagine you are the manager of an NBA team. You're thinking about trading one of your star players away. Once made, that decision can't (easily) be undone.

Once you learn to see decisions through the lens of reversible and irreversible, everything changes. It also changes how you make decisions.

Make reversible decisions as soon as possible and make irreversible decisions as late as possible.

When decisions are reversible, make them fast. Your biggest risk is dragging your feet and not making a decision. The cost to acquire additional information isn't worth the effort.

When decisions are irreversible, slow them down. The biggest risk is making the wrong decision. The cost to get the information we need to reduce uncertainty is worth the time and effort.

I used this heuristic to quit my job and start my first company. While some people saw this as a huge risk, I didn't. I realized that if the company failed, I would have learned a lot and could pretty easily return to my old job. It was a risk, but it wasn't as big as some thought. The future is unpredictable.

Sometimes you can handle the uncertainty or outcomes. Like trying a new restaurant after reading a review or hearing about it from someone at work. Other times, you want to remove as much uncertainty as possible. You wouldn't decide to marry someone after one amazing date, buy a car without test driving it, or put all your money into a stock you overheard someone talking about in line at the grocery store.

Avoiding Analysis Paralysis

Make reversible decisions as soon as possible. Make irreversible decisions as late as possible.

When I mention this rule to people, they ask: how do I know it's as late as possible?

Consider my rule of STOP, LOP, or KNOW. If you stop gathering useful information (STOP), you're about to lose an opportunity (LOP), or you know what to do (KNOW).

If you stop gathering useful information and there is no prospect of any on the horizon, make the decision. When you're in charge of operations at a three-letter agency, you make many hard decisions with imperfect information. Once you've talked to all the people with useful information, it's time to act. The problem is a lot of people don't act. They sit waiting for some magical piece of information that might or might not come that will make the decision clear. I call this unicorn information. We know it's out there, but we can never find it. You can't wait for the unicorn, you have to decide. The people that waited for the unicorn didn't last.

If you're about to lose a meaningful opportunity, make the decision. Recently a big real estate opportunity came across my desk. While not impossible to reverse, it would have been prohibitively costly. As with any decision that involves a lot of money — the biggest check I've ever written, I dove into the details wanting to understand everything. At first, there was no rush to make the decision. When interest rates started to rise, the deal got a lot more attractive. My partner called and asked if I was in because it was going forward with or without me. I had to decide, or I'd lose the opportunity.

If you know what to do, make the decision. When you're the boss, sometimes you have to let people go. While you can offer feedback and coach and hope things will change, sometimes you wake up and know what to do. Once you know it's best for both parties to move on, the biggest mistake is waiting.

Fast is not always Reckless.

Reversible decisions don't need to be made the same way as irreversible decisions.

Reversible decisions are not an excuse to act recklessly or be ill-informed, but rather an acknowledgement that imperfect decisions are ok.

Fast decisions are a competitive advantage. Warren Buffett has famously given a yes/no decision on acquisitions in less than 48 hours. Fast decisions are one advantage that start-ups have over incumbents.

A good plan, violently executed now, is better than a perfect plan next week.

General George Patton

Bezos considers 70% certainty as the cut-off point where it is appropriate to make a decision. That means acting once we have 70% of the required information, instead of waiting longer. Making a decision at 70% certainty and then quickly course-correcting is much more effective than waiting for 90% certainty.

More Information does not mean Better Outcomes.

In Blink: The Power of Thinking Without Thinking, Malcolm Gladwell explains why decision-making under uncertainty can be so effective. We usually assume that more

information leads to better decisions — if a doctor proposes additional tests, we tend to believe they will lead to a better outcome. Gladwell disagrees: “In fact, you need to know very little to find the underlying signature of a complex phenomenon. All you need is evidence of the ECG, blood pressure, fluid in the lungs, and an unstable angina. That’s a radical statement.”

In medicine, as in many areas, more information does not necessarily ensure improved outcomes. To illustrate this, Gladwell gives the example of a man arriving at a hospital with intermittent chest pains. His vital signs show no risk factors, yet his lifestyle does and he had heart surgery two years earlier. If a doctor looks at all the available information, it may seem that the man needs to be admitted to the hospital. But the additional factors, beyond the vital signs, are not important in the short term. In the long run, he is at serious risk of developing heart disease.

Gladwell writes:

... the role of those other factors is so small in determining what is happening to the man right now that an accurate diagnosis can be made without them. In fact, ... that extra information is more than useless. It's harmful. It confuses the issues. What screws up doctors when they are trying to predict heart attacks is that they take too much information into account.

Once you understand that reversible decisions are a great way to inject randomness, gather information, or even delegate to others, things change.

The biggest risk to irreversible decisions is deciding before you need to. The biggest risk to reversible ones is waiting until the last minute.

Make reversible decisions as soon as possible and make irreversible decisions as late as possible.

131. The Value of Probabilistic Thinking: Spies, Crime, and Lightning Strikes

Probabilistic thinking is essentially trying to estimate, using some tools of math and logic, the likelihood of any specific outcome coming to pass. It is one of the best tools we have to improve the accuracy of our decisions. In a world where each moment is determined by an infinitely complex set of factors, probabilistic thinking helps us identify the most likely outcomes. When we know these our decisions can be more precise and effective.

The Great Mental Models Volumes One and Two are out.

Learn more about [the project here](#).

Are you going to get hit by lightning or not?

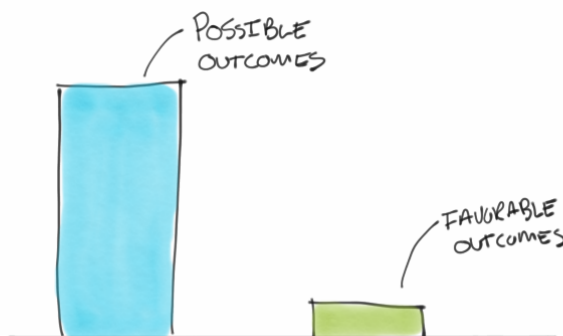
Why we need the concept of probabilities at all is worth thinking about. Things either are or are not, right? We either *will* get hit by lightning today or we *won't*. The problem is, we just don't know until we live out the day, which doesn't help us at all when we make our decisions in the morning. The future is far from determined and we can better navigate it by understanding the likelihood of events that could impact us.

Our lack of perfect information about the world gives rise to all of probability theory, and its usefulness. We know now that the future is inherently unpredictable because not all variables can be known and even the smallest error imaginable in our data very quickly throws off our predictions. The best we can do is estimate the future by generating realistic, useful probabilities. So how do we do that?

Probability is everywhere, down to the very bones of the world. The probabilistic machinery in our minds—the cut-to-the-quick *heuristics* made so famous by the psychologists Daniel Kahneman and Amos Tversky—was evolved by the human species in a time before computers, factories, traffic, middle managers, and the stock market. It served us in a time when human life was about *survival*, and still serves us well in that capacity.

But what about today—a time when, for most of us, survival is not so much the issue? We want to *thrive*. We want to compete, and win. Mostly, we want to make good decisions in complex social systems that were not part of the world in which our brains evolved their (quite rational) heuristics.

For this, we need to consciously add in a needed layer of probability awareness. What is it and how can I use it to my advantage?



There are three important aspects of probability that we need to explain so you can integrate them into your thinking to get into the ballpark and improve your chances of catching the ball:

1. Bayesian thinking,
2. Fat-tailed curves
3. Asymmetries

Thomas Bayes and Bayesian thinking: Bayes was an English minister in the first half of the 18th century, whose most famous work, “An Essay Toward Solving a Problem in the Doctrine of Chances” was brought to the attention of the Royal Society by his friend Richard Price in 1763—two years after his death. The essay, the key to what we now know as Bayes’s Theorem, concerned how we should adjust probabilities when we encounter new data.

The core of Bayesian thinking (or Bayesian updating, as it can be called) is this: given that we have limited but useful information about the world, and are constantly encountering new information, we should probably take into account what we already know when we learn something new. As much of it as possible. Bayesian thinking allows us to use all relevant prior information in making decisions. Statisticians might call it a *base rate*, taking in outside information about past situations like the one you’re in.

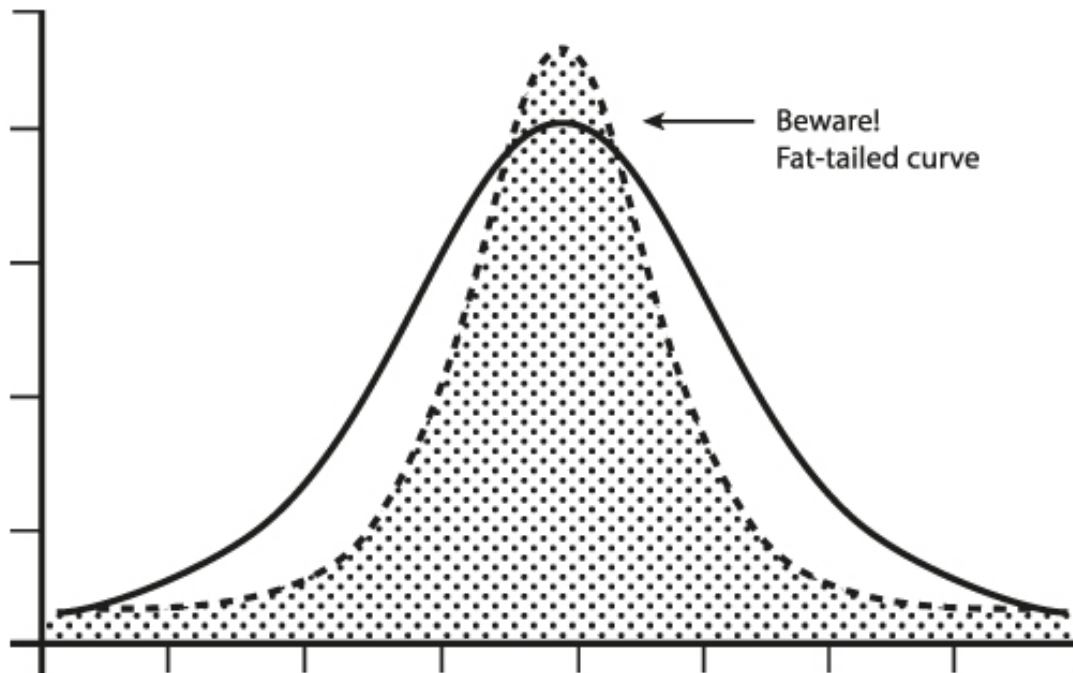
Consider the headline “Violent Stabbings on the Rise.” Without Bayesian thinking, you might become genuinely afraid because your chances of being a victim of assault or murder is higher than it was a few months ago. But a Bayesian approach will have you putting this information into the context of what you already know about violent crime. You know that violent crime has been declining to its lowest rates in decades. Your city is safer now than it has been since this measurement started. Let’s say your chance of being a victim of a stabbing last year was one in 10,000, or 0.01%. The article states, with accuracy, that violent crime has doubled. It is now two in 10,000, or 0.02%. Is that worth being terribly worried about? The prior information here is key. When we factor it in, we realize that our safety has not really been compromised.

Conversely, if we look at the diabetes statistics in the United States, our application of prior knowledge would lead us to a different conclusion. Here, a Bayesian analysis indicates you should be concerned. In 1958, 0.93% of the population was diagnosed with diabetes. In 2015 it was 7.4%. When you look at the intervening years, the climb in diabetes diagnosis is steady, not a spike. So the prior relevant data, or priors, indicate a trend that is worrisome.

It is important to remember that priors themselves are probability estimates. For each bit of prior knowledge, you are not putting it in a binary structure, saying it is true or not. You’re assigning it a probability of being true. Therefore, you can’t let your priors get in the way of processing new knowledge. In Bayesian terms, this is called the likelihood ratio or the Bayes factor. Any new information you encounter that challenges a prior simply means that the probability of that prior being true may be reduced. Eventually, some priors are replaced completely. This is an ongoing cycle of challenging and validating what you believe you know. When making uncertain decisions, it’s nearly always a mistake not to ask: What are the relevant priors? What might I already know that I can use to better understand the reality of the situation?

Now we need to look at fat-tailed curves: Many of us are familiar with the bell curve, that nice, symmetrical wave that captures the relative frequency of so many things from height to exam scores. The bell curve is great because it’s easy to understand and easy to use. Its technical name is “normal distribution.” If we know we are in a bell curve situation, we can quickly identify our parameters and plan for the most likely outcomes.

Fat-tailed curves are different. Take a look.



At first glance they seem similar enough. Common outcomes cluster together, creating a wave. The difference is in the tails. In a bell curve the extremes are predictable. There can only be so much deviation from the mean. In a fat-tailed curve there is no real cap on extreme events.

The more extreme events that are possible, the longer the tails of the curve get. Any one extreme event is still unlikely, but the sheer number of options means that we can't rely on the most common outcomes as representing the average. The more extreme events that are possible, the higher the probability that one of them will occur. Crazy things are definitely going to happen, and we have no way of identifying when.

Think of it this way. In a bell curve type of situation, like displaying the distribution of height or weight in a human population, there are outliers on the spectrum of possibility, but the outliers have a fairly well defined scope. You'll never meet a man who is ten times the size of an average man. But in a curve with fat tails, like wealth, the central tendency does not work the same way. You may regularly meet people who are ten, 100, or 10,000 times wealthier than the average person. That is a very different type of world.

Let's re-approach the example of the risks of violence we discussed in relation to Bayesian thinking. Suppose you hear that you had a greater risk of slipping on the stairs and cracking your head open than being killed by a terrorist. The statistics, the priors, seem to back it up: 1,000 people slipped on the stairs and died last year in your country and only 500 died of terrorism. Should you be more worried about stairs or terror events?

Some use examples like these to prove that terror risk is low—since the recent past shows very few deaths, why worry?[1] The problem is in the fat tails: The risk of terror violence is more like wealth, while stair-slipping deaths are more like height and weight. In the next ten years, how many events are possible? How fat is the tail?

The important thing is not to sit down and imagine every possible scenario in the tail (by definition, it is impossible) but to deal with fat-tailed domains in the correct way: by positioning ourselves to survive or even benefit from the wildly unpredictable future, by being the only ones thinking correctly and planning for a world we don't fully understand. Asymmetries: Finally, you need to think about something we might call "metaprobability" — the probability that your probability estimates themselves are any good.

This massively misunderstood concept has to do with asymmetries. If you look at nicely polished stock pitches made by professional investors, nearly every time an idea is presented, the investor looks their audience in the eye and states they think they're going to achieve a rate of return of 20% to 40% per annum, if not higher. Yet *exceedingly* few of them ever attain that mark, and it's not because they don't have any winners. It's because they get so many so wrong. They consistently overestimate their confidence in their probabilistic estimates. (For reference, the general stock market has returned no more than 7% to 8% per annum in the United States over a long period, before fees.)

Another common asymmetry is people's ability to estimate the effect of traffic on travel time. How often do you leave "on time" and arrive 20% early? Almost never? How often do you leave "on time" and arrive 20% late? All the time? Exactly. Your estimation errors are asymmetric, skewing in a single direction. This is often the case with probabilistic decision-making.[2]

Far more probability estimates are wrong on the "over-optimistic" side than the "under-optimistic" side. You'll rarely read about an investor who aimed for 25% annual return rates who subsequently earned 40% over a long period of time. You can throw a dart at the Wall Street Journal and hit the names of lots of investors who aim for 25% per annum with each investment and end up closer to 10%.

The spy world

Successful spies are very good at probabilistic thinking. High-stakes survival situations tend to make us evaluate our environment with as little bias as possible.

When Vera Atkins was second in command of the French unit of the Special Operations Executive (SOE), a British intelligence organization reporting directly to Winston Churchill during World War II[3], she had to make hundreds of decisions by figuring out the probable accuracy of inherently unreliable information.

Atkins was responsible for the recruitment and deployment of British agents into occupied France. She had to decide who could do the job, and where the best sources of intelligence were. These were literal life-and-death decisions, and all were based in probabilistic thinking.

First, how do you choose a spy? Not everyone can go undercover in high-stress situations and make the contacts necessary to gather intelligence. The result of failure in France in WWII was not getting fired; it was death. What factors of personality and experience show that a person is right for the job? Even today, with advancements in psychology, interrogation, and polygraphs, it's still a judgment call.

For Vera Atkins in the 1940s, it was very much a process of assigning weight to the various factors and coming up with a probabilistic assessment of who had a decent chance of success. Who spoke French? Who had the confidence? Who was too tied to

family? Who had the problem-solving capabilities? From recruitment to deployment, her development of each spy was a series of continually updated, educated estimates. Getting an intelligence officer ready to go is only half the battle. Where do you send them? If your information was so great that you knew exactly where to go, you probably wouldn't need an intelligence mission. Choosing a target is another exercise in probabilistic thinking. You need to evaluate the reliability of the information you have and the networks you have set up. Intelligence is not evidence. There is no chain of command or guarantee of authenticity.

The stuff coming out of German-occupied France was at the level of grainy photographs, handwritten notes that passed through many hands on the way back to HQ, and unverifiable wireless messages sent quickly, sometimes sporadically, and with the operator under incredible stress. When deciding what to use, Atkins had to consider the relevancy, quality, and timeliness of the information she had.

She also had to make decisions based not only on what had happened, but what possibly could. Trying to prepare for every eventuality means that spies would never leave home, but they must somehow prepare for a good deal of the unexpected. After all, their jobs are often executed in highly volatile, dynamic environments. The women and men Atkins sent over to France worked in three primary occupations: organizers were responsible for recruiting locals, developing the network, and identifying sabotage targets; couriers moved information all around the country, connecting people and networks to coordinate activities; and wireless operators had to set up heavy communications equipment, disguise it, get information out of the country, and be ready to move at a moment's notice. All of these jobs were dangerous. The full scope of the threats was never completely identifiable. There were so many things that could go wrong, so many possibilities for discovery or betrayal, that it was impossible to plan for them all. The average life expectancy in France for one of Atkins' wireless operators was six weeks.

Finally, the numbers suggest an asymmetry in the estimation of the probability of success of each individual agent. Of the 400 agents that Atkins sent over to France, 100 were captured and killed. This is not meant to pass judgment on her skills or smarts.

Probabilistic thinking can only get you in the ballpark. It doesn't guarantee 100% success. There is no doubt that Atkins relied heavily on probabilistic thinking to guide her decisions in the challenging quest to disrupt German operations in France during World War II. It is hard to evaluate the success of an espionage career, because it is a job that comes with a lot of loss. Atkins was extremely successful in that her network conducted valuable sabotage to support the allied cause during the war, but the loss of life was significant.

Conclusion

Successfully thinking in shades of probability means roughly identifying what matters, coming up with a sense of the odds, doing a check on our assumptions, and then making a decision. We can act with a higher level of certainty in complex, unpredictable situations. We can never know the future with exact precision. Probabilistic thinking is an extremely useful tool to evaluate how the world will most likely look so that we can effectively strategize.

132. Inertia: The Force That Holds the Universe Together

Inertia is the force that holds the universe together. Literally. Without it, things would fall apart. It's also what keeps us locked in destructive habits, and resistant to change.

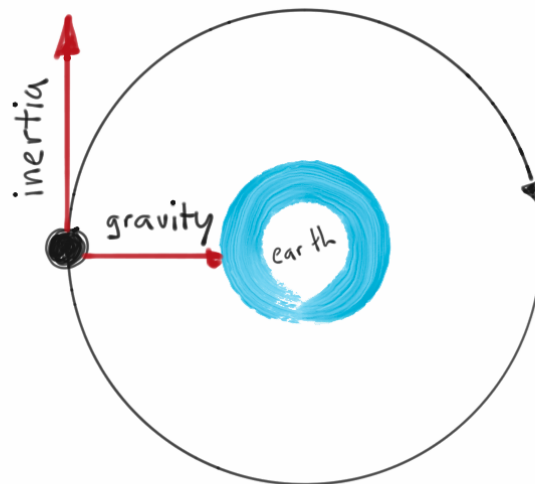
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"If it were possible to flick a switch and turn off inertia, the universe would collapse in an instant to a clump of matter," write Peter and Neal Garneau in *In the Grip of the Distant Universe: The Science of Inertia*.

...death is the destination we all share. No one has ever escaped it. And that is as it should be, because death is very likely the single best invention of life. It's life's change agent; it clears out the old to make way for the new ... Your time is limited, so don't waste it living someone else's life.

Steve Jobs

Inertia is the force that holds the universe together. Literally. Without it, matter would lack the electric forces necessary to form its current arrangement. Inertia is counteracted by the heat and kinetic energy produced by moving particles. Subtract it and everything cools to -459.67 degrees Fahrenheit (absolute zero temperature). Yet we know so little about inertia and how to leverage it in our daily lives.



The Basics

The German astronomer Johannes Kepler (1571–1630) coined the word “inertia.” The etymology of the term is telling. Kepler obtained it from the Latin for “unskillfulness, ignorance; inactivity or idleness.” True to its origin, inertia keeps us in bed on a lazy Sunday morning (we need to apply activation energy to overcome this state).

Inertia refers to resistance to change — in particular, resistance to changes in motion. Inertia may manifest in physical objects or in the minds of people.

We learn the principle of inertia early on in life. We all know that it takes a force to get something moving, to change its direction, or to stop it.

Our intuitive sense of how inertia works enables us to exercise a degree of control over the world around us. Learning to drive offers further lessons. Without external physical forces, a car would keep moving in a straight line in the same direction. It takes a force (energy) to get a car moving and overcome the inertia that kept it still in a parking space. Changing

direction to round a corner or make a U-turn requires further energy. Inertia is why a car does not stop the moment the brakes are applied.

The heavier a vehicle is, the harder it is to overcome inertia and make it stop. A light bicycle stops with ease, while an eight-carriage passenger train needs a good mile to halt. Similarly, the faster we run, the longer it takes to stop. Running in a straight line is much easier than twisting through a crowded sidewalk, changing direction to dodge people. Any object that can be rotated, such as a wheel, has rotational inertia. This tells us how hard it is to change the object's speed around the axis. Rotational inertia depends on the mass of the object and its distribution relative to the axis.

Inertia is Newton's first law of motion, a fundamental principle of physics. Newton summarized it this way: "The vis insita, or innate force of matter, is a power of resisting by which every body, as much as in it lies, endeavors to preserve its present state, whether it be of rest or of moving uniformly forward in a straight line."

When developing his first law, Newton drew upon the work of Galileo Galilei. In a 1624 letter to Francesco Ingoli, Galileo outlined the principle of inertia:

I tell you that if natural bodies have it from Nature to be moved by any movement, this can only be a circular motion, nor is it possible that Nature has given to any of its integral bodies a propensity to be moved by straight motion. I have many confirmations of this proposition, but for the present one alone suffices, which is this.

I suppose the parts of the universe to be in the best arrangement so that none is out of its place, which is to say that Nature and God have perfectly arranged their structure...

Therefore, if the parts of the world are well ordered, the straight motion is superfluous and not natural, and they can only have it when some body is forcibly removed from its natural place, to which it would then return to a straight line.

In 1786, Immanuel Kant elaborated further: "All change of matter has an external cause. (Every body remains in its state of rest or motion in the same direction and with the same velocity, if not compelled by an external cause to forsake this state.) ... This mechanical law can only be called the law of inertia (lex inertiae)...."

Now that we understand the principle, let's look at some of the ways we can understand it better and apply it to our advantage.

Decision Making and Cognitive Inertia

We all experience cognitive inertia: the tendency to stick to existing ideas, beliefs, and habits even when they no longer serve us well. Few people are truly able to revise their opinions in light of disconfirmatory information. Instead, we succumb to confirmation bias and seek out verification of existing beliefs. It's much easier to keep thinking what we've always been thinking than to reflect on the chance that we might be wrong and update our views. It takes work to overcome cognitive dissonance, just as it takes effort to stop a car or change its direction.

When the environment changes, clinging to old beliefs can be harmful or even fatal.

Whether we fail to perceive the changes or fail to respond to them, the result is the same.

Even when it's obvious to others that we must change, it's not obvious to us. It's much easier to see something when you're not directly involved. If I ask you how fast you're moving right now, you'd likely say zero, but you're moving 18,000 miles an hour around the sun. Perspective is everything, and the perspective that matters is the one that most closely lines up with reality.

Sometimes you make up your mind about something without knowing why, and your decision persists by the power of inertia. Every year it gets harder to change.

Milan Kundera, *The Unbearable Lightness of Being*

Cognitive inertia is the reason that changing our habits can be difficult. The default is always the path of least resistance, which is easy to accept and harder to question. Consider your bank, for example. Perhaps you know that there are better options at other banks. Or you have had issues with your bank that took ages to get sorted. Yet very few people actually change their banks, and many of us stick with the account we first opened. After all, moving away from the status quo would require a lot of effort: researching alternatives, transferring balances, closing accounts, etc. And what if something goes wrong? Sounds risky. The switching costs are high, so we stick to the status quo. Sometimes inertia helps us. After all, questioning everything would be exhausting. But in many cases, it is worthwhile to overcome inertia and set something in motion, or change direction, or halt it.

The important thing about inertia is that it is only the initial push that is difficult. After that, progress tends to be smoother. Ernest Hemingway had a trick for overcoming inertia in his writing. Knowing that getting started was always the hardest part, he chose to finish work each day at a point where he had momentum (rather than when he ran out of ideas). The next day, he could pick up from there. In *A Moveable Feast*, Hemingway explains: *I always worked until I had something done and I always stopped when I knew what was going to happen next. That way I could be sure of going on the next day.*

Later on in the book, he describes another method, which was to write just one sentence: *Do not worry. You have always written before and you will write now. All you have to do is write one true sentence. Write the truest sentence that you know. So, finally I would write one true sentence and go on from there. It was easy then because there was always one true sentence that I knew or had seen or had heard someone say. If I started to write elaborately, or like someone introducing or presenting something, I found that I could cut that scrollwork or ornament out and throw it away and start with the first true simple declarative sentence I had written.*

We can learn a lot from Hemingway's approach to tackling inertia and apply it in areas beyond writing. As with physics, the momentum from getting started can carry us a long way. We just need to muster the required activation energy and get going.

Status Quo Bias: "When in Doubt, Do Nothing"

Cognitive inertia also manifests in the form of status quo bias. When making decisions, we are rarely rational. Faced with competing options and information, we often opt for the default because it's easy. Doing something other than what we're already doing requires mental energy that we would rather preserve. In many areas, this helps us avoid decision fatigue.

Many of us eat the same meals most of the time, wear similar outfits, and follow routines. This tendency usually serves us well. But the status quo is not necessarily the optimum solution. Indeed, it may be outright harmful or at least unhelpful if something has changed in the environment or we want to optimize our use of time.

The great enemy of any attempt to change men's habits is inertia. Civilization is limited by inertia.

Edward L. Bernays, *Propaganda*

In a paper entitled "If you like it, does it matter if it's real?" Felipe De Brigard^[1] offers a powerful illustration of status quo bias. One of the best-known thought experiments concerns Robert Nozick's "experience machine." Nozick asked us to imagine that scientists have created a virtual reality machine capable of simulating any pleasurable experience. We are offered the opportunity to plug ourselves in and live out the rest of our lives in permanent, but fake enjoyment. The experience machine would later inspire the *Matrix* film series. Presented with the thought experiment, most people balk and claim they would prefer reality. But what if we flip the narrative? De Brigard believed that we are

opposed to the experience machine because it contradicts the status quo, the life we are accustomed to.

In an experiment, he asked participants to imagine themselves woken by the doorbell on a Saturday morning. A man in black, introducing himself as Mr. Smith, is at the door. He claims to have vital information. Mr. Smith explains that there has been an error and you are in fact connected to an experience machine. Everything you have lived through so far has been a simulation. He offers a choice: stay plugged in, or return to an unknown real life. Unsurprisingly, far fewer people wished to return to reality in the latter situation than wished to remain in it in the former. The aversive element is not the experience machine itself, but the departure from the status quo it represents.

Conclusion

Inertia is a pervasive, problematic force. It's the pull that keeps us clinging to old ways and prevents us from trying new things. But as we have seen, it is also a necessary one.

Without it, the universe would collapse. Inertia is what enables us to maintain patterns of functioning, maintain relationships, and get through the day without questioning everything. We can overcome inertia much like Hemingway did — by recognizing its influence and taking the necessary steps to create that all-important initial momentum.

133. Deductive vs Inductive Reasoning: Make Smarter Arguments, Better Decisions, and Stronger Conclusions

You can't prove truth, but using deductive and inductive reasoning, you can get close. Learn the difference between the two types of reasoning and how to use them when evaluating facts and arguments.

In this article we'll cover:

- What Makes Something True?
- Reasoning by Induction
- Reasoning by Deduction
- The History of Reasoning

Ok, let's dig in and see what we can learn.

What Makes Something True?

As odd as it sounds, in science, law, and many other fields, there is no such thing as proof — there are only conclusions drawn from facts and observations. Scientists cannot prove a hypothesis, but they can collect evidence that points to its being true. Lawyers cannot prove that something happened (or didn't), but they can provide evidence that seems irrefutable.

The question of what makes something true is more relevant than ever in this era of alternative facts and fake news. This article explores truth — what it means and how we establish it. We'll dive into inductive and deductive reasoning as well as a bit of history.

"Contrariwise," continued Tweedledee, "if it was so, it might be; and if it were so, it would be; but as it isn't, it ain't. That's logic."

— Lewis Carroll, *Through the Looking-Glass*

The essence of reasoning is a search for truth. Yet truth isn't always as simple as we'd like to believe it is.

For as far back as we can imagine, philosophers have debated whether absolute truth exists. Although we're still waiting for an answer, this doesn't have to stop us from improving how we think by understanding a little more.

In general, we can consider something to be true if the available evidence seems to verify it. The more evidence we have, the stronger our conclusion can be. When it comes to samples, size matters. As my friend Peter Kaufman says:

What are the three largest, most relevant sample sizes for identifying universal principles? Bucket number one is inorganic systems, which are 13.7 billion years in size. It's all the laws of math and physics, the entire physical universe. Bucket number two is organic systems, 3.5 billion years of biology on Earth. And bucket number three is human history....

In some areas, it is necessary to accept that truth is subjective. For example, ethicists accept that it is difficult to establish absolute truths concerning whether something is right or wrong, as standards change over time and vary around the world. When it comes to reasoning, a correctly phrased statement can be considered to have objective truth. Some statements have an objective truth that we cannot ascertain at present. For example, we do not have proof for the existence or non-existence of aliens, although proof does exist somewhere.

Deductive and inductive reasoning are both based on evidence.

Several types of evidence are used in reasoning to point to a truth:

- Direct or experimental evidence — This relies on observations and experiments, which should be repeatable with consistent results.
- Anecdotal or circumstantial evidence — Overreliance on anecdotal evidence can be a logical fallacy because it is based on the assumption that two coexisting factors are linked even though alternative explanations have not been explored. The main use of anecdotal evidence is for forming hypotheses which can then be tested with experimental evidence.
- Argumentative evidence — We sometimes draw conclusions based on facts. However, this evidence is unreliable when the facts are not directly testing a hypothesis. For example, seeing a light in the sky and concluding that it is an alien aircraft would be argumentative evidence.
- Testimonial evidence — When an individual presents an opinion, it is testimonial evidence. Once again, this is unreliable, as people may be biased and there may not be any direct evidence to support their testimony.

“The weight of evidence for an extraordinary claim must be proportioned to its strangeness.”

— Laplace, *Théorie analytique des probabilités* (1812)

Reasoning by Induction

The fictional character Sherlock Holmes is a master of induction. He is a careful observer who processes what he sees to reach the most likely conclusion in the given set of circumstances. Although he pretends that his knowledge is of the black-or-white variety, it often isn't. It is true induction, coming up with the strongest possible explanation for the phenomena he observes.

Consider his description of how, upon first meeting Watson, he reasoned that Watson had just come from Afghanistan:

“Observation with me is second nature. You appeared to be surprised when I told you, on our first meeting, that you had come from Afghanistan.”

“You were told, no doubt.”

“Nothing of the sort. I knew you came from Afghanistan. From long habit the train of thoughts ran so swiftly through my mind, that I arrived at the conclusion without being conscious of intermediate steps. There were such steps, however. The train of reasoning ran, ‘Here is a gentleman of a medical type, but with the air of a military man. Clearly an army doctor, then. He has just come from the tropics, for his face is dark, and that is not the natural tint of his skin, for his wrists are fair. He has undergone hardship and sickness, as his haggard face says clearly. His left arm has been injured. He holds it in a stiff and unnatural manner. Where in the tropics could an English army doctor have seen much hardship and got his arm wounded? Clearly in Afghanistan.’ The whole train of thought did not occupy a second. I then remarked that you came from Afghanistan, and you were astonished.”

(From Sir Arthur Conan Doyle's A Study in Scarlet)

Inductive reasoning involves drawing conclusions from facts, using logic. We draw these kinds of conclusions all the time. If someone we know to have good literary taste recommends a book, we may assume that means we will enjoy the book.

Induction can be strong or weak. If an inductive argument is strong, the truth of the premise would mean the conclusion is likely. If an inductive argument is weak, the logic connecting the premise and conclusion is incorrect.

There are several key types of inductive reasoning:

- Generalized — Draws a conclusion from a generalization. For example, “All the swans I have seen are white; therefore, all swans are probably white.”
- Statistical — Draws a conclusion based on statistics. For example, “95 percent of swans are white” (an arbitrary figure, of course); “therefore, a randomly selected swan will probably be white.”
- Sample — Draws a conclusion about one group based on a different, sample group. For example, “There are ten swans in this pond and all are white; therefore, the swans in my neighbor’s pond are probably also white.”
- Analogous — Draws a conclusion based on shared properties of two groups. For example, “All Aylesbury ducks are white. Swans are similar to Aylesbury ducks. Therefore, all swans are probably white.”
- Predictive — Draws a conclusion based on a prediction made using a past sample. For example, “I visited this pond last year and all the swans were white. Therefore, when I visit again, all the swans will probably be white.”
- Causal inference — Draws a conclusion based on a causal connection. For example, “All the swans in this pond are white. I just saw a white bird in the pond. The bird was probably a swan.”

The entire legal system is designed to be based on sound reasoning, which in turn must be based on evidence. Lawyers often use inductive reasoning to draw a relationship between facts for which they have evidence and a conclusion.

The initial facts are often based on generalizations and statistics, with the implication that a conclusion is most likely to be true, even if that is not certain. For that reason, evidence can rarely be considered certain. For example, a fingerprint taken from a crime scene would be said to be “consistent with a suspect’s prints” rather than being an exact match. Implicit in that statement is the assertion that it is statistically unlikely that the prints are not the suspect’s.

Inductive reasoning also involves Bayesian updating. A conclusion can seem to be true at one point until further evidence emerges and a hypothesis must be adjusted. Bayesian updating is a technique used to modify the probability of a hypothesis’s being true as new evidence is supplied. When inductive reasoning is used in legal situations, Bayesian thinking is used to update the likelihood of a defendant’s being guilty beyond a reasonable doubt as evidence is collected. If we imagine a simplified, hypothetical criminal case, we can picture the utility of Bayesian inference combined with inductive reasoning.

Let’s say someone is murdered in a house where five other adults were present at the time. One of them is the primary suspect, and there is no evidence of anyone else entering the house. The initial probability of the prime suspect’s having committed the murder is 20 percent. Other evidence will then adjust that probability. If the four other people testify that they saw the suspect committing the murder, the suspect’s prints are on the murder weapon, and traces of the victim’s blood were found on the suspect’s clothes, jurors may consider the probability of that person’s guilt to be close enough to 100 percent to convict. Reality is more complex than this, of course. The conclusion is never certain, only highly probable.

One key distinction between deductive and inductive reasoning is that the latter accepts that a conclusion is uncertain and may change in the future. A conclusion is either strong or weak, not right or wrong. We tend to use this type of reasoning in everyday life, drawing conclusions from experiences and then updating our beliefs.

[quote]A conclusion is either strong or weak, not right or wrong.[/quote]

Everyday inductive reasoning is not always correct, but it is often useful. For example, superstitious beliefs often originate from inductive reasoning. If an athlete performed well on a day when they wore their socks inside out, they may conclude that the inside-out socks brought them luck. If future successes happen when they again wear their socks inside out, the belief may strengthen. Should that not be the case, they may update their belief and recognize that it is incorrect.

Another example (let's set aside the question of whether turkeys can reason): A farmer feeds a turkey every day, so the turkey assumes that the farmer cares for its wellbeing. Only when Thanksgiving rolls around does that assumption prove incorrect.

The issue with overusing inductive reasoning is that cognitive shortcuts and biases can warp the conclusions we draw. Our world is not always as predictable as inductive reasoning suggests, and we may selectively draw upon past experiences to confirm a belief. Someone who reasons inductively that they have bad luck may recall only unlucky experiences to support that hypothesis and ignore instances of good luck.

In *The 12 Secrets of Persuasive Argument*, the authors write:

In inductive arguments, focus on the inference. When a conclusion relies upon an inference and contains new information not found in the premises, the reasoning is inductive. For example, if premises were established that the defendant slurred his words, stumbled as he walked, and smelled of alcohol, you might reasonably infer the conclusion that the defendant was drunk. This is inductive reasoning. In an inductive argument the conclusion is, at best, probable. The conclusion is not always true when the premises are true. The probability of the conclusion depends on the strength of the inference from the premises. Thus, when dealing with inductive reasoning, pay special attention to the inductive leap or inference, by which the conclusion follows the premises.

... There are several popular misconceptions about inductive and deductive reasoning. When Sherlock Holmes made his remarkable "deductions" based on observations of various facts, he was usually engaging in inductive, not deductive, reasoning.

In *Inductive Reasoning*, Aiden Feeney and Evan Heit write:

...inductive reasoning ... corresponds to everyday reasoning. On a daily basis we draw inferences such as how a person will probably act, what the weather will probably be like, and how a meal will probably taste, and these are typical inductive inferences.

[...]

[I]t is a multifaceted cognitive activity. It can be studied by asking young children simple questions involving cartoon pictures, or it can be studied by giving adults a variety of complex verbal arguments and asking them to make probability judgments.

[...]

[I]nduction is related to, and it could be argued is central to, a number of other cognitive activities, including categorization, similarity judgment, probability judgment, and decision making. For example, much of the study of induction has been concerned with category-based induction, such as inferring that your next door neighbor sleeps on the basis that your neighbor is a human animal, even if you have never seen your neighbor sleeping. "A very great deal more truth can become known than can be proven."

— Richard Feynman

Reasoning by Deduction

Deduction begins with a broad truth (the major premise), such as the statement that all men are mortal. This is followed by the minor premise, a more specific statement, such as that Socrates is a man. A conclusion follows: Socrates is mortal. If the major premise is true and the minor premise is true the conclusion cannot be false.

Deductive reasoning is black and white; a conclusion is either true or false and cannot be partly true or partly false. We decide whether a deductive statement is true by assessing

the strength of the link between the premises and the conclusion. If all men are mortal and Socrates is a man, there is no way he can not be mortal, for example. There are no situations in which the premise is not true, so the conclusion is true.

In science, deduction is used to reach conclusions believed to be true. A hypothesis is formed; then evidence is collected to support it. If observations support its truth, the hypothesis is confirmed. Statements are structured in the form of “if A equals B, and C is A, then C is B.” If A does not equal B, then C will not equal B. Science also involves inductive reasoning when broad conclusions are drawn from specific observations; data leads to conclusions. If the data shows a tangible pattern, it will support a hypothesis.

For example, having seen ten white swans, we could use inductive reasoning to conclude that all swans are white. This hypothesis is easier to disprove than to prove, and the premises are not necessarily true, but they are true given the existing evidence and given that researchers cannot find a situation in which it is not true. By combining both types of reasoning, science moves closer to the truth. In general, the more outlandish a claim is, the stronger the evidence supporting it must be.

We should be wary of deductive reasoning that appears to make sense without pointing to a truth. Someone could say “A dog has four paws. My pet has four paws. Therefore, my pet is a dog.” The conclusion sounds logical but isn’t, because the initial premise is too specific.

The History of Reasoning

The discussion of reasoning and what constitutes truth dates back to Plato and Aristotle. Plato (429–347 BC) believed that all things are divided into the visible and the intelligible. Intelligible things can be known through deduction (with observation being of secondary importance to reasoning) and are true knowledge.

Aristotle took an inductive approach, emphasizing the need for observations to support knowledge. He believed that we can reason only from discernable phenomena. From there, we use logic to infer causes.

Debate about reasoning remained much the same until the time of Isaac Newton.

Newton’s innovative work was based on observations, but also on concepts that could not be explained by a physical cause (such as gravity). In his *Principia*, Newton outlined four rules for reasoning in the scientific method:

1. “We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances.” (We refer to this rule as Occam’s Razor.)
2. “Therefore, to the same natural effects we must, as far as possible, assign the same causes.”
3. “The qualities of bodies, which admit neither intensification nor remission of degrees, and which are found to belong to all bodies within the reach of our experiments, are to be esteemed the universal qualities of all bodies whatsoever.”
4. “In experimental philosophy, we are to look upon propositions collected by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, ’till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions.”

In 1843, philosopher John Stuart Mill published *A System of Logic*, which further refined our understanding of reasoning. Mill believed that science should be based on a search for regularities among events. If a regularity is consistent, it can be considered a law. Mill described five methods for identifying causes by noting regularities. These methods are still used today:

- Direct method of agreement — If two instances of a phenomenon have a single circumstance in common, the circumstance is the cause or effect.

- Method of difference — If a phenomenon occurs in one experiment and does not occur in another, and the experiments are the same except for one factor, that is the cause, part of the cause, or the effect.
- Joint method of agreement and difference — If two instances of a phenomenon have one circumstance in common, and two instances in which it does not occur have nothing in common except the absence of that circumstance, then that circumstance is the cause, part of the cause, or the effect.
- Method of residue — When you subtract any part of a phenomenon known to be caused by a certain antecedent, the remaining residue of the phenomenon is the effect of the remaining antecedents.
- Method of concomitant variations — If a phenomenon varies when another phenomenon varies in a particular way, the two are connected.

Karl Popper was the next theorist to make a serious contribution to the study of reasoning. Popper is well known for his focus on disconfirming evidence and disproving hypotheses. Beginning with a hypothesis, we use deductive reasoning to make predictions. A hypothesis will be based on a theory — a set of independent and dependent statements. If the predictions are true, the theory is true, and vice versa. Popper's theory of falsification (disproving something) is based on the idea that we cannot prove a hypothesis; we can only show that certain predictions are false. This process requires vigorous testing to identify any anomalies, and Popper does not accept theories that cannot be physically tested. Any phenomenon not present in tests cannot be the foundation of a theory, according to Popper. The phenomenon must also be consistent and reproducible. Popper's theories acknowledge that theories that are accepted at one time are likely to later be disproved. Science is always changing as more hypotheses are modified or disproved and we inch closer to the truth.

Conclusion

In *How to Deliver a TED Talk*, Jeremy Donovan writes:

No discussion of logic is complete without a refresher course in the difference between inductive and deductive reasoning. By its strictest definition, inductive reasoning proves a general principle—your idea worth spreading—by highlighting a group of specific events, trends, or observations. In contrast, deductive reasoning builds up to a specific principle—again, your idea worth spreading—through a chain of increasingly narrow statements.

Logic is an incredibly important skill, and because we use it so often in everyday life, we benefit by clarifying the methods we use to draw conclusions. Knowing what makes an argument sound is valuable for making decisions and understanding how the world works. It helps us to spot people who are deliberately misleading us through unsound arguments. Understanding reasoning is also helpful for avoiding fallacies and for negotiating.

135. The Disproportional Power of Anecdotes

Anecdotes tend to not be statistically significant, but their added emotional significance leads us to place additional weight on them.

Humans, it seems, have an innate tendency to overgeneralize from small samples. How many times have you been caught in an argument where the only proof offered is anecdotal? Perhaps your co-worker saw this bratty kid make a mess in the grocery store while the parents appeared to do nothing. “They just let that child pull things off the shelves and create havoc! My parents would never have allowed that. Parents are so permissive now.” Hmm. Is it true that most parents commonly allow young children to cause trouble in public? It would be a mistake to assume so based on the evidence presented, but a lot of us would go with it anyway. Your co-worker did.

Our propensity to confuse the “now” with “what always is,” as if the immediate world before our eyes consistently represents the entire universe, leads us to bad conclusions and bad decisions. We don’t bother asking questions and verifying validity. So we make mistakes and allow ourselves to be easily manipulated.

Political polling is a good example. It’s actually really hard to design and conduct a good poll. Matthew Mendelsohn and Jason Brent, in their article “Understanding Polling Methodology,” say:

Public opinion cannot be understood by using only a single question asked at a single moment. It is necessary to measure public opinion along several different dimensions, to review results based on a variety of different wordings, and to verify findings on the basis of repetition. Any one result is filled with potential error and represents one possible estimation of the state of public opinion.

This makes sense. But it’s amazing how often we forget.

We see a headline screaming out about the state of affairs and we dive right in, instant believers, without pausing to question the validity of the methodology. How many people did they sample? How did they select them? Most polling aims for random sampling, but there is pre-selection at work immediately, depending on the medium the pollsters use to reach people.

Truly random samples of people are hard to come by. In order to poll people, you have to be able to reach them. The more complicated this is, the more expensive the poll becomes, which acts as a deterrent to thoroughness. The internet can offer high accessibility for a relatively low cost, but it’s a lot harder to verify the integrity of the demographics. And if you go the telephone route, as a lot of polling does, are you already distorting the true randomness of your sample size? Are the people who answer “unknown” numbers already different from those who ignore them?

Polls are meant to generalize larger patterns of behavior based on small samples. You need to put a lot of effort in to make sure that sample is truly representative of the population you are trying to generalize about. Otherwise, erroneous information is presented as truth.

Why does this matter?

It matters because generalization is a widespread human bias, which means a lot of our understanding of the world actually is based on extrapolations made from relatively small sample sizes. Consequently, our individual behavior is shaped by potentially incomplete or inadequate facts that we use to make the decisions that are meant to lead us to success. This bias also shapes a fair degree of public policy and government legislation. We don’t want people who make decisions that affect millions to be dependent on captivating bullshit. (A further concern is that once you are invested, other biases kick in).

Some really smart people are perpetual victims of the problem.

Joseph Henrich, Steven J. Heine, and Ara Norenzayan wrote an article called "The weirdest people in the world?" It's about how many scientific psychology studies use college students who are predominantly Western, Educated, Industrialized, Rich, and Democratic (WEIRD), and then draw conclusions about the entire human race from these outliers. They reviewed scientific literature from domains such as "visual perception, fairness, cooperation, spatial reasoning, categorization and inferential induction, moral reasoning, and the heritability of IQ. The findings suggest that members of WEIRD societies, including young children, are among the least representative populations one could find for generalizing about humans."

Uh-oh. This is a double whammy. "It's not merely that researchers frequently make generalizations from a narrow subpopulation. The concern is that this particular subpopulation is highly unrepresentative of the species."

This is why it can be dangerous to make major life decisions based on small samples, like anecdotes or a one-off experience. The small sample may be an outlier in the greater range of possibilities. You could be correcting for a problem that doesn't exist or investing in an opportunity that isn't there.

This tendency of mistaken extrapolation from small samples can have profound consequences.

Are you a fan of the San Francisco 49ers? They exist, in part, because of our tendency to over-generalize. In the 19th century in Western America and Canada, a few findings of gold along some creek beds led to a massive rush as entire populations flocked to these regions in the hope of getting rich. San Francisco grew from 200 residents in 1846 to about 36,000 only six years later. The gold rush provided enormous impetus toward California becoming a state, and the corresponding infrastructure developments touched off momentum that long outlasted the mining of gold.

But for most of the actual rushers, those hoping for gold based on the anecdotes that floated east, there wasn't much to show for their decision to head west. The *Canadian Encyclopedia* states, "If the nearly 29 million (figure unadjusted) in gold that was recovered during the heady years of 1897 to 1899 [in the Klondike] was divided equally among all those who participated in the gold rush, the amount would fall far short of the total they had invested in time and money."

How did this happen? Because those miners took anecdotes as being representative of a broader reality. Quite literally, they learned mining from rumor, and didn't develop any real knowledge. Most people fought for claims along the creeks, where easy gold had been discovered, while rejecting the bench claims on the hillsides above, which often had just as much gold.

You may be thinking that these men must have been desperate if they packed themselves up, heading into unknown territory, facing multiple dangers along the way, to chase a dream of easy money. But most of us aren't that different. How many times have you invested in a "hot stock" on a tip from one person, only to have the company go under within a year? Ultimately, the smaller the sample size, the greater role the factors of chance play in determining an outcome.

If you want to limit the capriciousness of chance in your quest for success, increase your sample size when making decisions. You need enough information to be able to plot the range of possibilities, identify the outliers, and define the average.

So next time you hear the words "the polls say," "studies show," or "you should buy this," ask questions before you take action. Think about the population that is actually being represented before you start modifying your understanding. Accept the limits of small sample sizes from large populations. And don't give power to anecdotes.

136. Winner Takes it All: How Markets Favor the Few at the Expense of the Many

Markets tend to favor unequal distributions of market share and profits, with a few leaders emerging in any industry. Winner-take-all markets are hard to disrupt and suppress the entry of new players by locking in market share for leading players.

In almost any market, crowds of competitors fight for business within their niche. But over time, with few exceptions, a small number of companies come to dominate the industry. These are the names we all know. The logos we see every day. The brands which shape the world with every decision they make. Even those which are not household names have a great influence on our lives. Operating behind the scenes, they quietly grow more powerful each year, often sowing the seeds of their own destruction in the process.

A winner-take-all market doesn't mean there is only one company in the market. Rather, when we say a winner takes all, what we mean is that a single company receives the majority of available profits. A few others have at best a modest share. The rest fight over a miniscule remnant, and tend not to survive long.

In a winner-take-all market, the winners have tremendous power to dictate outcomes. Winner-take-all markets occur in many different areas. We can apply the concept to all situations which involve unequal distributions.

Unequal Distribution

As a general rule, resources are never distributed evenly among people. In almost every situation, a small number of people or organizations are the winners.

Most of the books sold each year are written by a handful of authors. Most internet traffic is to a few websites. The top 100 websites get more traffic than ranks 100-999 combined (welcome to power laws). Most citations in any field refer to the same few papers and researchers. Most clicks on Google searches are on the first result. Each of these is an instance of a winner-take-all market.

Wealth is a prime example of this type of market. The Pareto Principle states that in a given nation, 20% of the people own 80% of the wealth (the actual figures are 15% and 85%.) However, the Pareto Principle goes deeper than that. We can look at the richest 20%, then calculate the wealth of the richest 20% of that group. Once again, the Pareto principle applies. So roughly 4% own 64% of the wealth. Keep repeating that calculation and we end up with about 9 people. By some estimates, this tiny group has as much as wealth as the poorest half of the world.

“With limited time or opportunity to experiment, we intentionally narrow our choices to those at the top.”

— Seth Godin

The Perks of Being the Best

There are tremendous benefits to being the best in any particular area. Top performers might be only slightly more skilled than the people one level below them, yet they receive an exponential payoff. A small difference in relative performance—an athlete who can run 100 meters a few microseconds faster, a leader who can make better decisions, an opera singer who can go a little higher—can mean the difference between a lucrative career and relative obscurity. The people at the tops of their fields get it all. They are the winners in that particular market. And once someone is regarded as the best, they tend to retain that status. It takes a monumental effort for a newcomer to rise to such a position. Every day new people do make it to the top, but it's a lot easier to stay there than to get there.

Top performers don't just earn the most. They also tend to receive the majority of media coverage and win most awards. They have the most leverage when it comes to choosing their work. These benefits are exponential, following a power law distribution. A silver

medalist might get 10 times the benefits the bronze medalist does. But the gold medalist will receive 10 times the benefits of the silver. If a company is risking millions over a lawsuit, they will want the best possible lawyer no matter the cost. And a surgeon who is 10% better than average can charge more than 10% higher fees. When someone or something is the best, we hear about it. The winners take all the attention. It's one reason why the careers of Nobel Prize winners tend to go downhill after receiving the award. It becomes too lucrative for them to devote their time to the media, giving talks or writing books. Producing more original research falls by the wayside.

Leverage

One reason the best are rewarded more now than ever is leverage. Up until recently, if you were a nanosecond faster than someone else, there was no real advantage. Now there is. Small differences in performance translate into large differences in real-world benefits. A gold medallist in the Olympics, even one that wins by a nanosecond, is disproportionately rewarded for a very small edge.

Now we all live in a world of leverage, through capital, technology, and productivity. Leveraged workers can outperform unleveraged ones by orders of magnitude. When you're leveraged, judgment becomes far more important. That small difference in ability can be put to better use. Software engineers can create billions of dollars of value through code. Ten coders working 10 times harder but slightly less effective in their thinking will have nothing to show for it. Just as with winner-take-all markets, the inputs don't match the outputs.

Feedback Loops

Economist Sherwin Rosen looked at unequal distribution in *The Economics of Superstars*. Rosen found that the demand for classical music and live comedy is high and continues to grow. Yet each area only employs about two hundred full-time performers. These top-performing comedians and musicians take most of the market. Meanwhile, thousands of others struggle for any recognition. Performers regarded as second best within a field earn considerably less than the top performers, even though the average person cannot discern any difference.

In *Success and Luck*, Robert H. Frank explains the self-perpetuating nature of winner take all markets:

Is the Mona Lisa special? Is Kim Kardashian? They're both famous, but sometimes things are famous just for being famous. Although we often try to explain their success by scrutinising their objective qualities, they are in fact often no more special than many of their less renowned counterparts...Success often results from positive feedback loops that amplify tiny initial variations into enormous differences in final outcomes.

Winner-take-all markets are increasingly dictated by feedback loops. Feedback loops develop when the output becomes the input. Consider books. More people will buy a best-selling book because it's a best-selling book. More people will listen to a song that tops charts. More people will go to see an Oscar winning film. These feedback loops serve to magnify initial luck or manipulation. Some writers will purchase thousands of copies of their own book to push it onto best seller lists. Once it makes it onto the list, the feedback loop will begin and possibly keep it there longer than it merits.¹

It's hard to establish what sets off these feedback loops. In many cases, the answer is simple: luck. Although many people and organizations create narratives to explain their achievements, luck plays a large role. This is a combination of hindsight bias and the narrative fallacy. In retrospect, becoming the winner in the market seems inevitable. In truth, luck plays a substantial role in the creation of winner-take-all markets. A combination of timing, location and connections serves to create winners. Their status is never inevitable, no matter what they might tell those who ask.

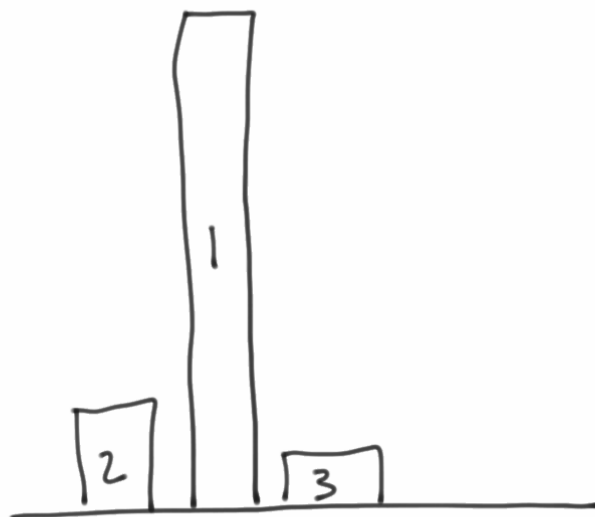
In some cases, governments deliberately strive to create positive feedback loops. Drug patents are one example. These create a powerful incentive for companies to invest in

research and development. Releasing a new, copyrighted drug is a lucrative enterprise. As the only company in that particular market, a company can set the price to whatever it wishes. Until the patent runs out, that company is the winner. This is exactly how the market plays out. In 2016, the highest grossing drug company earned \$71 billion. The three runners up each earned around \$50 billion. From there on, the other drug companies have a comparatively small share of the market.

Profit enables companies to invest in more research and development, pay employees more, and invest in their communities. A positive feedback loop forms. Talented researchers join successful teams. They gather valuable data. Developing new drugs becomes easier. Drug companies gain greater and greater market power over time. A few winners end up with almost total control. They become the names we trust and hold their position, absorbing any risks or scandals. New effective drugs benefit society on the whole, improving our well-being. This winner-take-all market has its upsides. Issues emerge when patent holders set prices above the means of the people who need the drugs most.

Once the patent runs out on a drug (generally after 12 years) any other firm can produce an identical product. Prices soon fall as other companies enter the market. The feedback loop breaks, and the winner no longer takes all. Even so, the former winner will retain a large share of the market. People tend to be unwilling to switch to a new brand of drug, even if it has the same effects.

Ironically, winner-take-all markets tend to perpetuate themselves by attracting more losers. When we look at founders in Silicon Valley or actors in LA, we don't see the failures. Survivorship bias means we only see those who succeed. Attracted by the thought of winning, growing numbers of people flock to try their luck in the market. Most fail, overconfident and misled. The rewards become even more concentrated. More people are attracted and the cycle continues.



DeBeers Diamonds

In the market for diamonds, there is one main winner: DeBeers. This international corporation controls most of the global diamond market, including mining, trading and retail. For around a century, DeBeers had a complete monopoly. Diamonds are a scarce Veblen good with minimal practical use. The value depends on our perception.

Prior to the late 19th century, the global production of diamonds totaled a couple of pounds a year. Demand barely existed, so no one had much interest in supplying it. However, the discovery of several large mines increased production from pounds to tons. Those who stood to profit recognized that diamonds have no intrinsic value. They needed to create a perception of scarcity. DeBeers began taking control of the market in 1888, quickly forming a monopoly. It had an ambitious vision for the diamond market. DeBeers wanted to promote the stones as irreplaceable. Other gemstones have basically the same properties—hard, shiny rocks which make nice jewelry. As Edward Jay Epstein wrote in 1982: *The diamond invention is far more than a monopoly for fixing diamond prices; it is a mechanism for converting tiny crystals of carbon into universally recognized tokens of wealth, power, and romance. To achieve this goal, De Beers had to control demand as well as supply. Both women and men had to be made to perceive diamonds not as marketable precious stones but as an inseparable part of courtship and married life.*

Their ensuing role as winners in the diamond market is all down to clever marketing. Slogans such as “diamonds are forever” have cemented the monopoly. Note that the slogan applies to all diamonds, not their particular brand. Imagine if Apple made adverts declaring “phones are forever”. Or if McDonald’s made adverts saying “fast food is forever.” That’s how powerful DeBeers is. It can promote the entire market, knowing it will be the one to benefit. Throughout the twentieth century, DeBeer gave famous actresses diamond rings, pitched stories featuring the stones to magazines and incorporated their products into images of the British royal family. As their advertising agency, N. W. Ayer, explained, “There was no direct sale to be made. There was no brand name to be impressed on the public mind. There was simply an idea—the eternal emotional value surrounding the diamond.... The substantial diamond gift can be made a more widely sought symbol of personal and family success—an expression of socioeconomic achievement.”

The Impact of Technology

In our interconnected, globalized world, a few large firms continue to grow in power. Modern technology enables firms like Walmart to open branches all over the world. Without the barriers once associated with communication and supply networks, large firms can take over the local market anywhere they open. Small businesses have a very hard time competing.

When a new market appears, entrepreneurs rush to create products, services or technology. There is a flurry of activity for a few months or year. With time, customers gravitate toward the two or three companies they prefer. Starved of revenue, the other competitors shut down. Technology has exacerbated the growth of winner-take-all markets.

We are seeing this at the moment with ride-hailing services. In a once-crowded marketplace, two giant winners remain to take all the profits. It’s hard to say exactly why Uber and Lyft triumphed over numerous similar services. But it’s unlikely they will lose their market share anytime soon.

The same occurred with search engines. Google has now eliminated any meaningful competition. As their profits soar each year, even their nearest competitors—Yahoo, Bing—struggle. We can see from the example of Google how winner-take-all markets can self-perpetuate. Google is on top, so it gets the best employees, and has high research and development budgets. Google can afford to take risks and accumulate growing mountains of user data. Any losses or failures get absorbed. Consistent growth holds the trust of shareholders. Google essentially uses a form of Nassim Taleb’s barbell strategy. As Taleb writes in *The Black Swan*:

True, the Web produces acute concentration. A large number of users visit just a few sites, such as Google, which, at the time of this writing, has total market dominance. At no time in history has a company grown so dominant so quickly—Google can service people from

Nicaragua to southwestern Mongolia to the American West Coast, without having to worry about phone operators, shipping, delivery, and manufacturing. This is the ultimate winner-take-all case study. People forget, though, that before Google, Alta Vista dominated the search-engine market. I am prepared to revise the Google metaphor by replacing it with a new name for future editions of this book.

The role of data is particularly important. The more data a company has on its customers, the better equipped it is to release new products and market existing ones. Facebook has a terrifying amount of information about its users, so it can keep updating the social network to make it addictive and to lock people in. Newer or less popular social networks are working with less data and cannot compete for attention. A positive feedback loop forms for the entrenched companies. Facebook has a lot of data, and it can use that data to make the site more appealing. In turn, this more attractive Facebook leads people to spend more time clicking and generates even more data.²

Winner-take-all markets can be the result of lock-in. When the costs of switching between one supplier and another are too high to be worthwhile, consumers become locked in. Microsoft is a winner in the software market because most of the world is locked in to their products. As it stands, it would be nearly impossible for anyone to erode the market share Windows possesses. As Windows is copyrighted, no one can replicate it. Threatened by inconvenience, we become loyal to avoid incurring switching costs.

Marc Andreessen described the emergence of winner-take-all technology markets in 2013: *In normal markets, you can have Pepsi and Coke. In technology markets, in the long run, you tend to only have one.... The big companies, though, in technology tend to have 90 percent market share. So we think that generally, these are winner-take-all markets.*

Generally, number one is going to get like 90 percent of the profits. Number two is going to get like 10 percent of the profits, and numbers three through 10 are going to get nothing.

Leaders in certain areas are becoming winners and taking all because they can leverage small advantages, thanks to technology. In the past, an amazing teacher, singer, accountant, artist or stock broker could only reach a small number of people in their community. As their status grew, they would often charge more and choose to see fewer people, meaning their expertise became even more scarce. Now, however, those same top performers can reach a limitless audience through blogs, podcasts, videos, online courses and so on.

Think of it another way. For most of history we were limited to learning from the people in our community. Say you wanted to learn how to draw. You had access to your community art teacher. The odds they were the best art teacher in the world were extremely slim.

Now, however, you can go on the internet and access the best teacher in the world.

For most of history, comedians (or rather, their predecessors such as vaudeville performers) and musicians performed live. There was a distinct limit to how many shows they could do a year and how many people could attend each. So, there were many people at the top of each field, as many as needed to meet audience demand for performers. Now that we are no longer confined to live performances, we gravitate towards a few exceptional entertainers. Or consider the example of sports. Athletes were paid far more modest wages until TV allowed them to leverage their skills and reach millions of homes.

Having more information available offers us further incentives to pay attention only to the winners. Online, we can filter by popularity, look at aggregate reviews, select the first search option, or go with other people's preferences. With too many options, we google 'best Chinese restaurant near me' or 'best horror film 2016.' Sorting through all the options is too time-consuming, so the best stay as the best.

"In order to win, you must first survive."

— Warren Buffett

The Downsides of Winner-Take-All Markets

There are some serious downsides to winner-take-all markets. Economic growth and innovation rely on the emergence of new startups and entrepreneurs with disruptive ideas. When the gale of creative destruction stops blowing, industries stagnate. When a handful of winners control a market, they may discourage newcomers who cannot compete with established giants' budgets and power over the industry. According to some estimates, startups are failing faster and more frequently than in the past. Investors prefer established companies with secure short-term returns. Even when a startup succeeds, it tends to get acquired by a larger company. Apple, Amazon, Facebook and others acquire hundreds of companies each year.

Winner-take-all markets tend to discourage collaboration and cooperation. The winners have incentive to keep their knowledge and new data to themselves. Patents and copyright are liberally used to suppress any serious competition. Skilled workers are snapped up the second they leave education, and have powerful inducements to stay working for the winners. The result is a prisoner's dilemma-style situation. Although collaboration may be best for everyone, each individual organization benefits from being selfish. As a result, no one collaborates, they just compete.

The result is what Warren Buffett calls a "moat"—a substantial barrier against competition. Business moats come in many forms. Apple's superior brand identity is a moat, for example. It has taken enormous investments of resources to build and newer companies cannot compete. No number of Facebook adverts or billboards could replicate the kind of importance Apple has in our cultural consciousness. For other winners, the moat could be the ability to provide a product or service at a lower price than competitors, as with Amazon and Alibaba. Each of these has a great deal of market power and can influence prices. If Amazon drops their prices, competitors have no choice but to do the same and make less profit. If Apple decides to raise their prices, we are unlikely to buy our phones and laptops elsewhere and will pay a premium. As Greg Mankiw writes in *Principles of Microeconomics*, "Market power can cause markets to be inefficient because it keeps the price and quantity away from the equilibrium of supply and demand."

Luckily for us, winners tend to sow the seeds of their own destruction—but we'll save that for another article.

137. The Surprising Power of The Long Game

In a world where most people play the short game, playing the long game offers a huge advantage.

There is an old saying that I think of often, passed to me by my friend Peter Kaufman, “If you do what everyone else is doing, you shouldn’t be surprised to get the same results everyone else is getting.” Unless you’re lucky, doing what everyone else does ensures average results. The problem is we don’t want the same outcomes as everyone else. We want different outcomes. Different outcomes come from doing different things or doing things differently.

It’s easy to overestimate the importance of luck in success and underestimate the importance of investing in success every single day. Too often, we convince ourselves that success is just luck.

We tell ourselves the school teacher that left millions was just lucky. No. She wasn’t. She was playing a different game than you were. She was playing the long game.

Here’s the thing about the long game: It’s simpler to win than the short game. Simple but not easy. It requires repeatedly doing hard things today that make tomorrow easier.

We play the short game because we lack patience. Everyone wants to win, but there is a difference between trying to win the moment and trying to win the decade. As I’ve said before, a lack of patience changes the outcome.

The most successful people in any field all play the long game. The long game isn’t particularly notable. It doesn’t attract a lot of attention. In fact, from the outside, the long game looks boring. The tiny advantages that accrue aren’t noticed until success becomes too obvious to ignore.

The short game is intermittent. It’s as if Sisyphus pushes his huge boulder halfway up a steep hill, gets tired, lets it roll down the hill, and says to himself, “I’ll come back and do this tomorrow.” This is the human condition.

The Short Game

Immediate and visible benefits seduce you into the short game. You win today but lose tomorrow. The short game is taking advantage of your counterparties. The short game is spending more than you earn. The short game is not sleeping as much as you need to.

The short game is not investing in your relationships when you don’t need them.

The longer you play the short game, the harder things get.

Just as the accumulation of tiny advantages makes the future easier, the accumulation of tiny disadvantages makes the future harder.

If you take advantage of people, they won’t want to work with you. If you follow a get-rich-quick scheme, you end up back at zero. If you over-charge your customers, they will leave.

If you don’t invest in your relationship, you will come home to an empty house.

I like to explain it to my kids like this: Think of playing pool. Your goal is to run the table.

The short game sinks the first shot but doesn’t care where the ball goes next. You have the illusion of winning, but when you go to line up the next shot, you realize it’s harder than it needs to be.

Only when the costs become too large to ignore do people realize they played the wrong game.

The Long Game

The long game is the opposite of the short game. You have to think about where the ball ends up next.

From the outside, the long game looks pretty boring:

- Leaving the party early to make sure you get some sleep
- Eating healthy when everyone else is eating junk

- Investing your relationships every day so you have a foundation when something happens
- Going for a walk rather than watching Netflix
- Spending less than you make

... and countless other examples.

The long game isn't really debatable. Everyone knows; to get rich, we should spend less than we make and invest the difference and wait a long time. The formula isn't debatable. It just requires patience. The lack of patience changes the outcome.

The first step in the long game is the hardest. You have to be willing to suffer a little today in order to make tomorrow just a little bit easier. And you have to be smart enough to know that just because you can't see the tiny advantage you created doesn't mean it's not there.

Conclusion

Every action is a step toward the short game or the long game. You can't opt out, and you can't play a long-term game in everything. You need to pick what matters to you. But in everything you do, time amplifies the difference between strategies that work in the short term and ones that work in the long term.

The long game allows you to compound results. The longer you play, the bigger the rewards. The question to think about is when and where to play a long-term game. A good place to start is with things that compound: knowledge, relationships, and finances.

138. Entropy: The Hidden Force That Complicates Life

Entropy, a measure of disorder, explains why life always seems to get more, not less, complicated as time goes on.

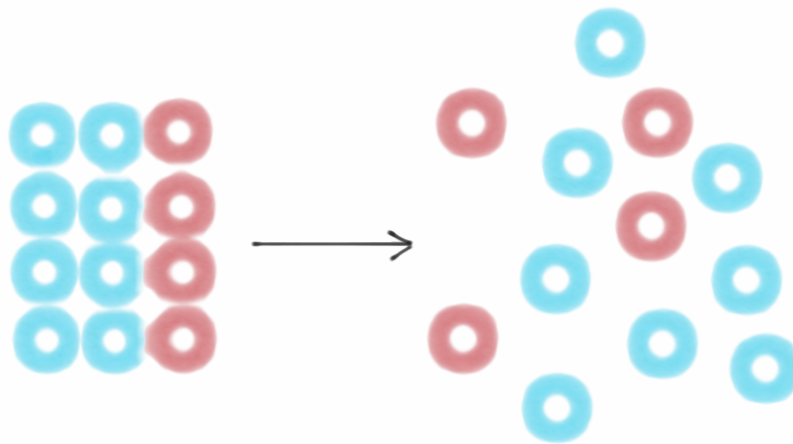
The Order of Disorder

The second law of thermodynamics states that “as one goes forward in time, the net entropy (degree of disorder) of any isolated or closed system will always increase (or at least stay the same).”[1]

Entropy is a measure of disorder and affects all aspects of our daily lives. You can think of it as nature’s tax.[2]

Entropy naturally increases over time. Problems arise: your house gets messy, your garden gets weeds, and the heat from your coffee spreads out. Businesses fail, crimes and revolutions occur, and relationships end. In the long run, everything naturally decays, and disorder always increases.

Disorder is not a mistake; it is the default. Order is always artificial and temporary.



Discovery of Entropy

The identification of entropy is attributed to Rudolf Clausius (1822–1888), a German mathematician and physicist.

Clausius studied the conversion of heat into work. He recognized that heat from a body at a high temperature would flow to one at a lower temperature. This is how your coffee cools down the longer it’s left out — the heat from the coffee flows into the room. This happens naturally. But if you want to heat cold water to make the coffee, you need to do work — you need a power source to heat the water.

From this idea comes Clausius’s statement of the second law of thermodynamics: “Heat does not pass from a body at low temperature to one at high temperature without an accompanying change elsewhere.”

Clausius also observed something curious: Only a percentage of energy is converted into actual work. Nature was exerting a tax.

Perplexed, scientists asked, *where did the rest of the heat go and why?*

Clausius solved the riddle by observing a steam engine and calculating that energy spread out and left the system. In *The Mechanical Theory of Heat*, Clausius explains his findings: *... the quantities of heat which must be imparted to, or withdrawn from a changeable body are not the same, when these changes occur in a non-reversible manner, as they are*

when the same changes occur reversibly. In the second place, with each non-reversible change is associated an uncompensated transformation...

... I propose to call the magnitude S the entropy of the body... I have intentionally formed the word entropy so as to be as similar as possible to the word energy....

The second fundamental theorem [the second law of thermodynamics], in the form which I have given to it, asserts that all transformations occurring in nature may take place in a certain direction, which I have assumed as positive, by themselves, that is, without compensation... [T]he entire condition of the universe must always continue to change in that first direction, and the universe must consequently approach incessantly a limiting condition.

... For every body two magnitudes have thereby presented themselves—the transformation value of its thermal content [the amount of inputted energy that is converted to “work”], and its disgregation [separation or disintegration]; the sum of which constitutes its entropy.

Clausius summarized the concept of entropy in simple terms: “The energy of the universe is constant. The entropy of the universe tends to a maximum.”

The increase of disorder or entropy is what distinguishes the past from the future, giving a direction to time.

Stephen Hawking, *A Brief History of Time*

Entropy and Time

Entropy is one of the few concepts that provide evidence for the existence of time. The “Arrow of Time” is a name given to the idea that time is asymmetrical and flows in only one direction: forward. It is a non-reversible process wherein entropy increases.

Astronomer Arthur Eddington pioneered the concept of the Arrow of Time in 1927, writing: *Let us draw an arrow arbitrarily. If as we follow the arrow[,] we find more and more of the random element in the state of the world, then the arrow is pointing towards the future; if the random element decreases[,] the arrow points towards the past. That is the only distinction known to physics.*

In a segment of *Wonders of the Universe*, produced for BBC Two, physicist Brian Cox explains:

The Arrow of Time dictates that as each moment passes, things change, and once these changes have happened, they are never undone. Permanent change is a fundamental part of what it means to be human. We all age as the years pass by — people are born, they live, and they die. I suppose it’s part of the joy and tragedy of our lives, but out there in the universe, those grand and epic cycles appear eternal and unchanging. But that’s an illusion. See, in the life of the universe, just as in our lives, everything is irreversibly changing.

In his play *Arcadia*, Tom Stoppard uses a novel metaphor for the non-reversible nature of entropy:

When you stir your rice pudding, Septimus, the spoonful of jam spreads itself round making red trails like the picture of a meteor in my astronomical atlas. But if you stir backwards, the jam will not come together again. Indeed, the pudding does not notice and continues to turn pink just as before. Do you think this is odd?

Entropy in Business and Economics

Entropy is fundamentally a probabilistic idea: For every possible “usefully ordered” state of molecules, there are many more possible “disordered” states.

Just as energy tends towards a less useful, more disordered state, so do businesses and organizations. Rearranging the molecules — or business systems and people — into an “ordered” state requires constant energy expenditure.

Let's imagine that we start a company by sticking 20 people in an office with an ill-defined but ambitious goal and no further leadership. We tell them we'll pay them as long as they're there, working. We come back two months later to find that five have quit, five are sleeping with each other, and the other ten have no idea how to solve the litany of problems that have arisen. The employees are certainly not much closer to the goal laid out for them. Left to its own devices, the whole enterprise falls apart.

As a student of business administration, I know that there is a law of evolution for organizations as stringent and inevitable as anything in life. The longer one exists, the more it grinds out restrictions that slow its own functions. It reaches entropy in a state of total narcissism. Only the people sufficiently far out in the field get anything done, and every time they do, they are breaking half a dozen rules in the process.

Roger Zelazny, *Doorways in the Sand*

In physics, entropy is a law; in social systems, it's a mere tendency — though a strong one, to be sure.

Entropy occurs in every aspect of a business. Employees may forget training, lose enthusiasm, cut corners, and ignore rules. Equipment may break down, become inefficient, or be subject to improper use. Products may become outdated or be in less demand. Even the best of intentions cannot prevent an entropic slide towards chaos. Successful businesses invest time and money to minimize entropy. For example, they provide regular staff training, good reporting of issues, inspections, detailed files, and monitoring reports of successes and failures. They ruthlessly seek out and eliminate the sediment of bureaucracy. Anything less will mean almost inevitable problems and loss of potential revenue. Without the necessary effort, a business expands into bankruptcy. Entropy sows the seeds of destruction.

Fortunately, unlike thermodynamic systems, a business can reverse the impact of entropy. A balance must be struck between creativity and control, though. Too little autonomy for employees results in disinterest, while too much leads to poor decisions.

Entropy in Everyday Life

We have all observed entropy in our everyday lives. Everything tends towards disorder. Life always seems to get more complicated. Once-tidy rooms become cluttered and dusty. Strong relationships grow fractured and end. We grow old. Complex skills are forgotten. Buildings degrade as brickwork cracks, paint chips, and tiles loosen.

Disorder is not a mistake; it is the default. Order is always artificial and temporary.

Just because entropy is the natural tendency of things, that doesn't mean you can't fight back. You can clean a messy house, pull weeds out of the garden, and practice your skills. You can maintain your relationship, go to the gym, and even put up a fresh coat of paint. The ... ultimate purpose of life, mind, and human striving: to deploy energy and information to fight back the tide of entropy and carve out refuges of beneficial order.

Steven Pinker

Combatting entropy requires energy. When you clean a messy house, you use energy to return the house to a previous, simpler, tidier state. This is why entropy is nature's tax. You need to expend energy just to maintain the current state. Failing to pay nature's tax means things get more complicated, disorganized, and messier.

We cannot expect anything to stay the way we leave it. To maintain our health, relationships, careers, skills, knowledge, societies, and possessions requires never-ending effort and vigilance.

Now you understand why one of the hardest things in life is keeping it simple.

Disorder is not a mistake; it is our default. Order is always artificial and temporary.

Does that seem sad or pointless? It's not. Imagine a world with no entropy — everything stays the way we leave it, no one ages or gets ill, nothing breaks or fails, everything remains pristine. Arguably, that would also be a world without innovation, creativity, urgency, or need for progress.

In *The Information: A History, a Theory, a Flood*, James Gleick writes, *Organisms organize. ... We sort the mail, build sand castles, solve jigsaw puzzles, separate wheat from chaff, rearrange chess pieces, collect stamps, alphabetize books, create symmetry, compose sonnets and sonatas, and put our rooms in order... We propagate structure (not just we humans but we who are alive). We disturb the tendency toward equilibrium. It would be absurd to attempt a thermodynamic accounting for such processes, but it is not absurd to say we are reducing entropy, piece by piece. Bit by bit ... Not only do living things lessen the disorder in their environments; they are in themselves, their skeletons and their flesh, vesicles and membranes, shells, and carapaces, leaves, and blossoms, circulatory systems and metabolic pathways—miracles of pattern and structure. It sometimes seems as if curbing entropy is our quixotic purpose in the universe.* The question is not whether we can prevent entropy (we can't) but how we can curb, control, work with, and understand it. Entropy is all around us.

The tiny individual decisions we make (or don't make) to combat entropy in our daily lives create massively different results. Consider focus. The number of projects we are involved in only seems to grow. Those of us who expend energy to maintain focus on only one or two get a lot more done than those who naturally let things expand. Focus requires effort.

Using Entropy to Gain an Advantage

Whether you're starting a business or trying to change your organization, understanding the abstraction of entropy as a mental model will help you accomplish your goals more effectively. Because things naturally move to disorder over time, we can position ourselves to create stability.

There are two types of stability: active and passive. Consider a ship, which, if designed well, should be able to sail through a storm without intervention. This is passive stability. A fighter jet, in contrast, requires active stability. The plane can't fly for more than a few seconds without having to adjust its wings. This adjustment happens so fast that it's controlled by software. There is no inherent stability here: if you cut the power, the plane crashes.[3]

People get in trouble when they confuse the two types of stability.

Relationships, for example, require attention and care. If you assume your relationship is passively stable, you'll wake up one day to divorce papers. Your house is also not passively stable. If not cleaned regularly, it will continue to get messier and messier.

Organizations require stability, as well. If you're a company that relies on debt, you're not passively stable but actively stable. Factoring in a margin of safety, this means that the people giving you the credit should be passively stable. If you're both actively stable, then when the power gets cut, you're likely to be in a position of weakness, not strength.

With active stability, you're applying energy to a system to bring about some advantage (keeping the plane from crashing, your relationship going, the house clean, etc.). If we move a little further down the rabbit hole, we can see how applying the same amount of energy can yield totally different results.

Let's use the analogy of coughing.[4] Coughing is the transfer of energy as heat. If you cough in a quiet coffee shop, which you can think of as a system with low entropy, you cause a big change. Your cough is disruptive. On the other hand, if you cough in Times Square, a system with a lot of entropy, that same cough will have no impact. While you change the entropy in both cases, the impact you have with the same cough is proportional to the existing entropy.

Now think of this example in relation to your organization. You're applying energy to get something done. The higher the entropy in the system, the less efficient the energy you

apply will be. The same person applying 20 units of energy in a big bureaucracy is going to see less impact than someone applying the same 20 units in a small startup.

You can think about this idea in a competitive sense, too. If you're starting a business and you're competing against very effective and efficient people, a lot of effort will get absorbed. It's not going to be very efficient. If, on the other hand, you compete against less efficient and effective people, the same amount of energy will be more efficient in its conversion.

For a change to occur, you must apply more energy to the system than is extracted by the system.

139. Resonance: How to Open Doors For Other People

It's only polite.

Hold the door open for others, and they will open doors for you.

We are far more interdependent than we would like to admit. We biologically need to connect. "Limbic resonance" is a term used by Thomas Lewis, Fari Amini, and Richard Lannon in their book, *A General Theory of Love*, to express the ability to share deep emotional states. The name comes from the limbic system, the set of structures in our brains which appear to be responsible for our emotions, among other things.

Resonance is not only a mammalian capacity but an outright necessity. Our infants will die if not provided with the warmth of connection with another being, despite being provided with all their physiological needs. This has been illustrated in inhumane 13th-century human 'experiments' by Frederick the Great depriving babies of human connection, and more recently by Harry Harlow in rhesus monkeys. Baby monkeys choose to spend 17 hours a day with a soft cloth mother figure that does not provide food compared to only one hour a day with a wire mother figure that actually provides milk. Connection is a far superior sustenance.

An oft-quoted study by psychologist John Gottman suggests a partner's ability to answer "emotional bids" to be strongly predictive of divorce. The divorce rate is higher in couples where partners do not resonate or fail to engage and respond to requests for attention. Those who divorced after a six-year follow-up were observed to have turned towards the other on only 30% of occasions a bid was made, whilst couples who were still together averaged closer to 90%. Furthermore, in *A General Theory of Love*, the authors convincingly argue that what we are actually doing is synchronising ourselves with one another, with deep impacts on our emotional and physical health.

This would be in keeping with the results of the well-known Harvard Study of Adult Development, which followed a large cohort of people over a lifetime. These types of studies are rare because they're expensive and hard to carry out. This study was well worth investing in, with one clear overall conclusion: good relationships keep us happier and healthier. Its director, psychiatrist Robert Waldinger, states:

Well, the lessons aren't about wealth or fame or working harder and harder. The clearest message that we get from this 75-year study is this: Good relationships keep us happier and healthier. Period.

We've learned three big lessons about relationships. The first is that social connections are really good for us, and that loneliness kills. It turns out that people who are more socially connected to family, to friends, to community, are happier, they're physically healthier, and they live longer than people who are less well connected. And the experience of loneliness turns out to be toxic. People who are more isolated than they want to be from others find that they are less happy, their health declines earlier in midlife, their brain functioning declines sooner and they live shorter lives than people who are not lonely.

So what now? Where does that leave us?

People feel connected when they are understood and appreciated. My friend's aunt taught her this when they walked together down a busy road. Her aunt stopped to talk to a homeless man. With no money to give him, she started asking questions about his dog, chatting to him about her own dog. The interaction took 30 seconds. The man's eyes shone back bright, engaged. As they walked away, my friend's aunt whispered, "People want to be recognized. It reminds them they exist. Never take that away from anyone."

Lesson learned.

Listen, Summarize, Show

I work hard to live that lesson through the following: listen, summarize, show. True, sustained listening is one of the hardest skills to achieve. I've met only a handful of people

with the ability. A simple way to focus your attention is to *listen* with the intention of *summarizing* the other person's point of view. This stops you from using your mental energy to work out your reply, and helps store the other's words in your memory as well as identify any gaps in your understanding so you can ask questions to clarify.

The nature of these questions in themselves will *show* to the other person that they are heard and effort is being made to take them seriously. Just as it is not enough to know, when it comes to human relationships, it is not enough to understand. What is crucial is to show you understand. If empathy is recognizing another's perspective, consideration for the other needs to be externalized from you for it to exist and build rapport.

Summarizing and asking questions is a way of feeding back your resonance. Cutting short the conversation, stating opinions, value judgements, your own solutions, or even a lazy "I see" or "interesting" does not demonstrate resonance. In fact, you can use "I understand" as a red flag for someone who does not understand. Often, this is followed by an action that shows a thorough lack of comprehension.

Connect Where It Matters

To resonate with others, we need to connect when it matters. This nurtures both us and others, and also earns trust. Just as in cooking, timing is everything.

This is where the metaphorical doors come in. How do you feel when someone holds the door open for you—especially when you've got your hands full? When would you hold open a door for another person?

We may kindly open a door, to find the person has no intention of walking through it and continues down the stairwell because they're heading to the floor below. In this case, we did not understand their needs. We may even find ourselves bending over backwards for another, without consequence. This is the equivalent of opening doors willy-nilly down a long corridor without anyone walking through them.

At worst, we might inadvertently (or dare I say, even intentionally) slam a door in someone's face. That will hurt—even more so if we had offered to hold it for them and they were counting on it to be open. Holding a door open at the right time represents tending to a perceived need and meeting expectations.

All people want to be understood and appreciated. By connecting in this way, they trust you understand them and are actually looking out for their interests. You are attentive and willing to open doors for them. The power of resonance will keep you happy and healthy and open doors for you.

140. Illusion of Transparency: Your Poker Face is Better Than You Think

We tend to think that people can easily tell what we're thinking and feeling. They can't.

Understanding the illusion of transparency bias can improve relationships, job performance, and more.

"A wonderful fact to reflect upon, that every human creature is constituted to be that profound secret and mystery to every other." — Charles Dickens, A Tale of Two Cities

When we experience strong emotions, we tend to think it's obvious to other people, especially those who know us well. When we're angry or tired or nervous or miserable, we may assume that anyone who looks at our face can spot it straight away.

That's not true. Most of the time, other people can't correctly guess what we're thinking or feeling. Our emotions are not written all over our face all the time. The gap between our subjective experience and what other people pick up on is known as the illusion of transparency. It's a fallacy that leads us to overestimate how easily we convey our emotions and thoughts.

For example, you arrive at the office exhausted after a night with too little sleep. You drift around all day, chugging espressos, feeling sluggish and unfocused. Everything you do seems to go wrong. At the end of the day, you sheepishly apologize to a coworker for being "useless all day."

They look at you, slightly confused. 'Oh,' they say. 'You seemed fine to me.' Clearly, they're just being polite. There's no way your many minor mistakes during the day could have escaped their notice. It must be extra apparent considering your coworkers all show up looking fresh as a daisy every single day.

Or imagine that you have to give a talk in front of a big crowd and you're terrified. As you step on stage, your hands shake, your voice keeps catching in your throat, you're sweating and flushed. Afterward, you chat to someone from the audience and remark: 'So that's what a slow-motion panic attack looks like.'

'Well, you seemed like a confident speaker,' they say. 'You didn't look nervous at all. I wish I could be as good at public speaking.' Evidently, they were sitting at the back or they have bad eyesight. Your shaking hands and nervous pauses were far too apparent. Especially compared to the two wonderful speakers who came after you.

No one cares

"Words are the source of misunderstandings." — Antoine de Saint-Exupéry, The Little Prince

The reality is that other people pay much less attention to you than you think. They're often far too absorbed in their own subjective experiences to pick up on subtle cues related to the feelings of others. If you're annoyed at your partner, they're probably too busy thinking about what they need to do at work tomorrow or what they're planning to cook for dinner to scrutinize your facial expressions. They're not deliberately ignoring you, they're just thinking about other things. While you're having a bad day at work, your coworkers are probably distracted by their own deadlines and personal problems. You could fall asleep sitting up and many of them wouldn't even notice. And when you give a talk in front of people, most of them are worrying about the next time they have to do any public speaking or when they can get a coffee.

In your own subjective experience, you're in the eye of the storm. But what other people have to go on are things like your tone of voice, facial expressions, and body language. The clues these provide can be hard to read. Unless someone is trying their best to figure out what you're thinking or feeling, they're not going to be particularly focused on your body language. If you make even the slightest effort to conceal your inner state, you're quite able to hide it altogether from everyone.

Our tendency to overestimate how much attention people are paying to us is a result of seeing our own perspective as the only perspective. If we're feeling a strong emotion, we assume other people care about how we feel as much as we do. This egocentric bias leads to the spotlight effect—in social situations, we feel like there's a spotlight shining on us. It's not self-obsession, it's natural. But overall, this internal self-focus is what makes you think other people can tell what you're thinking.

Take the case of lying. Even if we try to err on the side of honesty, we all face situations where we feel we have no option except to tell a lie. Setting aside the ethics of the matter, most of us probably don't feel good about lying. It makes us uncomfortable. It's normal to worry that whoever you're lying to will easily be able to tell. Again, unless you're being very obvious, the chances of someone else picking up on it are smaller than you think. In one study, participants asked to lie to other participants estimated they'd be caught about half the time. In fact, people only guessed they were lying about a quarter of the time—a rate low enough for random chance to account for it.

Tactics

“Even if one is neither vain nor self-obsessed, it is so extraordinary to be oneself—exactly oneself and no one else—and so unique, that it seems natural that one should also be unique for someone else.” — Simone de Beauvoir

Understanding how the illusion of transparency works can help you navigate otherwise challenging situations with ease.

Start with accepting that other people don't usually know what you're thinking and feeling. If you want someone to know your mental state, you need to tell them in the clearest terms possible. You can't make assumptions. Being subtle about your feelings is not the best idea, especially in high-stakes situations. Err on the side of caution whenever possible by communicating plainly in words about your feelings or views.

Likewise, if you think you know how someone else feels, you should ask them to confirm. You shouldn't assume you've got it right—you probably haven't. If it's important, you need to double check. The person who seems calm on the surface might be frenzied underneath. Some of us just appear unhappy to others all the time, no matter how we're feeling. If you can't pick up on someone's mental state, they might not be vocalizing it because they think it's obvious. So ask.

As Dylan Evans writes in *Risk Intelligence: How To Live With Uncertainty*,

The first and most basic remedy is simply to treat all your hunches about the thoughts and feelings of other people with a pinch of salt and to be similarly skeptical about their ability to read your mind. It can be hard to resist the feeling that someone is lying to you, or that your own honesty will shine through, but with practice it can be done.

The illusion of transparency doesn't go away just because you know someone well. Even partners, family members and close friends have difficulty reading each other's mental states. The problem compounds when we think they should be able to do this. We can easily become annoyed when they can't. If you're upset or angry and someone close to you doesn't make any attempt to make you feel better, they are not necessarily ignoring you. They just haven't noticed anything is wrong, or they may not know how you want them to respond. As Hanlon's razor teaches us, it's best not to assume malicious intent. Understanding this can help avoid arguments that spring up based on thinking we're communicating clearly when we're not.

“Much unhappiness has come into the world because of bewilderment and things left unsaid.” — Fyodor Dostoevsky

Set yourself free

Knowing about the illusion of transparency can be liberating. Guess what? No one really cares. Or almost no one. If you've got food stuck between your teeth or you stutter during a speech or you're exhausted at work, you might as well assume no one has noticed. Most of the time, they haven't.

Back to public speaking: We get it all wrong when we think people can tell we're nervous about giving a talk. In a study entitled "The illusion of transparency and the alleviation of speech anxiety," Kenneth Savitsky and Thomas Gilovich tested how knowing about the effect could help people feel less scared about public speaking.¹ When participants were asked to give a speech, their self-reported levels of nervousness were well above what audience members guessed they were experiencing. Inside, they felt like a nervous wreck. On the outside, they looked calm and collected.

But when speakers learned about the illusion of transparency beforehand, they were less concerned about audience perceptions and therefore less nervous. They ended up giving better speeches, according to both their own and audience assessments. It's a lot easier to focus on what you're saying if you're not so worried about what everyone else is thinking.

The sun revolves around me, doesn't it?

In psychology, anchoring refers to our tendency to make an estimated guess by selecting whatever information is easily available as our "anchor," then adjusting from that point. Often, the adjustments are insufficient. This is exactly what happens when you try to guess the mental state of others. If we try to estimate how a friend feels, we take how we feel as our starting point, then adjust our guess from there.

According to the authors of a paper entitled "The Illusion of Transparency: Biased Assessments of Other's Ability to Read One's Emotional States,"

People are typically quite aware of their own internal states and tend to focus on them rather intently when they are strong. To be sure, people recognize that others are not privy to the same information as they are, and they attempt to adjust for this fact when trying to anticipate another's perspective. Nevertheless, it can be hard to get beyond one's own perspective even when one knows that.

This is similar to hindsight bias, where things seem obvious in retrospect, even if they weren't beforehand. When you look back on an event, it's hard to disentangle what you knew then from what you know now. You can only use your current position as an anchor, a perspective which is inevitably skewed.

If you're trying to hide your mental state, you're probably doing better than you think. Unless you're talking to, say, a trained police interrogator or professional poker player, other people are easy to fool. They're not looking that hard, so a mild effort to hide your emotions is likely to work well. People can't read your mind, whether you're trying to pretend you don't hate the taste of a trendy new beer, or trying to conceal your true standing in a negotiation to gain more leverage.

The illusion of transparency explains why, even once you're no longer a teenager, it still seems like few people understand you. It's not that other people are ambivalent or confused. Your feelings just aren't as clear as you think. Often you can't see beyond the confines of your own head and neither can anyone else. It's best to make allowances for that.

141. How to Use Occam's Razor Without Getting Cut

Occam's razor is one of the most useful, (yet misunderstood,) models in your mental toolbox to solve problems more quickly and efficiently. Here's how to use it.

Occam's razor (also known as the "law of parsimony") is a problem-solving principle which serves as a useful mental model. A philosophical razor is a tool used to eliminate improbable options in a given situation. Occam's is the best-known example.

Occam's razor can be summarized as follows:

Among competing hypotheses, the one with the fewest assumptions should be selected.

The Basics

In simpler language, Occam's razor states that the simplest explanation is preferable to one that is more complex. Simple theories are easier to verify. Simple solutions are easier to execute.

In other words, we should avoid looking for excessively complex solutions to a problem, and focus on what works given the circumstances. Occam's razor can be used in a wide range of situations, as a means of making rapid decisions and establishing truths without empirical evidence. It works best as a mental model for making initial conclusions before the full scope of information can be obtained.

Science and math offer interesting lessons that demonstrate the value of simplicity. For example, the principle of minimum energy supports Occam's razor. This facet of the second law of thermodynamics states that wherever possible, the use of energy is minimized. Physicists use Occam's razor in the knowledge that they can rely on everything to use the minimum energy necessary to function. A ball at the top of a hill will roll down in order to be at the point of minimum potential energy. The same principle is present in biology. If a person repeats the same action on a regular basis in response to the same cue and reward, it will become a habit as the corresponding neural pathway is formed. From then on, their brain will use less energy to complete the same action.

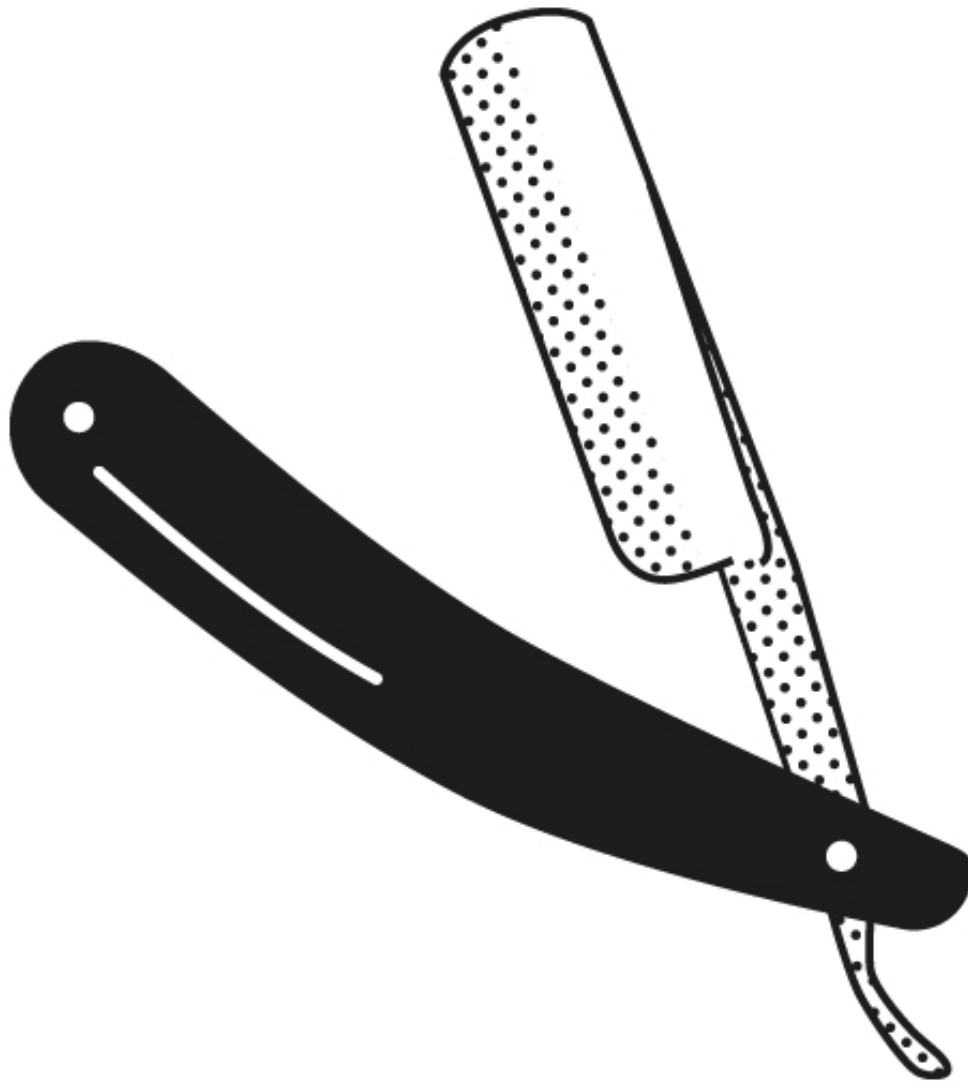
The History of Occam's Razor

The concept of Occam's razor is credited to William of Ockham, a 14th-century friar, philosopher, and theologian. While he did not coin the term, his characteristic way of making deductions inspired other writers to develop the heuristic. Indeed, the concept of Occam's razor is an ancient one. Aristotle produced the oldest known statement of the concept, saying, "We may assume the superiority, other things being equal, of the demonstration which derives from fewer postulates or hypotheses."

Robert Grosseteste expanded on Aristotle's writing in the 1200s, declaring

That is better and more valuable which requires fewer, other circumstances being equal.... For if one thing were demonstrated from many and another thing from fewer equally known premises, clearly that is better which is from fewer because it makes us know quickly, just as a universal demonstration is better than particular because it produces knowledge from fewer premises. Similarly, in natural science, in moral science, and in metaphysics the best is that which needs no premises and the better that which needs the fewer, other circumstances being equal.

Nowadays, Occam's razor is an established mental model which can form a useful part of a latticework of knowledge.



Examples of the Use of Occam's Razor

The Development of Scientific Theories

Occam's razor is frequently used by scientists, in particular for theoretical matters. The simpler a hypothesis is, the more easily it can be proven or falsified. A complex explanation for a phenomenon involves many factors which can be difficult to test or lead to issues with the repeatability of an experiment. As a consequence, the simplest solution which is consistent with the existing data is preferred. However, it is common for new data to allow hypotheses to become more complex over time. Scientists choose to opt for the simplest solution as the current data permits, while remaining open to the possibility of future research allowing for greater complexity.

The version used by scientists can best be summarized as:

When you have two competing theories that make exactly the same predictions, the simpler one is better.

The use of Occam's razor in science is also a matter of practicality. Obtaining funding for simpler hypotheses tends to be easier, as they are often cheaper to prove.

Albert Einstein referred to Occam's razor when developing his theory of special relativity. He formulated his own version: "It can scarcely be denied that the supreme goal of all

theory is to make the irreducible basic elements as simple and as few as possible without having to surrender the adequate representation of a single datum of experience.” Or, “Everything should be made as simple as possible, but not simpler.”

The physicist Stephen Hawking advocates for Occam’s razor in *A Brief History of Time*: *We could still imagine that there is a set of laws that determines events completely for some supernatural being, who could observe the present state of the universe without disturbing it. However, such models of the universe are not of much interest to us mortals. It seems better to employ the principle known as Occam’s razor and cut out all the features of the theory that cannot be observed.*

Isaac Newton used Occam’s razor too when developing his theories. Newton stated: “We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances.” He sought to make his theories, including the three laws of motion, as simple as possible, with only the necessary minimum of underlying assumptions.

Medicine

Modern doctors use a version of Occam’s razor, stating that they should look for the fewest possible causes to explain their patient’s multiple symptoms, and give preference to the most likely causes. A doctor we know often repeats the aphorism that “common things are common.” Interns are instructed, “when you hear hoofbeats, think horses, not zebras.” For example, a person displaying influenza-like symptoms during an epidemic would be considered more likely to be suffering from influenza than an alternative, rarer disease. Making minimal diagnoses reduces the risk of over-treating a patient, causing panic, or causing dangerous interactions between different treatments. This is of particular importance within the current medical model, where patients are likely to see numerous health specialists and communication between them can be poor.

Prison Abolition and Fair Punishment

Occam’s razor has long played a role in attitudes towards the punishment of crimes. In this context, it refers to the idea that people should be given the least punishment necessary for their crimes. This is to avoid the excessive penal practices which were popular in the past. For example, a 19th-century English convict could receive five years of hard labor for stealing a piece of food.

The concept of penal parsimony was pioneered by Jeremy Bentham, the founder of utilitarianism. He held that punishments should not cause more pain than they prevent. Life imprisonment for murder could be seen as justified in that it might prevent a great deal of potential pain, should the perpetrator offend again. On the other hand, long-term imprisonment of an impoverished person for stealing food causes substantial suffering without preventing any.

Bentham’s writings on the application of Occam’s razor to punishment led to the prison abolition movement and many modern ideas related to rehabilitation.

Exceptions and Issues

It is important to note that, like any mental model, Occam’s razor is not foolproof. Use it with care, lest you cut yourself. This is especially crucial when it comes to important or risky decisions. There are exceptions to any rule, and we should never blindly follow the results of applying a mental model which logic, experience, or empirical evidence contradict. When you hear hoofbeats behind you, in most cases you should think horses, not zebras—unless you are out on the African savannah.

Furthermore, simple is as simple does. A conclusion can’t rely just on its simplicity. It must be backed by empirical evidence. And when using Occam’s razor to make deductions, we must avoid falling prey to confirmation bias. In the case of the NASA moon landing conspiracy theory, for example, some people consider it simpler for the moon landing to have been faked, others for it to have been real. Lisa Randall best expressed the issues

with the narrow application of Occam's razor in her book, *Dark Matter and the Dinosaurs: The Astounding Interconnectedness of the Universe*:

Another concern about Occam's Razor is just a matter of fact. The world is more complicated than any of us would have been likely to conceive. Some particles and properties don't seem necessary to any physical processes that matter—at least according to what we've deduced so far. Yet they exist. Sometimes the simplest model just isn't the correct one.

This is why it's important to remember that opting for simpler explanations still requires work. They may be easier to falsify, but still require effort. And that the simpler explanation, although having a higher chance of being correct, is not always true.

Occam's razor is not intended to be a substitute for critical thinking. It is merely a tool to help make that thinking more efficient. Harlan Coben has disputed many criticisms of Occam's razor by stating that people fail to understand its exact purpose:

Most people oversimplify Occam's razor to mean the simplest answer is usually correct.

But the real meaning, what the Franciscan friar William of Ockham really wanted to emphasize, is that you shouldn't complicate, that you shouldn't "stack" a theory if a simpler explanation was at the ready. Pare it down. Prune the excess.

Remember, Occam's razor is complemented by other mental models, including fundamental error distribution, Hanlon's razor, confirmation bias, availability heuristic and hindsight bias. The nature of mental models is that they tend to all interlock and work best in conjunction.

142. Survivorship Bias: The Tale of Forgotten Failures

Survivorship bias is a common logical error that distorts our understanding of the world. It happens when we assume that success tells the whole story and when we don't adequately consider past failures.

There are thousands, even tens of thousands of failures for every big success in the world. But stories of failure are not as sexy as stories of triumph, so they rarely get covered and shared. As we consume one story of success after another, we forget the base rates and overestimate the odds of real success.

"See," says he, "you who deny a providence, how many have been saved by their prayers to the Gods."

"Ay," says Diagoras, "I see those who were saved, but where are those painted who were shipwrecked?"

— Cicero

The Basics

A college dropout becomes a billionaire. Batuli Lamichhane, a chain-smoker, lives to the age of 118. Four young men are rejected by record labels and told "guitar groups are on the way out," then go on to become the most successful band in history.

Bill Gates, Batuli Lamichhane, and the Beatles are oft-cited examples of people who broke the rules without the expected consequences. We like to focus on people like them—the result of a cognitive shortcut known as survivorship bias.

When we only pay attention to those who survive, we fail to account for base rates and end up misunderstanding how selection processes actually work. The base rate is the probability of a given result we can expect from a sample, expressed as a percentage. If you play roulette, for example, you can be expected to win one out of 38 games, or 2.63%, which is the base rate. The problem arises when we mistake the winners for the rule and not the exception. People like Gates, Lamichhane, and the Beatles are anomalies at one end of a distribution curve. While there is much to learn from them, it would be a mistake to expect the same results from doing the same things.

A stupid decision that works out well becomes a brilliant decision in hindsight.

— Daniel Kahneman

Cause and Effect

Can we achieve anything if we try hard enough? Not necessarily. Survivorship bias leads to an erroneous understanding of cause and effect. People see correlation in mere coincidence. We all love to hear stories of those who beat the odds and became successful, holding them up as proof that the impossible is possible. We ignore failures in pursuit of a coherent narrative about success.

Few would think to write the biography of a business person who goes bankrupt and spends their entire life in debt. Or a musician who tried again and again to get signed and was ignored by record labels. Or of someone who dreams of becoming an actor, moves to LA, and ends up returning a year later, defeated and broke. After all, who wants to hear that? We want the encouragement survivorship bias provides, and the subsequent belief in our own capabilities. The result is an inflated idea of how many people become successful. The discouraging fact is that success is never guaranteed. Most businesses fail. Most people do not become rich or famous. Most leaps of faith go wrong. It does not mean we should not try, just that we should be realistic with our understanding of reality.

Beware of advice from the successful.

— Barnaby James

Survivorship Bias in Business

Survivorship bias is particularly common in the world of business. Companies which fail early on are ignored, while the rare successes are lauded for decades. Studies of market performance often exclude companies which collapse. This can distort statistics and make success seem more probable than it truly is. Just as history is written by the winners, so is much of our knowledge about business. Those who end up broke and chastened lack a real voice. They may be blamed for their failures by those who ignore the role coincidence plays in the upward trajectories of the successful.

Nassim Taleb writes of our tendency to ignore the failures: "We favor the visible, the embedded, the personal, the narrated, and the tangible; we scorn the abstract." Business books laud the rule-breakers who ignore conventional advice and still create profitable enterprises. For most entrepreneurs, taking excessive risks and eschewing all norms is an ill-advised gamble. Many of the misfit billionaires who are widely celebrated succeeded in spite of their unusual choices, not because of them. We also ignore the role of timing, luck, connections and socio-economic background. A person from a prosperous family, with valuable connections, who founds a business at a lucrative time has a greater chance of survival, even if they drop out of college or do something unconventional. Someone with a different background, acting at an inopportune time, will have less of a chance.

In *No Startup Hipsters: Build Scalable Technology Companies*, Samir Rath and Teodora Georgieva write:

Almost every single generic presentation for startups starts with "Ninety Five percent of all startups fail", but very rarely do we pause for a moment and think "what does this really mean?" We nod our heads in somber acknowledgement and with great enthusiasm turn to the heroes who "made it" — Zuckerberg, Gates, etc. to absorb pearls of wisdom and find the Holy Grail of building successful companies. Learning from the successful is a much deeper problem and can reduce the probability of success more than we might imagine. Examining the lives of successful entrepreneurs teaches us very little. We would do far better to analyze the causes of failure, then act accordingly. Even better would be learning from both failures and successes.

Focusing on successful outliers does not account for base rates. As Rath and Georgieva go on to write:

After any process that picks winners, the non-survivors are often destroyed or hidden or removed from public view. The huge failure rate for start-ups is a classic example; if failures become invisible, not only do we fail to recognise that missing instances hold important information, but we may also fail to acknowledge that there is any missing information at all.

They describe how this leads us to base our choices on inaccurate assumptions:

Often, as we revel in stories of start-up founders who struggled their way through on cups of ramen before the tide finally turned on viral product launches, high team performance or strategic partnerships, we forget how many other founders did the same thing, in the same industry and perished...The problem we mention is compounded by biographical or autobiographical narratives. The human brain is obsessed with building a cause and effect narrative. The problem arises when this cognitive machinery misfires and finds patterns where there are none.

These success narratives are created both by those within successful companies and those outside. Looking back on their ramen days, founders may believe they had a plan all along. They always knew everything would work out. In truth, they may lack an idea of the cause and effect relationships underlying their progress. When external observers hear their stories, they may, in a quasi-superstitious manner, spot "signs" of the success to come. As Daniel Kahneman has written, the only true similarity is luck.

Consider What You Don't See

When we read about survivorship bias, we usually come across the archetypical story of Abraham Wald, a statistician studying World War II airplanes. His research group at

Columbia University was asked to figure out how to better protect airplanes from damage. The initial approach to the problem was to look at the planes coming back, seeing where they were hit the worst, then reinforcing that area.

However, Wald realized there was a missing, yet valuable, source of evidence: Planes that were hit that did not make it back. Planes that went down, that weren't surviving, had much better information to provide on areas that were most important to reinforce. Wald's approach is an example of how to overcome survivorship bias. Don't look just at what you can see. Consider all the things that started on the same path but didn't make it. Try to figure out their story, as there is as much, if not more, to be learned from failure.

Considering survivorship bias when presented with examples of success is difficult. It is not instinctive to pause, reflect, and think through what the base rate odds of success are and whether you're looking at an outlier or the expected outcome. And yet if you don't know the real odds, if you don't know if what you're looking at is an example of survivorship bias, then you've got a blind spot.

Whenever you read about a success story in the media, think of all the people who tried to do what that person did and failed. Of course, understanding survivorship bias isn't an excuse for not taking action, but rather an essential tool to help you cut through the noise and understand the world. If you're going to do something, do it fully informed.

143. Tradeoffs: The Currency of Decision Making

Every decision we make carries an opportunity cost. If we don't budget wisely, we end up wasting time and energy on things that don't matter. Here's how to do it right.

The disregard of tradeoffs and opportunity costs play out in the same pattern again and again in our lives. We try to do everything and end up accomplishing nothing.

If you're young, you think you can go all out in your career, have fulfilling relationships, travel on a regular basis, keep up with reading and social media, go without sleep, take out unnecessary credit card debt, and start a family at the same time. The end result is always a total meltdown.

Even if you are twenty or thirty years past this point, you are not immune. Every day we are faced with choices on how to invest our time, and we all can be guilty of the same thing: Taking on too much without properly understanding the costs. The problem is a misunderstanding of the importance of tradeoffs.

It's not always that we need to do more but rather that we need to focus on less.

Nathan W. Morris

The Dismal Science

Economics is all about tradeoffs. A tradeoff is loosely defined as any situation where making one choice means losing something else, usually forgoing a benefit or opportunity. We experience tradeoffs in zero-sum situations when a plus in one area must be a negative in another. A core component of economic theory is the study of how we allocate scarce resources and negotiate opportunity costs.

Economics offers tools that we can use as guides for getting what we want out of life if we take economic lessons and apply them to resources other than money. We all know our money isn't infinite, yet we end up treating our time and energy and attention as if they are. Many of us act as if there are no tradeoffs—we can just do everything if we try hard enough. The irony is that those who know how to make tradeoffs can get so much more out of life than those who try to get everything.

Economics teaches you that making a choice means giving up something.

Russ Roberts

That's not to say we can't get more out of our time investments while staying within the limitations imposed by mental and physical health. We can get more efficient in certain areas. We can combine activities. We can decide to focus on one area for a while, then switch to another. We can find plenty of smart ways to achieve more.

But blindly trying to overstuff our days and stretch our minds to their limits is foolish, whatever the self-help gurus and hustle porn promoters claim. We're sold the false belief that we can be and have everything. As Julian Baggini writes in What's It All About?: Philosophy & the Meaning of Life, a person in a content, long-term relationship might feel the pressure to get everything right:

They may well be an excellent life partner. But perhaps they are not a sexual athlete, the world's best communicator, the possessor of a great body, a domestic god or goddess. In their local bookshop, however, they will be told by a book that they can and perhaps should be all of these things. This can foster feelings of inadequacy.

The truth is, when you're trying to get everything right, you're getting nothing right.

No One Has Everything

When we look at other people, we end up getting the impression that they are managing to do everything. They are fantastic parents, their relationships are novel-worthy, they look amazing, their careers are epic, they get enough sleep, and they feel good all the time.

This, however, is far from true. We're just not seeing the hidden tradeoffs they're making.

Tradeoffs can take a while to become apparent. They sometimes only show up in the long term. We see this in complex adaptive systems. Try to optimize one area and there's likely to be a price elsewhere. Sometimes it's an obvious negative equation, like when steroid abuse leads to organ damage, or when fancy houses mask crippling debt.

But often the tradeoffs are genuinely hard to evaluate—people with world-class math abilities are often socially clueless, and many parents sacrifice career advancement to raise their kids. We all have to make sacrifices to be able to invest in what is important to us. Tradeoffs imply that to get really great at a few things, you have to accept being mediocre at a lot more.

There are no solutions. There are only trade-offs.

Thomas Sowell

Most of us can divide up our lives into a few important areas: work, health, family, relationships, friends, hobbies, and so on. It's an unfortunate truism that we can never quite keep everything in balance. We're constantly going off-kilter in one area or another and having to make course corrections. When one area goes well, another is usually sliding. It's like a game of whack-a-mole. Focus on one area and it's often to the detriment of another.

If you feel like you're always behind in some area of your life, it's probably a sign to reconsider tradeoffs. If you feel like you're always running in place without making any serious progress on anything you care about, you're probably making the wrong tradeoffs. We often end up allocating our time, and other scarce resources like money, by default, not in the way that gets us what we want.

The necessity of making trade-offs alters how we feel about the decisions we face; more important, it affects the level of satisfaction we experience from the decisions we ultimately make.

Barry Schwartz, *The Paradox of Choice: Why More Is Less*

How to take tradeoffs into account

One of the most important areas where we need to pay attention to tradeoffs is when we make decisions. It's not always enough to consider what we stand to gain from going for option B over option A. We also need to take into account what we lose.

Most big decisions involve major tradeoffs. That's not necessarily a bad thing. It's neutral. It's just the price we pay. Simply being aware of the notion of tradeoffs is enough to change the way we make decisions.

Time is our most fundamental constraint. If you use an hour for one thing, you can't use it for anything else. Time passes, whatever we do with it. It seems beneficial then to figure out the means of using it with the lowest possible opportunity costs. One of the simplest ways to do this is to establish how you'd like to be using your time, then track how you're using it for a week. Many people find a significant discrepancy. Once we see the gulf between the tradeoffs we're making and the ones we'd rather be making, it's easier to work on changing that.

For instance, understanding tradeoffs in time usage is a good way to cut out unwanted, unhelpful behaviors and wastage. It's one thing to tell yourself you're not going to spend half an hour reading the news every morning before starting work. It's another matter to plan how you're going to spend that time instead. Will you finish work earlier and cook a fancier dinner, or Skype with a friend who lives abroad, or read a chapter of a book?

The higher the value is of what you could be doing versus what you are doing, the greater the opportunity cost. We'd all agree that we'd rather devote our time to activities we value, yet we can end up not acting that way out of habit or obligation or simply because we

haven't considered what we're forgoing. We will never manage to get rid of everything that has low value to us, but we can keep cutting it back.

Multitasking is a way of getting more out of our time without making tradeoffs doesn't work. The tradeoff, in that case, is often not doing anything particularly well. If you answer emails when you're with your kids or friends, you're not really focusing on either. Your emails are banal and the people you are with feel unimportant. Even if we try to find ways around fundamental constraints, the tradeoffs show up somewhere.

The final requirement in order to take tradeoffs into account is that you really need to be able to let go of not being great at something. If you've chosen to prioritize your relationship with your kids over a clean house, then you need to be okay with letting other people see the mess. If you've prioritized physical activity over entertainment, you need to accept that other people are going to tease you for being ignorant of what's going on in the world. If you've chosen to focus on your career versus maintaining every friendship you've ever had, you need to get over the pang of hurt when people stop inviting you out.

Tradeoffs aren't always easy, which is probably why we try to avoid them.

Conclusion

If we think we can have it all, we're more likely to end up with nothing. We can get much farther if we decide where to focus our energy and which areas to ignore. When we actively choose which tradeoffs we want to make, we can feel much better about it than when we're forced to let things slide. We need to actively decide what we value the most. Each of the myriad decisions we make on a daily basis carries an opportunity cost. If we don't consider them, we easily end up stuck in situations where we're forgoing things we'd rather prioritize. We end up lamenting what we're missing out on against our will, unsure how this happened. But if we first consider the tradeoffs associated with the decisions we make, we can end up with far more satisfying choices.

144. Prisoner's Dilemma: What Game Are you Playing?

In this classic game theory experiment, you must decide: rat out another for personal benefit, or cooperate? The answer may be more complicated than you think.

What does it take to make people cooperate with each other when the incentives to act primarily out of self-interest are often so strong?

The Prisoner's Dilemma is a thought experiment originating from game theory. Designed to analyze the ways in which we cooperate, it strips away the variations between specific situations where people are called to overcome the urge to be selfish. Political scientist Robert Axelrod lays down its foundations in The Evolution of Cooperation:

Under what conditions will cooperation emerge in a world of egoists without a central authority? This question has intrigued people for a long time. And for good reason. We all know that people are not angels and that they tend to look after themselves and their own first. Yet we also know that cooperation does occur and that our civilization is based on it. But in situations where each individual has an incentive to be selfish, how can cooperation ever develop?

...To make headway in understanding the vast array of specific situations which have this property, a way is needed to represent what is common to these situations without becoming bogged down in the details unique to each...the famous Prisoner's Dilemma game.

The thought experiment goes as such: two criminals are in separate cells, unable to communicate, accused of a crime they both participated in. The police do not have enough evidence to sentence both without further evidence, though they are certain enough to wish to ensure they both spend time in prison. So they offer the prisoners a deal. They can accuse each other of the crime, with the following conditions:

- If both prisoners say the other did it, each will serve two years in prison.
- If one prisoner says the other did it and the other stays silent, the accused will serve three years and the accuser zero.
- If both prisoners stay silent, each will serve one year in prison.

In game theory, the altruistic behavior (staying silent) is called "cooperating," while accusing the other is called "defecting."

What should they do?

If they were able to communicate and they trusted each other, the rational choice is to stay silent; that way each serves less time in prison than they would otherwise. But how can each know the other won't accuse them? After all, people tend to act out of self-interest. The cost of being the one to stay silent is too high. The expected outcome when the game is played is that both accuse the other and serve two years. (In the real world, we doubt it would. After they served their time, it's not hard to imagine each of them still being upset. Two years is a lot of time for a spring to coil in a negative way. Perhaps they spend the rest of their lives sabotaging each other.)

The Iterated Prisoner's Dilemma

A more complex form of the thought experiment is the iterated Prisoner's Dilemma, in which we imagine the same two prisoners being in the same situation multiple times. In this version of the experiment, they are able to adjust their strategy based on the previous outcome.

If we repeat the scenario, it may seem as if the prisoners will begin to cooperate. But this doesn't make sense in game theory terms. When they know how many times the game will repeat, both have an incentive to accuse on the final round, seeing as there can be no

retaliation. Knowing the other will surely accuse on the final round, both have an incentive to accuse on the penultimate round—and so on, back to the start.

Gregory Mankiw summarizes how difficult it is to model cooperation in Business Economics as follows:

To see how difficult it is to maintain cooperation, imagine that, before the police captured . . . the two criminals, [they] had made a pact not to confess. Clearly, this agreement would make them both better off if they both live up to it, because they would each spend only one year in jail. But would the two criminals in fact remain silent, simply because they had agreed to? Once they are being questioned separately, the logic of self-interest takes over and leads them to confess. Cooperation between the two prisoners is difficult to maintain because cooperation is individually irrational.

However, cooperative strategies can evolve if we model the game as having random or infinite iterations. If each prisoner knows they will likely interact with each other in the future, with no knowledge or expectation their relationship will have a definite end, the cooperation becomes significantly more likely. If we imagine that the prisoners will go to the same jail or will run in the same circles once released, we can understand how the incentive for cooperation might increase. If you're a defector, running into the person you defected on is awkward at best, and leaves you sleeping with the fishes at worst.

Real-world Prisoner's Dilemmas

We can use the Prisoner's Dilemma as a means of understanding many real-world situations based on cooperation and trust. As individuals, being selfish tends to benefit us, at least in the short term. But when everyone is selfish, everyone suffers.

In The Prisoner's Dilemma, Martin Peterson asks readers to imagine two car manufacturers, Row Cars and Col Motors. As the only two actors in their market, the price each sells cars at has a direct connection to the price the other sells cars at. If one opts to sell at a higher price than the other, they will sell fewer cars as customers transfer. If one sells at a lower price, they will sell more cars at a lower profit margin, gaining customers from the other. In Peterson's example, if both set their prices high, both will make \$100 million per year. Should one decide to set their prices lower, they will make \$150 million while the other makes nothing. If both set low prices, both make \$20 million. Peterson writes:

Imagine that you serve on the board of Row Cars. In a board meeting, you point out that irrespective of what Col Motors decides to do, it will be better for your company to opt for low prices. This is because if Col Motors sets its price low, then a profit of \$20 million is better than \$0, and if Col Motors sets its price high, then a profit of \$150 million is better than \$100 million.

Gregory Mankiw gives another real-world example in Microeconomics, detailed here:

Consider an oligopoly with two members, called Iran and Saudi Arabia. Both countries sell crude oil. After prolonged negotiation, the countries agree to keep oil production low in order to keep the world price of oil high. After they agree on production levels, each country must decide whether to cooperate and live up to this agreement or to ignore it and produce at a higher level. The following image shows how the profits of the two countries depend on the strategies they choose.

Suppose you are the leader of Saudi Arabia. You might reason as follows:

I could keep production low as we agreed, or I could raise my production and sell more oil on world markets. If Iran lives up to the agreement and keeps its production low, then my country earns profit of \$60 billion with high production and \$50 billion with low production. In this case, Saudi Arabia is better off with high production. If Iran fails to live up to the agreement and produces at a high level, then my country earns \$40 billion with high production and \$30 billion with low production. Once again, Saudi Arabia is better off with high production. So, regardless of what Iran chooses to do, my country is better off reneging on our agreement and producing at a high level.

Producing at a high level is a dominant strategy for Saudi Arabia. Of course, Iran reasons in exactly the same way, and so both countries produce at a high level. The result is the inferior outcome (from both Iran and Saudi Arabia's standpoint) with low profits in each country. This example illustrates why oligopolies have trouble maintaining monopoly profits. The monopoly outcome is jointly rational for the oligopoly, but each oligopolist has an incentive to cheat. Just as self-interest drives the prisoners in the prisoners' dilemma to confess, self-interest makes it difficult for the oligopoly to maintain the cooperative outcome with low production, high prices and monopoly prices.

Other examples of prisoners' dilemmas include arms races, advertising, and common resources (see The Tragedy of the Commons). Understanding the Prisoner's Dilemma is an important component of the dynamics of cooperation, an extremely useful mental model.

Thinking of life as an iterative game changes how you play. Positioning yourself for the future carries more weight than "winning" in the moment.

144. The Tragedy Of The Commons

What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others. — Aristotle

The rules pay you to do the wrong thing. — Garrett Hardin

The Tragedy of the Commons is a parable that illustrates why common resources get used more than is desirable from the standpoint of society as a whole.

Garrett Hardin, introduces us to the The Tragedy of the Commons:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Greg Mankiw, in his Microeconomics text says:

Consider life in a small medieval town. Of the many economic activities that take place in the town, one of the most important is raising sheep. Many of the town's families own flocks of sheep and support themselves by selling the sheep's wool, which is used to make clothing.

As our story begins, the sheep spend much of their time grazing on the land surrounding the town, called the Town Commons. No family owns the land. Instead the town residents own the land collectively, and all the residents are allowed to graze their sheep on it.

Collective ownership works well because land is plentiful. As long as everyone can get all the good grazing land they want, the Town Common is not a rival good and allowing residents' sheep to graze for free causes no problems. Everyone in the town is happy.

As the years pass, the population of the town grows and so does the number of sheep grazing on the Town Commons. With a growing number of sheep and a fixed amount of land, the land starts to lose its ability to replenish itself. Eventually, the land is grazed so heavily that it becomes barren. With no grass left on the Town Common, raising sheep is impossible, and the town's once prosperous wool industry disappears and, tragically, many families lose their source of livelihood.

What causes the tragedy? Why do the shepherds allow the sheep population to grow so large that it destroys the Town Common? The reason is that social and private incentives differ. Avoiding the destruction of the grazing land depends on the collective action of the shepherds. If the shepherds acted together, they could reduce the sheep population to a

size that the Town Common could support. Yet no single family has an incentive to reduce the size of its own flock because each flock represents only a small part of the problem. In essence, the Tragedy of the Commons arises because of an externality. When one family's flock grazes on the common land, it reduces the quality of the land available for other families. Because people neglect this negative externality when deciding how many sheep to own, the result is an excessive number of sheep.

If the tragedy had been foreseen, the town could have solved the problem in various ways. It could have regulated the number of sheep in each family's flock, internalized the externality by taxing sheep, or auctioned off a limited number of sheep grazing permits. That is, the medieval town could have dealt with the problem of overgrazing in the way that modern society deals with the problem of pollution.

In the case of land, however, there is a simpler solution. The town can divide up the land among town families. Each family can enclose its allotment of land with a fence and then protect it from excessive grazing. In this way, the land becomes a private good rather than a common resource. This outcome in fact occurred during the enclosure movement in England in the 17th century.

The Tragedy of the Commons is a story with a general lesson: when one person uses a common resource, he diminishes other people's enjoyment of it. Because of this negative externality, common resources tend to be used excessively. The government can solve the problem by reducing use of the common resource through regulation or taxes.

Alternatively, the government can sometimes turn the common resource into a private good.

This lesson has been known for thousands of years. The ancient Greek philosopher Aristotle pointed out the problem with common resources: 'What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others.'

145. Mental Models For a Pandemic

Mental models help us understand the world better, something which is especially valuable during times of confusion, like a pandemic. Here's how to apply mental models to gain a more accurate picture of reality and keep a cool head.

It feels overwhelming when the world changes rapidly, abruptly, and extensively. The changes come so fast it can be hard to keep up—and the future, which a few months ago seemed reliable, now has so many unknown dimensions. In the face of such uncertainty, mental models are valuable tools for helping you think through significant disruptions such as a pandemic.

A mental model is simply a representation of how something works. They are how we simplify complexity, why we consider some things more relevant than others, and how we reason. Using them increases your clarity of understanding, providing direction for the choices you need to make and the options you want to keep open.

Models for ourselves

During a pandemic, a useful model is “the map is not the territory.” In rapidly changing situations like a global health crisis, any reporting is an incomplete snapshot in time. Our maps are going to be inaccurate for many reasons: limited testing availability, poor reporting, ineffective information sharing, lack of expertise in analyzing the available information. The list goes on.

If past reporting hasn't been completely accurate, then why would you assume current reporting is? You have to be careful when interpreting the information you receive, using it as a marker to scope out a range of what is happening in the territory.

In our current pandemic, we can easily spot our map issues. There aren't enough tests available in most countries. Because COVID-19 isn't fatal for the majority of people who contract it, there are likely many people who get it but don't meet the testing criteria. Therefore, we don't know how many people have it.

When we look at country-level reporting, we can also see not all countries are reporting to the same standard. Sometimes this isn't a matter of “better” or “worse”; there are just different ways of collating the numbers. Some countries don't have the infrastructure for widespread data collection and sharing. Different countries also have different standards for what counts as a death caused by COVID-19.

In other nations, incentives affect reporting. Some countries downplay their infection rate so as to not create panic. Some governments avoid reporting because it undermines their political interests. Others are more worried about the information on the economic map than the health one.

Although it is important to be realistic about our maps, it doesn't mean we shouldn't seek to improve their quality. Paying attention to information from experts and ignoring unverified soundbites is one step to increasing the accuracy of our maps. The more accurate we can get them, the more likely it is that we'll be able to unlock new possibilities that help us deal with the crisis and plan for the future.

There are two models that we can use to improve the effectiveness of the maps we do have: “compounding” and “probabilistic thinking.”

Compounding is exponential growth, something a lot of us tend to have a poor intuitive grasp on. We see the immediate linear relationships in the situation, like how one test diagnoses one person, while not understanding the compounding effects of that relationship. Increased testing can lead to an exponential decrease in virus transmission because each infected person usually passes the virus onto more than just one other person.

One of the clearest stories to illustrate exponential growth is the story of the man who asked to be paid in rice. In this story, a servant is to be rewarded for his service. When

asked how he wanted to be paid, he asks to be paid in rice, using a chessboard to determine the final amount. Starting with one grain, the amount of rice is to be doubled for each square. One grain on the first square looks pathetic. But halfway through the chessboard, the servant is making a good yearly living. And after doubling the rice sixty-four times, the servant is owed more rice than the whole world can produce.

Improving our ability to think exponentially helps us understand how more testing can lead to both an exponential decrease in testing prices and an exponential increase in the production of those tests. It also makes clear just how far-reaching the impact of our actions can be if we don't take precautions with the assumption that we could be infected.

Probabilistic thinking is also invaluable in helping us make decisions based on the incomplete information we have. In the absence of enough testing, for example, we need to use probabilistic thinking to make decisions on what actions to pursue. We ask ourselves questions like: Do I have COVID-19? If there's a 1% chance I have it, is it worth visiting my grandparents?

Being able to evaluate reasonable probability has huge impacts on how we approach physical distancing. Combining the models of probabilistic thinking and map is not the territory suggests our actions need to be guided by infection numbers much higher than the ones we have. We are likely to make significantly different social decisions if we estimate the probability of infection as being three people out of ten instead of one person out of one thousand.

Bayesian updating can also help clarify the physical distancing actions you should take. There's a small probability of being part of a horrendous chain of events that might not just have poor direct consequences but also follow you for the rest of your life. Evaluating how responsible you are being in terms of limiting transmission, would you bet a loved one's life on it?

Which leads us to Hanlon's Razor. It's hard not to get angry at reports of beach parties during spring break or at the guy four doors down who has his friends over to hang out every night. For your own sanity, try using Hanlon's Razor to evaluate their behavior. They are not being malicious and trying to kill people. They are just exceptionally and tragically ignorant.

Finally, on a day-to-day basis, trying to make small decisions with incomplete information, you can use inversion. You can look at the problem backwards. When the best way forward is far from clear, you ask yourself what you could do to make things *worse*, and then avoid doing those things.

Models for society

Applying mental models aids in the understanding the dynamics of the large-scale social response.

Currently we are seeing the counterintuitive measures with first-order negatives (closing businesses) but second- and third-order positives (reduced transmission, less stress on the healthcare system). Second-order thinking is an invaluable tool at all times, including during a pandemic. It's so important that we encourage the thinking, analysis, and decision-making that factors in the effects of the effects of the decisions we make.

In order to improve the maps that our leaders have to make decisions, we need to sort through the feedback loops providing the content. If we can improve not only the feedback but also the pace of iterations, we have a better chance of making good decisions.

For example, if we improve the rate of testing and the speed of the results, it would be a major game-changer. Imagine if knowing whether you had the virus or not was a \$0.01 test that gave you a result in less than a minute. In that case, we could make different decisions about social openness, even in the absence of a vaccine (however, this may have invasive privacy implications, as tracking this would be quite difficult otherwise).

As we watch the pandemic and its consequences unfold, it becomes clear that leadership and authority are not the same thing. Our hierarchical instincts emerge strongly in times of

crisis. Leadership vacuums, then, are devastating, and disasters expose the cracks in our hierarchies. However, we also see that people can display strong leadership without needing any authority. A pandemic provides opportunities for such leadership to emerge at community and local levels, providing alternate pathways for meeting the needs of many. One critical model we can use to look at society during a pandemic is Ecosystems. When we think about ecosystems, we might imagine a variety of organisms interacting in a forest or the ocean. But our cities are also ecosystems, as is the earth as a whole.

Understanding system dynamics can give us a lot of insight into what is happening in our societies, both at the micro and macro level.

One property of ecosystems that is useful to contemplate in situations like a pandemic is resilience—the speed at which an ecosystem recovers after a disturbance. There are many factors that contribute to resilience, such as diversity and adaptability. Looking at our global situation, one factor threatening to undermine our collective resilience is that our economy has rewarded razor-thin efficiency in the recent past. The problem with thin margins is they offer no buffer in the face of disruption. Therefore, ecosystems with thin margins are not at all resilient. Small disturbances can bring them down completely. And a pandemic is not a small disturbance.

Some argue that what we are facing now is a Black Swan: an unpredictable event beyond normal expectations with severe consequences. Most businesses are not ready to face one. You could argue that an economic recession is *not* a black swan, but the particular shape of this pandemic is testing the resiliency of our social and economic ecosystems regardless. The closing of shops and business, causing huge disruption, has exposed fragile supply chains. We just don't see these types of events often enough, even if we know they're theoretically possible. So we don't prepare for them. We don't or can't create big enough personal and social margins of safety. Individuals and businesses don't have enough money in the bank. We don't have enough medical facilities and supplies. Instead, we have optimized for a narrow range of possibilities, compromising the resilience of systems we rely on.

Finally, as we look at the role national borders are playing during this pandemic, we can use the Thermodynamics model to gain insight into how to manage flows of people during and after restrictions. Insulation requires a lot of work, as we are seeing with our borders and the subsequent effect on our economies. It's unsustainable for long periods of time. Just like how two objects of different temperatures that come into contact with each other eventually reach thermal equilibrium, people will mix with each other. All borders have openings of some sort. It's important to extend planning to incorporate the realistic tendencies of reintegration.

Some final thoughts about the future

As we look for opportunities about how to move forward both as individuals and societies, Cooperation provides a useful lens. Possibly more critical to evolution than competition, cooperation is a powerful force. It's rampant throughout the biological world; even bacteria cooperate. As a species, we have been cooperating with each other for a long time. All of us have given up some independence for access to resources provided by others.

Pandemics are intensified because of connection. But we can use that same connectivity to mitigate some negative effects by leveraging our community networks to create cooperative interactions that fill gaps in the government response. We can also use the cooperation lens to create more resilient connections in the future.

Finally, we need to ask ourselves how we can improve our antifragility. How can we get to a place where we grow stronger through change and challenge? It's not about getting "back to normal." The normal that was our world in 2019 has proven to be fragile. We shouldn't *want* to get back to a time when we were unprepared and vulnerable.

Existential threats are a reality of life on earth. One of the best lessons we can learn is to open our eyes and integrate planning for massive change into how we approach our lives. This will not be the last pandemic, no matter how careful we are. The goal now should not be about assigning blame or succumbing to hindsight bias to try to implement rules designed to prevent a similar situation in the future. We will be better off if we make changes aimed at increasing our resilience and embracing the benefits of challenge.

146. Bad Arguments and How to Avoid Them

Productive arguments serve two purposes: to open our minds to truths we couldn't see — and help others do the same. Here's how to avoid common pitfalls and argue like a master.

We're often faced with situations in which we need to argue a point, whether we're pitching an investor or competing for a contract. When being powerfully persuasive matters, it's important that we don't use bad arguments that prevent useful debate instead of furthering it. To do this, it's useful to know some common ways people remove the possibility of a meaningful discussion. While it can be a challenge to keep our cool and not sink to using bad arguments when responding to a Twitter troll or during a heated confrontation over Thanksgiving dinner, we can benefit from knowing what to avoid when the stakes are high.

"If the defendant be a man of straw, who is to pay the costs?"

— Charles Dickens

To start, let's define three common types of bad arguments, or logical fallacies: "straw man," "hollow man," and "iron man."

Straw man arguments

A straw man argument is a misrepresentation of an opinion or viewpoint, designed to be as easy as possible to refute. Just as a person made of straw would be easier to fight with than a real human, a straw man argument is easy to knock to the ground. And just as it might look a bit like a real person from a distance, a straw man argument has the rough outline of the actual discussion. In some cases, it might seem similar to an outside observer. But it lacks any semblance of substance or strength. The sole purpose is for it to be easy to refute. It's not an argument you happen to find inconvenient or challenging. It's one that is logically flawed. A straw man argument may not even be invalid; it's just not relevant.

It's important not to confuse a strawman argument with a simplified summary of a complex argument. When we're having a debate, we may sometimes need to explain an opponent's grounds back to them to ensure we understand it. In this case, this explanation will be by necessity a briefer version. But it is only a straw man if the simplification is used to make it easier to attack, rather than to facilitate clearer understanding.

There are a number of common tactics used to construct straw man arguments. One is *per fas et nefas* (which means "through right and wrong" in Latin) and involves refuting one of the reasons for an opponent's argument, then claiming that discredits everything they've said. Often, this type of straw man argument will focus on an irrelevant or unimportant detail, selecting the weakest part of the argument. Even though they have no response to the rest of the discourse, they purport to have disproven it in its entirety. As Doug Walton, professor of philosophy at the University of Winnipeg, puts it, "The straw man tactic is essentially to take some small part of an arguer's position and then treat it as if that represented his larger position, even though it is not really representative of that larger position. It is a form of generalizing from one aspect to a larger, broader position, but not in a representative way."

Oversimplifying an argument makes it easier to attack by removing any important nuance. An example is the "peanut butter argument," which states life cannot have evolved through natural selection because we do not see the spontaneous appearance of new life forms inside sealed peanut butter jars. The argument claims evolutionary theory asserts life emerged through a simple combination of matter and heat, both of which are present in a jar of peanut butter. It is a straw man because it uses an incorrect statement about

evolution as being representative of the whole theory. The defender of evolution gets trapped into explaining a position they didn't even have: why life doesn't spontaneously develop inside a jar of peanut butter.

Another tactic is to over-exaggerate a line of reasoning to the point of absurdity, thus making it easier to refute. An example would be someone claiming a politician who is not opposed to immigration is thus in favor of open borders with no restrictions on who can enter a country. Seeing as that would be a weak view that few people hold, the politician then feels obligated to defend border controls and risks losing control of the debate and being charged as a hypocrite.

"The light obtained by setting straw men on fire is not what we mean by illumination."

— Adam Gopnik

Straw man arguments that respond to irrelevant points could involve *ad hominem* points, which are sort of relevant but don't refute the argument—for example, responding to the point that wind turbines are a more environmentally friendly means of generating energy than fossil fuels by saying, "But wind turbines are ugly." This point has a loose connection, yet the way wind turbines look doesn't discredit their benefits for power generation. A person who made an *ad hominem* point like that would likely be doing so because they knew they had no rebuttal for the actual assertion.

Quoting an argument out of context is another tactic of straw man arguments. "Quote mining" is the practice of removing any part of a source that proves contradictory, often using ellipses to fill in the gaps. For instance, film posters and book blurbs will sometimes take quotes from bad reviews out of context to make them seem positive. So, "It's amazing how bad this film is" becomes "Amazing," and "The perfect book for people who wish to be bored to tears" becomes "The perfect book." Reviewers face an uphill battle in trying not to write anything that could be taken out of control in this manner.

Hollow man arguments

A hollow man argument is similar to a straw man one. The difference is that it is a weak case attributed to a non-existent group. Someone will fabricate a viewpoint that is easy to refute, then claim it was made by a group they disagree with. Arguing against an opponent which doesn't exist is a pretty easy way to win any debate. People who use hollow man arguments will often favor vague, non-specific language without explicitly giving any sources or stating who their opponent is.

Hollow man arguments slip into debate because they're a lazy way of making a strong point without risking anyone refuting you or needing to be accountable for the actual strength of a line of reasoning. In Why We Argue (And How We Should): A Guide to Political Disagreement, Scott F. Aikin and Robert B. Talisse write that "speakers commit the hollow man when they respond critically to arguments that nobody on the opposing side has ever made. The act of erecting a hollow man is an argumentative failure because it distracts attention away from the actual reasons and argument given by one's opposition. . . . It is a full-bore fabrication of the opposition."

An example of a hollow man argument would be the claim that animal rights activists want humans and non-human animals to have a perfectly equal legal standing, meaning that dogs would have to start wearing clothes to avoid being arrested for public indecency. This is a hollow man because no one has said that all laws applying to humans should also apply to dogs.

"The smart way to keep people passive and obedient is to strictly limit the spectrum of acceptable opinion, but allow very lively debate within that spectrum."

Iron man argument

An iron man argument is one constructed in such a way that it is resistant to attacks by a challenger. Iron man arguments are difficult to avoid because they have a lot of overlap with legitimate debate techniques. The distinction is whether the person using them is doing so to prevent opposition altogether or if they are open to changing their minds and listening to an opposer. Being proven wrong is painful, which is why we often unthinkingly resort to shielding ourselves from it using iron man arguments.

Someone using an iron man argument often makes their own stance so vague that nothing anyone says about it can weaken it. They'll make liberal use of caveats, jargon, and imprecise terms. This means they can claim anyone who disagrees didn't understand them, or they'll rephrase their contention repeatedly. You could compare this to the language used in the average horoscope or in a fortune cookie. It's so vague that it's hard to disagree with or label it as incorrect because it *can't* be incorrect. It's like boxing with a wisp of steam.

An example would be a politician who answers a difficult question about their policies by saying, "I think it's important that we take the best possible actions to benefit the people of this country. Our priority in this situation is to implement policies that have a positive impact on everyone in society." They've answered the question, just without saying anything that anyone could disagree with.

Why bad arguments are harmful

What is the purpose of debate? Most of us, if asked, would say it's about helping someone with an incorrect, harmful idea see the light. It's an act of kindness. It's about getting to the truth.

But the way we tend to engage in debate contradicts our supposed intentions.

Much of the time, we're really debating because we want to prove we're right and our opponent is wrong. Our interest is not in getting to the truth. We don't even consider the possibility that our opponent might be correct or that we could learn something from them. As decades of psychological research indicate, our brains are always out to save energy, and part of that is that we prefer not to change our minds about anything. It's much easier to cling to our existing beliefs through whatever means possible and ignore anything that challenges them. Bad arguments enable us to engage in what looks like a debate but doesn't pose any risk of forcing us to question what we stand for.

We debate for other reasons, too. Sometimes we're out to entertain ourselves. Or we want to prove we're smarter than someone else. Or we're secretly addicted to the shot of adrenaline we get from picking a fight. And that's what we're doing—fighting, not arguing. In these cases, it's no surprise that shoddy tactics like using straw man or hollow man arguments emerge.

It's never fun to admit we're wrong about anything or to have to change our minds. But it is essential if we want to get smarter and see the world as it is, not as we want it to be. Any time we engage in debate, we need to be honest about our intentions. What are we trying to achieve? Are we open to changing our minds? Are we listening to our opponent? Only when we're out to have a balanced discussion with the possibility of changing our minds can a debate be productive, avoiding the use of logical fallacies.

Bad arguments are harmful to everyone involved in a debate. They don't get us anywhere because we're not tackling an opponent's actual viewpoint. This means we have no hope of convincing them. Worse, this sort of underhand tactic is likely to make an opponent feel frustrated and annoyed by the deliberate misrepresentation of their beliefs. They're forced to listen to a refutation of something they don't even believe in the first place, which insults their intelligence. Feeling attacked like this only makes them hold on tighter to their actual belief. It may even make them less willing to engage in any sort of debate in the future.

And if you're a chronic constructor of bad arguments, as many of us are, it leads people to avoid challenging you or starting discussions. Which means you don't get to learn from them or have your views questioned. In formal situations, using bad arguments makes it look like you don't really have a strong point in the first place.

How to avoid using bad arguments

If you want to have useful, productive debates, it's vital to avoid using bad arguments.

The first thing we need to do to avoid constructing bad arguments is to accept it's something we're all susceptible to. It's easy to look at a logical fallacy and think of all the people we know who use it. It's much harder to recognize it in ourselves. We don't always realize when the point we're making isn't that strong.

Bad arguments are almost unavoidable if we haven't taken the time to research both sides of the debate. Sometimes the map is not the territory—that is, our perception of an opinion is not that opinion. The most useful thing we can do is attempt to see the territory. That brings us to steelman arguments and the ideological Turing test.

Steel man arguments

The most powerful way to avoid using bad arguments and to discourage their use by others is to follow the principle of charity and to argue against the strongest and most persuasive version of their grounds. In this case, we suspend disbelief and ignore our own opinions for long enough to understand where they're coming from. We recognize the good sides of their case and play to its strengths. Ask questions to clarify anything you don't understand. Be curious about the other person's perspective. You might not change their mind, but you will at least learn something and hopefully reduce any conflict in the process.

"It is better to debate a question without settling it than to settle a question without debating it."

— Joseph Joubert

In Intuition Pumps and Other Tools for Thinking, the philosopher Daniel Dennett offers some general guidelines for using the principle of charity, formulated by social psychologist and game theorist Anatol Rapoport:

1. *You should attempt to re-express your target's position so clearly, vividly, and fairly that your target says, "Thanks, I wish I'd thought of putting it that way."*
2. *You should list any points of agreement (especially if they are not matters of general or widespread agreement).*
3. *You should mention anything you have learned from your target.*
4. *Only then are you permitted to say so much as a word of rebuttal or criticism.*

An argument that is the strongest version of an opponent's viewpoint is known as a steel man. It's purposefully constructed to be as difficult as possible to attack. The idea is that we can only say we've won a debate when we've fought with a steel man, not a straw one. Seeing as we're biased towards tackling weaker versions of an argument, often without realizing it, this lets us err on the side of caution.

As challenging as this might be, it serves a bigger picture purpose. Steel man arguments help us understand a new perspective, however ludicrous it might be in our eyes, so we're better positioned to succeed and connect better in the future. It shows a challenger we are empathetic and willing to listen, regardless of personal opinion. The point is to see the strengths, not the weaknesses. If we're open-minded, not combative, we can learn a lot.

“He who knows only his side of the case knows little of that.”

— John Stuart Mill

An exercise in steel manning, the ideological Turing test, proposes that we cannot say we understand an opponent's position unless we would be able to argue in favor of it so well that an observer would not be able to tell which opinion we actually hold. In other words, we shouldn't hold opinions we can't argue against. The ideological Turing test is a great thought experiment to establish whether you understand where an opponent is coming from.

Although we don't have the option to do this for every single thing we disagree with, when a debate is extremely important to us, the ideological Turing test can be a helpful tool for ensuring we're fully prepared. Even if we can't use it all the time, it can serve us well in high-stakes situations.

How to handle other people using bad arguments

“You could not fence with an antagonist who met rapier thrust with blow of battle axe.”

— L.M. Montgomery

Let's say you're in the middle of a debate with someone with a different opinion than yours. You're responding to the steel man version of their explanation, staying calm and measured. But what do you do if your opponent starts using bad arguments against you? What if they're not listening to you?

The first thing you can do when someone uses a bad argument against you is the simplest: point it out. Explain what they're doing and why it isn't helpful. There's not much point in just telling them they're using a straw man argument or any other type of logical fallacy. If they're not familiar with the concept, it may just seem like alienating jargon. There's also not much point in using it as a “gotcha!” point which will likewise foster more tensions. It's best to define the concept, then reiterate your actual beliefs and how they differ from the bad argument they're arguing against.

1. Edward Damer writes in Attacking Faulty Reasoning, “It is not always possible to know whether an opponent has deliberately distorted your argument or has simply failed to understand or interpret it in the way that you intended. For this reason, it might be helpful to recapitulate the basic outline . . . or [ask] your opponent to summarize it for you.”

If this doesn't work, you can continue to repeat your original point and make no attempt to defend the bad argument. Should your opponent prove unwilling to recognize their use of a bad argument (and you're 100% certain that's what they're doing), it's worth considering if there is any point in continuing the debate. The reality is that most of the debates we have are not rationally thought out; they're emotionally driven. This is even more pertinent when we're arguing with people we have a complex relationship with. Sometimes, it's better to walk away.

Conclusion

The bad arguments discussed here are incredibly common logical fallacies in debates. We often use them without realizing it or experience them without recognizing it. But these types of debates are unproductive and unlikely to help anyone learn. If we want our arguments to create buy-in and not animosity, we need to avoid making bad ones.

148. Descriptions Aren't Prescriptions

When we look at a representation of reality, we can choose to either see it as descriptive, meaning it tells us what the world is currently like, or as prescriptive, meaning it tells us how the world should be. Descriptions teach us, but they also give us room to innovate. Prescriptions can get us stuck. One place this tension shows up is in language.

In one chapter of The Utopia of Rules: On Technology, Stupidity, and the Secret Joys of Bureaucracy, David Graeber describes his experience of learning Malagasy, the national language of Madagascar. While the language's writing system came about in the fifteenth century, it wasn't until the early nineteenth century that missionaries documented the rules of Malagasy grammar for the purpose of translating scripture.

Of course, the "rules" of Malagasy the missionaries recorded weren't rules at all. They were reflections of how people spoke at that point in time, as far as outside observers could tell. Languages don't usually come into existence when someone invents the rules for them. Instead, languages evolve and change over time as speakers make modifications or respond to new needs.

However, those early nineteenth-century records remained in place as the supposed "official" version of Malagasy. Children learned the old form of grammar in school, even as they spoke a somewhat different version of the language at home. For Graeber, learning to speak the version of Malagasy people actually understood in conversation was a challenge. Native speakers he hired would instruct him on the nineteenth-century grammatical principles, then turn and speak to each other in a whole other fashion. When asked why they couldn't teach him the version of the language they spoke, Graeber's Malagasy teachers responded that they were just using slang. Asked why no one seemed to speak the official version, they said people were too lazy. Graeber writes, "Clearly the problem was that the entire population had failed to memorize their lessons properly. But what they were actually denying was the legitimacy of collective creativity, the free play of the system. " While the official rules stayed the same over the decades, the language itself kept evolving. People assumed the fault of not speaking "proper" Malagasy lay with them, not with the outdated dictionary and grammar. They confused a description for a prescription. He writes:

It never seems to occur to anyone—until you point it out—that had the missionaries come and written their books two hundred years later, current usages would be considered the correct ones, and anyone speaking as they had two hundred years ago would themselves be assumed to be in error.

Graeber sees the same phenomenon playing out in other languages for which grammars and dictionaries only came into existence a century or two ago. Often, such languages were mostly spoken and, like Malagasy, no one made formal records until the need arose for people from elsewhere to make translations. Instead of treating those records as descriptive and outdated, those teaching the language treat them as prescriptive—despite knowing they're not practical for everyday use.

Why don't people talk "proper"?

So why can't people just speak a language per the official rules? If someone has gone to all the effort of identifying and recording the rules and people received instruction on them in school, why not follow them? Why keep changing things up?

If languages didn't evolve, it would make life a lot easier for historians looking at texts from the past. It would also simplify matters for people learning the language, for those coming from different areas, and even for speakers across generations. Yet all languages change all the time.

Graeber suggests the reason for this is because people like to play. We find it dull to speak according to the official rules of our language. We seek out novelty in our everyday lives

and do whatever it takes to avoid boredom. Even if each person only plays a little bit once in a while, the results compound. Graeber explains that *“this playing around will have cumulative effects.”*

Languages still need conventions so people can understand each other. The higher the similarity between the versions of a language different people speak, the more they can communicate. At the same time, they cannot remain rigid. Trying to follow an unyielding set of strict rules will inevitably curtail the usefulness of a language and prevent it from developing in interesting and necessary ways. Languages need a balance: enough guidance to help everyone understand each other and provide an entry point for learners, and enough flexibility to keep updating the rules as actual usage changes.

As a result, languages call into question our idea of freedom: *“It’s worth thinking about language for a moment, because one thing it reveals, probably better than any other example, is that there is a basic paradox in our very idea of freedom. On the one hand, rules are by their nature constraining. Speech codes, rules of etiquette, and grammatical rules, all have the effect of limiting what we can and cannot say.”* On the other hand, no rules whatsoever mean no one can understand each other.

Languages need frameworks, but no amount of grammar classes or official dictionaries will prevent people from playing and having fun with their speech.

The dictionary is not the language

“The map is not the territory” means that any representation of reality has to be a simplification that may contain errors, become outdated, or reflect biases. Maps remove details that aren’t necessary for their intended use. Representations of complex systems may show expected behavior or ideal behavior. For example, the London Underground map doesn’t reflect the distances between stations because this information isn’t important to most commuters. If a map represented its territory without reducing anything, it would be identical to the territory and therefore would be useless. In fact, the simplest maps can be the most useful because they’re the easiest to understand and remember.

Sometimes maps are descriptive, and sometimes they’re prescriptive; often they’re a bit of both. We run into problems when we confuse one type for another and try to navigate an idealized territory or make the real territory fit an idealized image.

A language’s grammar and dictionary are a sort of map. They take a complex system—a language spoken by what could be tens of millions of people—and aim to represent it with something which is, by comparison, simple. The official rules are not the language itself, but they provide guidance for navigating it. Much like a map of a city needs periodic updates as parts are torn down, built up, renamed, destroyed, added, and so on, the official rules need updating as the language changes. Trying to learn Malagasy using grammar rules written two hundred years ago is like trying to navigate Antananarivo using a street map made two hundred years ago.

A map of a complex system, like a language, is meant to help us find our way by giving us a sense of how things looked at one point in time—it’s usually descriptive. It doesn’t necessarily tell us how that system should look, and we may run into problems if we try to make it conform to the map, ignoring the system’s own adaptive properties. Even if the cartographer never intended this, we can end up treating a map as a prescription. We try to make reality conform to the map. This is what occurs with languages. Graeber calls this the “grammar-book effect”:

People do not invent languages by writing grammars, they write grammars—at least, the first grammars to be written for any given language—by observing the tacit, largely unconscious rules that people seem to be employing when they speak. Yet once a book exists, and especially once it is employed in schoolrooms, people feel that the rules are not just descriptions of how people do talk, but prescriptions for how they should talk.

As we've seen, one reason the map is not the territory with language is because people feel compelled to play and experiment. When we encounter representations of systems involving people, we should keep in mind that while we may need rules for the sake of working together and understanding each other, we're always pushing up against and reshaping those rules. We find it boring to follow a rigid prescription.

For instance, imagine some of the documents you might receive upon starting a role at a new company. Process documents showing step by step how to do the main tasks you'll be expected to perform. But when the person you're replacing shows you how to do those same tasks, you notice they don't follow the listed steps at all. When you ask why, they explain that the process documents were written before they started actually carrying out those tasks, meaning they discovered more efficient ways afterward.

Why keep the process documents, then? Because for someone filling in or starting out, it might make sense to follow them. It's the most defensible option. Once you truly know the territory and won't change something without considering why it was there in the first place, you can play with the rules. Those documents might be useful as a description, but they're unlikely to remain a prescription for long.

The same is true for laws. Sometimes aspects of them are just descriptive of how things are at one point in time, but we end up having to keep following them to the letter because they haven't been updated. A law might have been written at a time when documents needed sending by letter, meaning certain delays for shipping. Now they can be sent by email. If the law hasn't been updated, those delay allowances turn from descriptions into prescriptions. Or a law might reflect what people were permitted to do at the time, but now we assume people should have the right to do that thing even if we have new evidence it's not the best idea. We are less likely to change laws if we persist in viewing them as prescriptive.

Conclusion

Descriptions of reality are practical for helping us navigate it, while also giving us room to change things. Prescriptions are helpful for giving us ways of understanding each other and providing enough structure for shared conventions, but they can also become outdated or end up limiting flexibility. When you encounter a representation of something, it's useful to consider which parts are descriptive and which parts are prescriptive. Remember that both prescriptions and descriptions can and should change over time.

149. Mental Models for Career Changes

Career changes are some of the biggest moves we will ever make, but they don't have to be daunting. Using mental models to make decisions we determine where we want to go and how to get there. The result is a change that aligns with the person we are, as well as the person we want to be.

We've all been there: you're at a job, and you know it's not for you anymore. You come in drained, you're not excited on a Monday morning, and you feel like you could be using your time so much better. It's not the people, and it's not the organization. It's the work. It's become boring, unfulfilling, or redundant, and you know you want to do something different. But what?

Just deciding to change careers doesn't get you very far because there are more areas to work in than you know about. A big change often involves some retraining. A career shift will impact your personal life. At the end of it all, you want to be happier but know there are no guarantees. How do you find a clear path forward?

No matter how ready you think you are to make a move, career changes are daunting. The stress of leaving what you're comfortable with to venture into foreign territory stops many people from taking the first step toward something new.

It doesn't have to be this way.

Using mental models can help you clarify the direction you want to go and plan for how to get there. They are tools that will give you more control over your career and more confidence in your decisions. When you do the work up front by examining your situation through the lens of a few mental models, you set yourself up for fewer regrets and more satisfaction down the road.

Get in touch with yourself

Before you can decide which change to make, you need to get in touch with yourself. No change will be the right one if it doesn't align with what you want to get out of life.

First, do you know where you want to go? Are you moving with direction or just moving?

As a mental model, velocity reminds us there is a difference between speed and direction. It's easy to move fast without getting anywhere. We can stay busy all day without achieving our goals. Without considering our velocity, we run a huge risk of getting sidetracked by things that make us move faster (more money, a title on a business card) without that movement actually leading us where we want to end up.

As the old saying goes, we want to run *to* something, not *from* something. When you start articulating your desired direction, you give yourself clear purpose in your career. It will be easier to play the long game because you know that everything you are doing is leading somewhere you want to be.

When it comes to changing careers, there are a lot of options. Using the mental model of velocity will help you focus on and identify the best opportunities.

Once you know where you want to end up, it's often useful to work backward to where you are now. This is known as inversion. Start at the end and carefully consider the events that get you there in reverse order.

For example, it could be something as simple as waking up happy and excited to work every day. What needs to be true in order for that to be a reality? Are you working from home, having a quiet cup of coffee as you prepare to do some creative work? Are you working on projects aligned with your values? Are you contributing to making the world a better place? Are you in an intense, collaborative team environment?

Doing an inversion exercise helps you identify the elements needed for you to achieve success. Once you identify your requirements, you can use that list to evaluate opportunities that come up.

Inversion will help you recognize critical factors, like finances or the support of your family, that will be necessary to get to where you want to go. If your dream direction requires you to learn a new skill or work at a junior level while you ramp up on the knowledge you'll need, you might need to live off some savings in the short term. Inversion, combined with velocity, will help you create the foundation you need now to take action when the right time comes.

Finally, the last step before you start evaluating the career environment is taking stock of the skills you already have. Why do you need to do this? So you know what you can repurpose. Here, you're using the concept of exaptation, which is part of the broader adaptation model in biology. Exaptation refers to traits that evolved for one purpose and then, through natural selection, were used for completely unrelated capabilities. For instance, feathers probably evolved for insulation. It was only much later that they turned out to be useful for flying.

History is littered with examples of technologies or tools invented for one purpose that later became the foundation for something completely different. Did you know that Play-Doh was originally created to clean coal soot off walls? And bubble wrap was originally envisioned as material for shower curtains.

Using this model is partly about getting out of the "functional fixedness" mindset. You want to look at your skills, talents, and knowledge and ask of each one: what else could this be used for?

Too often we fail to realize just how versatile the experience we've built up over the years is. We're great at using forks to eat, but they can also be used to brush hair, dig in a garden, and pin things to walls. Being great at presenting the monthly status update doesn't mean you're good at presenting monthly status updates. Rather, it means you can articulate yourself well, parse information for a diverse audience, and build networks to get the right information. Now, what else can those skills be used for?

Evaluate the environment

Looking at different careers, we're usually in a situation where the "map is not the territory." It's hard to know how great (or terrible) a job is until you actually do it. We often have two types of maps for the careers we wish we had: maps of the highlights, success stories, and opinions of people who love the work and maps based on how much we love the field or discipline ourselves.

The territory of the day-to-day work of these careers, however, is very different from what those two maps tell us.

In order to determine if a particular career will work for us, we need better maps. For example, the reality of being an actor isn't just the movies and programs you see them in. It's audition after audition, with more rejections than roles. It's intense competition and job insecurity. Being a research scientist at a university isn't just immersing yourself in a subject you love. It's grant applications and teaching and navigating the bureaucracy of academia.

In order to build a more comprehensive map of your dream job, do your research on as large a sample size as possible. Talk to people doing the job you want. Talk to people who work in the organization. Talk to the ones that enjoy it. Talk to the ones who quit. Try to get an accurate picture of what the day-to-day is like.

Very few jobs are one-dimensional. They involve things like administrative tasks, networking, project management, and accountability. How much of your day will be spent doing paperwork or updating your coworkers? How much of a connection do you need to maintain with people outside the organization? How many people will you be dependent on? What are they like? And who will you be working for?

It's not a good idea to become a writer just because you want to tell stories, open a restaurant just because you like to cook, or become a landscape designer just because

you enjoy being outside. Those motivations are good places to start—because it's equally terrible to become a lawyer just because your parents wanted you to. But you can't stop with what you like. There isn't a job in the world that's pleasurable and fulfilling 100% of the time.

You give yourself a much higher chance of being satisfied with your career change if you take the time to learn as much as you can about the territory beforehand.

Elements of planning

You know which direction you're heading in, and you've identified a great new career possibility. Now what?

Planning for change is a crucial component of switching careers. Two models, global and local maxima and activation energy, can help us identify what we need to plan.

Global and local maxima refers to the high values in a mathematical function. On a graph, it's a wavy curve with peaks and valleys. The highest peak in a section is a local maximum. The highest peak across the entire graph is the global maximum. Activation energy comes from chemistry, and is the amount of energy needed to see a reaction through to its conclusion.

One of the things global and local maxima teaches us is that sometimes you have to go down a hill in order to climb up a new one. To move from a local maximum to a higher peak you have to go through a local minimum, a valley. Too often we just want to go higher right away, or at the very least we want to make a lateral move. We perceive going down as taking a step backward.

A common problem is when we tie our self-worth to our salary and therefore reject any opportunities that won't pay us as much as we're currently making. The same goes for job titles; no one wants to be a junior anything in their mid-forties. But it's impossible to get to the next peak if we won't walk through the valley.

If you look at your career change through the lens of global and local maxima, you will see that steps down can also be steps forward.

Activation energy is another great model to use in the planning phase because it requires you to think about the real effort required for sustained change. You need to plan not just for making a change but also for seeing it through until the new thing has time to take hold. Do you have enough in the bank to support yourself if you need to retrain or take a pay cut? Do you have the emotional support to help you through the challenges of taking on a brand-new career?

Just like fires don't start with one match and a giant log, you have to plan for what you need between now and your desired result. What do you need to keep that reaction going so the flame from the match leads to the log catching fire? The same kind of thinking needs to inform your planning. After you've taken the first step, what will you need to keep you moving in the direction you want to go?

After you've done all the work

After getting in touch with yourself, doing all your research, identifying possible paths, and planning for what you need to do to walk them to the end, it can still be hard to make a decision. You've uncovered so many nuances and encountered so many ideas that you feel overwhelmed. The reality is, when it comes to career change, there often is no perfect decision. You likely have more than one option, and whatever you choose, there's going to be a lot of work involved.

One final model you can use is probabilistic thinking. In this particular situation, it can be helpful to use a Bayesian casino.

A Bayesian casino is a thought experiment where you imagine walking up to a casino game, like roulette, and quantifying how much you would bet on any particular outcome.

Let's say when investigating your career change, you've narrowed it down to two options. Which one would you bet on for being the better choice one year later? And how much would you part with? If you'd bet ten dollars on black, then you probably need to take a fresh look at the research you've done. Maybe go talk to more people, or broaden your thinking. If you're willing to put down thousands of dollars on red, that's very likely the right decision for you.

It's important in this thought experiment to fully imagine yourself making the bet. Imagine the money in your bank account. Imagine withdrawing it and physically putting it down on the table. How much you're willing to part with regarding a particular career choice says a lot about how good that choice is likely to be for you.

Probabilistic thinking isn't a predictor of the future. With any big career move, there are inevitably a lot of unknowns. There are no guarantees that any choice is going to be the right one. The Bayesian casino just helps you quantify your thinking based on the knowledge you have at this moment in time.

As new information comes in, return to the casino and see if your bets change.

Conclusion

Career changes are some of the biggest moves we will ever make, but they don't have to be daunting. Using mental models helps us find both the direction we want to go and a path we can take to get there. The result is a change that aligns with the person we are, as well as the person we want to be.

150. Thought Experiment: How Einstein Solved Difficult Problems

Thought experiments are a classic tool used by many great thinkers. They enable us to explore impossible situations and predict their implications and outcomes. Mastering thought experiments can help you confront difficult questions and anticipate (and prevent) problems.

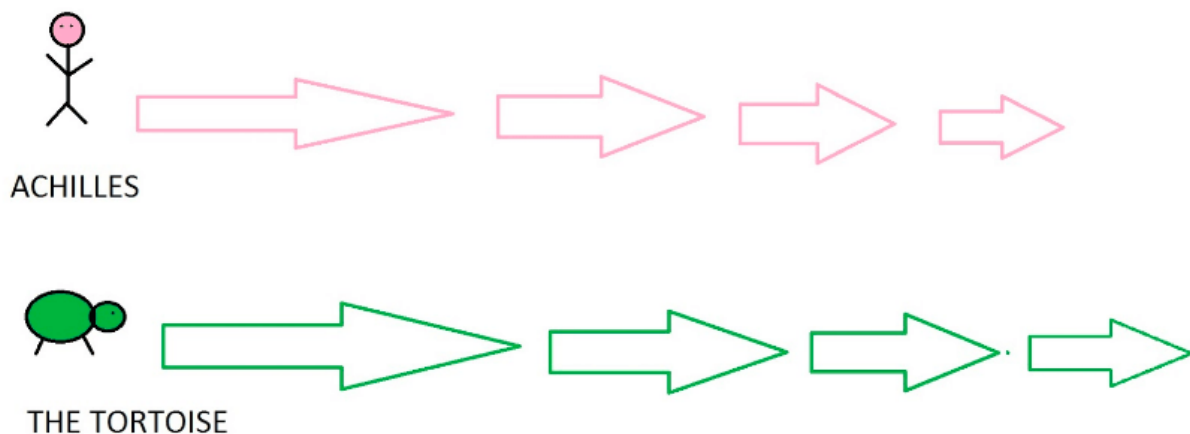
The purpose of a thought experiment is to encourage speculation, logical thinking and to change paradigms. Thought experiments push us outside our comfort zone by forcing us to confront questions we cannot answer with ease. They demonstrate gaps in our knowledge and help us recognize the limits of what can be known.

"All truly wise thoughts have been thought already thousands of times; but to make them truly ours, we must think them over again honestly, until they take root in our personal experience."

Johann Wolfgang von Goethe

Famous thought experiments

Thought experiments have a rich and complex history, stretching back to the ancient Greeks and Romans.



An early example of a thought experiment is Zeno's narrative of Achilles and the tortoise, dating to around 430 BC. Zeno's thought experiments aimed to deduce first principles through the elimination of untrue concepts.

In one instance, the Greek philosopher used it to 'prove' motion is an illusion. Known as the dichotomy paradox, it involves Achilles racing a tortoise. Out of generosity, Achilles gives the tortoise a 100m head start. Once Achilles begins running, he soon catches up on the head start. However, by that point, the tortoise has moved another 10m. By the time he catches up again, the tortoise will have moved further. Zeno claimed Achilles could never win the race as the distance between the pair would constantly increase.

Descartes conducted a thought experiment, doubting the existence of everything he could until there was nothing left he could doubt. Descartes could doubt everything except for the fact that he could doubt. His process left us with the philosophical thought experiment of 'a brain in a vat'.

In the 17th century, Galileo used thought experiments to affirm his theories. One example is his thought experiment involving two balls (one heavy, one light) which are dropped from the Leaning Tower of Pisa. Prior philosophers had theorized the heavy ball would land first. Galileo claimed this was untrue, as mass does not influence acceleration.

According to Galileo's early biography (written in 1654), he dropped two objects from the Leaning Tower of Pisa to disprove the gravitational mass relation hypothesis. Both landed

at the same time, ushering in a new understanding of gravity. It is unknown if Galileo performed the experiment itself, so it is regarded as a thought experiment, not a physical one.

In 1814, Pierre Laplace explored determinism through 'Laplace's demon.' This is a theoretical 'demon' which has an acute awareness of the location and movement of every single particle in existence. Would Laplace's demon know the future? If the answer is yes, the universe must be linear and deterministic. If no, the universe is nonlinear and free will exists.

In 1897, the German term 'Gedankenexperiment' passed into English and a cohesive picture of how thought experiments are used worldwide began to form.

Albert Einstein used thought experiments for some of his most important discoveries. The most famous of his thought experiments was on a beam of light, which was made into a brilliant children's book. What would happen if you could catch up to a beam of light as it moved he asked himself? The answers led him down a different path toward time, which led to the special theory of relativity.

Natural tendencies

In On Thought Experiments, 19th-century Philosopher and physicist Ernst Mach writes that curiosity is an inherent human quality. Babies test the world around them and learn the principle of cause and effect. With time, our exploration of the world becomes more and more in depth. We reach a point where we can no longer experiment through our hands alone. At that point, we move into the realm of thought experiments.

Thought experiments are a structured manifestation of our natural curiosity about the world.

Mach writes:

Our own ideas are more easily and readily at our disposal than physical facts. We experiment with thought, so as to say, at little expense. It shouldn't surprise us that, oftentimes, the thought experiment precedes the physical experiment and prepares the way for it... A thought experiment is also a necessary precondition for a physical experiment. Every inventor and every experimenter must have in his mind the detailed order before he actualizes it.

Mach compares thought experiments to the plans and images we form in our minds before commencing an endeavor. We all do this — rehearsing a conversation before having it, planning a piece of work before starting it, figuring out every detail of a meal before cooking it. Mach views this as an integral part of our ability to engage in complex tasks and to innovate creatively.

According to Mach, the results of some thought experiments can be so certain that it is unnecessary to physically perform it. Regardless of the accuracy of the result, the desired purpose has been achieved.

"It can be seen that the basic method of the thought experiment is just like that of a physical experiment, namely, the method of variation. By varying the circumstances (continuously, if possible) the range of validity of an idea (expectation) related to these circumstances is increased."

Ernst Mach

Thought experiments in philosophy

Thought experiments have been an integral part of philosophy since ancient times. This is in part due to philosophical hypotheses often being subjective and impossible to prove through empirical evidence.

Philosophers use thought experiments to convey theories in an accessible manner. With the aim of illustrating a particular concept (such as free will or mortality), philosophers explore imagined scenarios. The goal is not to uncover a 'correct' answer, but to spark new ideas.

An early example of a philosophical thought experiment is Plato's Allegory of the Cave, which centers around a dialogue between Socrates and Glaucon (Plato's brother.) A group of people are born and live within a dark cave. Having spent their entire lives seeing nothing but shadows on the wall, they lack a conception of the world outside. Knowing nothing different, they do not even wish to leave the cave. At some point, they are led outside and see a world consisting of much more than shadows.

Plato used this thought experiment to illustrate the incomplete view of reality most of us have. Only by learning philosophy, Plato claimed, can we see more than shadows.

Upon leaving the cave, the people realize the outside world is far more interesting and fulfilling. If a solitary person left, they would want others to do the same. However, if they return to the cave, their old life will seem unsatisfactory. This discomfort would become misplaced, leading them to resent the outside world. Plato used this to convey his (almost compulsively) deep appreciation for the power of educating ourselves. To take up the mantle of your own education and begin seeking to understand the world is the first step on the way out of the cave.

Moving from caves to insects, here's a thought experiment from 20th-century philosopher Ludwig Wittgenstein.

Imagine a world where each person has a beetle in a box. In this world, the only time anyone can see a beetle is when they look in their own box. As a consequence, the conception of a beetle each individual has is based on their own. It could be that everyone has something different, or that the boxes are empty, or even that the contents are amorphous.

Wittgenstein uses the 'Beetle in a Box' thought experiment to convey his work on the subjective nature of pain. We can each only know what pain is to us, and we cannot feel another person's agony. If people in the hypothetical world were to have a discussion on the topic of beetles, each would only be able to share their individual perspective. The conversation would have little purpose because each person can only convey what they see as a beetle. In the same way, it is useless for us to describe our pain using analogies ('it feels like a red hot poker is stabbing me in the back') or scales ('the pain is 7/10.')

Thought experiments in science

Although empirical evidence is usually necessary for science, thought experiments may be used to develop a hypothesis or to prepare for experimentation. Some hypotheses cannot be tested (e.g, string theory) – at least, not given our current capabilities. Theoretical scientists may turn to thought experiments to develop a provisional answer, often informed by Occam's razor.

In a paper entitled Thought Experimentation of Presocratic Philosophy, Nicholas Rescher writes:

In natural science, thought experiments are common. Think, for example, of Einstein's pondering the question of what the world would look like if one were to travel along a ray of light. Think too of physicists' assumption of a frictionlessly rolling body or the economists' assumption of a perfectly efficient market in the interests of establishing the laws of descent or the principles of exchange, respectively.

In a paper entitled Thought Experiments in Scientific Reasoning, Andrew D. Irvine explains that thought experiments are a key part of science. They are in the same realm as physical experiments. Thought experiments require all assumptions to be supported by empirical evidence. The context must be believable, and it must provide useful answers to complex questions. A thought experiment must have the potential to be falsified.

Irvine writes:

Just as a physical experiment often has repercussions for its background theory in terms of confirmation, falsification or the like, so too will a thought experiment. Of course, the parallel is not exact; thought experiments...no do not include actual interventions within the physical environment.

In Do All Rational Folks Think As We Do? Barbara D. Massey writes:

Often critique of thought experiments demands the fleshing out or concretizing of descriptions so that what would happen in a given situation becomes less a matter of guesswork or pontification. In thought experiments we tend to elaborate descriptions with the latest scientific models in mind...The thought experiment seems to be a close relative of the scientist's laboratory experiment with the vital difference that observations may be made from perspectives which are in reality impossible, for example, from the perspective of moving at the speed of light...The thought experiment seems to discover facts about how things work within the laboratory of the mind.

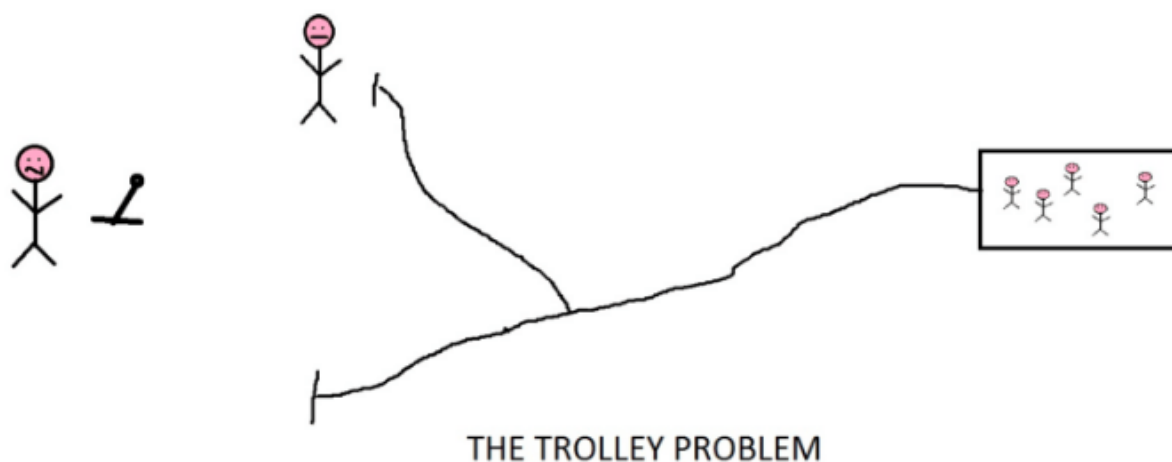
"We live not only in a world of thoughts, but also in a world of things. Words without experience are meaningless."

Vladimir Nabokov

Biologists use thought experiments, often of the counterfactual variety. In particular, evolutionary biologists question why organisms exist as they do today. For example, why are sheep not green? As surreal as the question is, it is a valid one. A green sheep would be better camouflaged from predators. Another thought experiment involves asking: why don't organisms (aside from certain bacteria) have wheels? Again, the question is surreal but is still a serious one. We know from our vehicles that wheels are more efficient for moving at speed than legs, so why do they not naturally exist beyond the microscopic level?

Psychology and Ethics — The Trolley Problem

Picture the scene. You are a lone passerby in a street where a tram is running along a track. The driver has lost control of it. If the tram continues along its current path, the five passengers will die in the ensuing crash. You notice a switch which would allow the tram to move to a different track, where a man is standing. The collision would kill him but would save the five passengers. Do you press the switch?



The Trolley Problem was first suggested by philosopher Phillipa Foot, and further considered extensively by philosopher Judith Jarvis Thompson. Psychologists and ethicists have also discussed the trolley problem at length, often using it in research. It raises many questions, such as:

- Is a casual observer required to intervene?
- Is there a measurable value to human life? I.e. is one life less valuable than five?
- How would the situation differ if the observer were required to actively push a man onto the tracks rather than pressing the switch?

- What if the man being pushed were a 'villain'? Or a loved one of the observer? How would this change the ethical implications?
- Can an observer make this choice without the consent of the people involved?

Research has shown most people are far more willing to press a switch than to push someone onto the tracks. This changes if the man is a 'villain' - people are then far more willing to push him. Likewise, they are reluctant if the person being pushed is a loved one. The trolley problem is theoretical, but it does have real world implications. As we move towards autonomous vehicles, there may be real life instances of similar situations. Vehicles may be required to make utilitarian choices – such as swerving into a ditch and killing the driver to avoid a group of children.

The Infinite Monkey Theorem and Mathematics

"Ford!" he said, "there's an infinite number of monkeys outside who want to talk to us about this script for Hamlet they've worked out."

Douglas Adams, *The Hitchhiker's Guide to the Galaxy*

In Fooled By Randomness, Nassim Taleb writes:

If one puts an infinite number of monkeys in front of (strongly built) typewriters, and lets them clap away, there is a certainty that one of them will come out with an exact version of the 'Iliad.' Upon examination, this may be less interesting a concept than it appears at first: Such probability is ridiculously low. But let us carry the reasoning one step beyond. Now that we have found that hero among monkeys, would any reader invest his life's savings on a bet that the monkey would write the 'Odyssey' next?

The infinite monkey theorem is intended to illustrate the idea that any issue can be solved through enough random input, in the manner a drunk person arriving home will eventually manage to fit their key in the lock even if they do it without much finesse. It also represents the nature of probability and the idea that any scenario is workable, given enough time and resources.

151. 5 Mental Models to Remove (Some of) the Confusion from Parenting

We often talk about mental models in the context of business, investing, and careers. But mental models can also help with other areas, like parenting. Here are 5 principle-based models you can apply to any family, any situation, and any child.

Just a few days ago, I saw a three-year-old wandering around at 10:30 at night and wondered if he was lost or jet-lagged. The parent came over and explained that they believed in children setting their own sleep schedule.

Interesting.

The problem with this approach is that it may work, or it may not. It may work for your oldest, but not your youngest. And therein lies the problem with the majority of the parenting advice available. It's all tactics, no principles.

Few topics provoke more unsolicited advice than parenting. The problem is, no matter how good the advice, it might not work for your child. Parenting is the ultimate "the map is not the territory" situation. There are so many maps out there, and often when we try to use them to navigate the territory that is each individual child, we end up lost and confused. As in other situations, when the map doesn't match the territory, better to get rid of the map and pay attention to what you are experiencing on the ground. The territory is the reality. We've all dealt with the seemingly illogical behavior of children. Take trying to get your child to sleep through the night—often the first, and most important, challenge. Do you sleep beside them and slowly work your way out of the room? Do you let them "cry it out?" Do you put them in your bed? Do you feed them on demand, or not until morning? Soft music or no music? The options are endless, and each of them has a decently researched book to back it up.

When any subsequent children come along, the problem is often exacerbated. You stick to what worked the first time, because it worked, but this little one is different. Now you're in a battle of wills, and it's hard to change your tactics at 3:00 a.m. Parenting is often a rinse and repeat of this scenario: ideas you have about how it should be, combined with what experience is telling you that it is, overlaid with too many options and chronic exhaustion. This is where mental models can help. As in any other area of your life, developing some principles or models that help you see how the world works will give you options for relevant and useful solutions. Mental models are amazing tools that can be applied across our lives. Here are five principle-based models you can apply to almost any family, situation, or child. These are ones I use often, but don't let this limit you—so many more apply!

1. Adaptation

Adaptation is a concept from evolutionary biology. It describes the development of genetic traits that are successful relative to their performance in a specific environment—that is, relative to organisms' survival in the face of competitive pressures. As Geerat Vermeij explains in Nature: An Economic History, "Adaptation is as good as it has to be; it need not be the best that could be designed. Adaptation depends on context."

In terms of parenting, this is a big one: the model we can use to stop criticizing ourselves for our inevitable parenting mistakes, to get out of the no-point comparisons with our peers, and to give us the freedom to make changes depending on the situation we find ourselves in.

Species adapt. It is a central feature of the theory of evolution—the ability of a species to survive and thrive in the face of changing environmental conditions. So why not apply this basic biological idea to parenting? Too often we see changing as a weakness. We're certain that if we aren't absolutely consistent with our children, they will grow up to be entitled underachievers or something. Or we put pressure on ourselves to be perfect, and

strive for an ideal that requires an insane amount of work and sacrifice that may actually be detrimental to our overall success.

We can get out of this type of thinking if we reframe 'changing' as 'adapting'. It's okay to have different rules in the home versus a public space. I am always super grateful when a parent pacifies a screaming child with a cookie, especially on an airplane or in a restaurant. They probably don't use the same strategy at home, but they adapt to the different environment. It's also okay to have two children in soccer, and the third in music. Adapting to their interests will offer a much better return of investment on all those lessons. No doubt your underlying goals for your children are consistent, like the desire of an individual to survive. How you meet those goals is where the adaptability comes in. Give yourself the freedom to respond to the individual characteristics of your children—and the specific needs of the moment—by trying different behaviors to see what works. And, just as with adaptation in the biological sense, you only need to be as good as you have to be to get the outcomes that are important to you, not be the best parent that ever was.

2. Velocity

There is a difference between speed and velocity. With speed you move, but with velocity you move somewhere. You have direction.

As many have said of parenting, the days are long but the years are short. It's hard to be focusing on your direction when homework needs to be done and dinner needs to get made before one child goes off in the carpool to soccer while you rush the other one to art class. Every day begins at a dead run and ends with you collapsing into bed only to go through it all again tomorrow. Between their activities and social lives, and your need to work and have time for yourself, there is no doubt that you move with considerable speed throughout your day.

But it's useful to sometimes ask, 'Where am I going?' Take a moment to make sure it's not all speed and no direction.

When it comes to time with your kids, what does the goal state look like? How do you move in that direction? If you are just speeding without moving then you have no frame of reference for your choices. You might ask, did I spend enough time with them today? But ten minutes or two hours isn't going to impact your velocity if you don't know where you are headed.

When you factor in a goal of movement, it helps you decide what to do when you have time with them. What is it you want out of it? What kind of memories do you want them to have? What kind of parent do you want to be and what kind of children do you want to raise? The answers are different for everyone, but knowing the direction you wish to go helps you evaluate the decisions you make. And it might have the added benefit of cutting out some unnecessary activity and slowing you down.

3. Algebraic Equivalence

"He got more pancakes than I did!" Complaints about fairness are common among siblings. They watch each other like hawks, counting everything from presents to hugs to make sure everyone gets the same. What can you do? You can drive yourself mad running out to buy an extra whatever, or you can teach your children the difference between 'same' and 'equal'.

If you haven't solved for x in a while, it doesn't really matter. In algebra, symbols are used to represent unknown numbers that can be solved for given other relevant information. The general point about algebraic equivalence is that it teaches us that two things need not be the same in order to be equal.

For example, $x + y = 5$. Here are some of the options for the values of x and y :

$$3 + 2$$

$$4 + 1$$

$$2.5 + 2.5$$

$$1.8 + 3.2$$

And those are just the simple ones. What is useful is this idea of abstracting to see what the full scope of possibilities are. Then you can demonstrate that what is on each side of those little parallel lines doesn't have to look the same to have equal value. When it comes to the pancakes, it's better to focus on an equal feeling of fullness than the number of pancakes on the plate.

In a deeper way, algebraic equivalence helps us deal with one accusation that all parents get at one time or another: "You love my sibling more than me." It's not true, but our default usually is to say, "No, I love you both the same." This can be confusing for children, because, after all, they are not the same as their sibling, and you likely interact with them differently, so how can the love be the same?

Using algebraic equivalence as a model shifts it. You can respond instead that you love them both equally. Even though what's on either side of the equation is different, it is equal. Swinging the younger child up in the air is equivalent to asking the older one about her school project. Appreciating one's sense of humor is equivalent to respecting the other's organizational abilities. They may be different, but the love is equal.

4. Seizing the Middle

In chess, the middle is the key territory to hold. As explained on [Wikipedia](#): "The center is the most important part of the chessboard, as pieces from the center can easily move to either flank with great speed. However, amateurs often prefer to concentrate on the king's side of the board. This is an incorrect mindset."

In parenting, seizing the middle means you must forget trying to control every single move. It's impossible anyway. Instead, focus on trying to control what I think of as the middle territory. I don't mind losing a few battles on the fringes, if I'm holding my ground in the area that will allow me to respond quickly to problems.

The other night my son and I got into perhaps our eighth fight of the week on the state of his room. The continual explosion makes it hard to walk in there, plus he loses things all the time, which is an endless source of frustration to both of us. I've explained that I hate buying replacements only to have them turn up in the morass months later.

So I got cranky and got on his case again, and he felt bad and cried again. When I went to the kitchen to find some calm, I realized that my strategy was all wrong. I was focused on the pawn in the far column of the chess board instead of what the pieces were doing right in front of me.

My thinking then went like this: what is the territory I want to be present in? Continuing the way I was would lead to a clean room, maybe. But by focusing on this flank I was sacrificing control of the middle. Eventually he was going to tune me out because no one wants to feel bad about their shortcomings every day. Is it worth saving a pawn if it leaves your queen vulnerable?

The middle territory with our kids is mutual respect and trust. If I want my son to come to me for help when life gets really complicated, which I do, then I need to focus on behaviors that will allow me to have that strategic influence throughout my relationship with him.

Making him feel like crap every day, because his shirts are mixed in with his pants or because of all the Pokemon cards are on the floor, isn't going to cut it. Make no mistake, seizing the middle is not about throwing out all the rules. This is about knowing which battles to fight, so you can keep the middle territory of the trust and respect of your child.

5. Inversion

Sometimes it's not about providing solutions, but removing obstacles. Sociologist Kurt Lewin observes in his work on force field analysis^[1] that reaching any goal has two components: augmenting the forces for, and removing the forces against. When it comes to parenting, we need to ask ourselves not only what we could be doing more of, but also what we could be doing less of.

When my friend was going on month number nine of her baby waking up four times a night, she felt at her wits' end. Out of desperation, she decided to invert the problem. She

had been trying different techniques and strategies, thinking that there was something she wasn't doing right. When nothing seemed to be working, she stopped trying to add elements like new tactics, and changed her strategy. She looked instead for obstacles to remove. Was there anything preventing the baby from sleeping through the night? The first night she made it darker. No effect. The second night she made it warmer. Her son has slept through the night ever since. It wasn't her parenting skills or the adherence to a particular sleep philosophy that was causing him to wake up so often. Her baby was cold. Once she removed that obstacle with a space heater the problem was resolved. We do this all the time, trying to fix problem by throwing new parenting philosophies at the situation. What can I do better? More time, more money, more lessons, more stuff. But it can be equally valuable to look for what you could be doing less of. In so doing, you may enrich your relationships with your children immeasurably. Parenting is inherently complex: the territory changes almost overnight. Different environments, different children—figuring out how to raise your kids plays out against a backdrop of some fast-paced evolution. Some tactics are great, and once in a while a technique fits the situation perfectly. But when your tactics fail, or your experience seems to provide no obvious direction, a principle-based mental models approach to parenting can give you the insight to find solutions as you go.

152. Predicting the Future with Bayes' Theorem

In episode #37 of The Knowledge Project, we talked with professional poker player Annie Duke about thinking in probabilities, something good poker players do all the time. At the poker table or in life, it's useful to think in probabilities versus absolutes based on all the information you have available to you.

Probabilistic thinking leads you to ask yourself, how confident am I in this prediction? What information would impact this confidence?

Bayes' Theorem

Bayes' theorem is an accessible way of integrating probability thinking into our lives.

Thomas Bayes was an English minister in the 18th century, whose most famous work, "*An Essay toward Solving a Problem in the Doctrine of Chances*," was brought to the attention of the Royal Society in 1763—two years after his death—by his friend Richard Price. The essay did not contain the theorem as we now know it but had the seeds of the idea. It looked at how to adjust our estimates of probabilities when encountering new data that influence a situation. Later development by French scholar Pierre-Simon Laplace and others helped codify the theorem and develop it into a useful tool for thinking.

Knowing the exact math of probability calculations is not the key to understanding Bayesian thinking. More critical is your ability and desire to assign probabilities of truth and accuracy to anything you think you know, and then being willing to update those probabilities when new information comes in.

Here is a short example, found in Investing: The Last Liberal Art, of how it works:

Let's imagine that you and a friend have spent the afternoon playing your favorite board game, and now, at the end of the game, you are chatting about this and that. Something your friend says leads you to make a friendly wager: that with one roll of the die from the game, you will get a 6. Straight odds are one in six, a 16 percent probability. But then suppose your friend rolls the die, quickly covers it with her hand, and takes a peek. "I can tell you this much," she says; "it's an even number." Now you have new information and your odds change dramatically to one in three, a 33 percent probability. While you are considering whether to change your bet, your friend teasingly adds: "And it's not a 4." With this additional bit of information, your odds have changed again, to one in two, a 50 percent probability. With this very simple example, you have performed a Bayesian analysis. Each new piece of information affected the original probability, and that is Bayesian [updating].

Both Nate Silver and Eliezer Yudkowsky have written about Bayes' theorem in the context of medical testing, specifically mammograms. Imagine you live in a country with 100 million women under 40. Past trends have revealed that there is a 1.4% chance of a woman under 40 in this country getting breast cancer—so roughly 1.4 million women. Mammograms will detect breast cancer 75% of the time. They will give out false positives—say a woman has breast cancer when she actually doesn't—about 10% of the time. At first, you might focus just on the mammogram numbers and think that a 75% success rate means that a positive is bad news. Let's do the math.

If all the women under 40 get mammograms, then the false positive rate will give 10 million women under 40 the news that they have breast cancer. But because you know the first statistic, that only 1.4 million women under 40 actually get breast cancer, you know that 8.6 million of the women who tested positive are not actually going to have breast cancer!

That's a lot of needless worrying, which leads to a lot of needless medical care. To remedy this poor understanding and make better decisions about using mammograms, we absolutely must consider prior knowledge when we look at the results, and try to update our beliefs with that knowledge in mind.

Weigh the Evidence

Often we ignore prior information, simply called “priors” in Bayesian-speak. We can blame this habit in part on the availability heuristic—we focus on what’s readily available. In this case, we focus on the newest information, and the bigger picture gets lost. We fail to adjust the probability of old information to reflect what we have learned.

The big idea behind Bayes’ theorem is that we must continuously update our probability estimates on an as-needed basis.

In their book The Signal and the Noise, Nate Silver and Allen Lane give a contemporary example, reminding us that new information is often most useful when we put it in the larger context of what we already know:

Bayes’ theorem is an important reality check on our efforts to forecast the future. How, for instance, should we reconcile a large body of theory and evidence predicting global warming with the fact that there has been no warming trend over the last decade or so? Skeptics react with glee, while true believers dismiss the new information.

A better response is to use Bayes’ theorem: the lack of recent warming is evidence against recent global warming predictions, but it is weak evidence. This is because there is enough variability in global temperatures to make such an outcome unsurprising. The new information should reduce our confidence in our models of global warming—but only a little.

The same approach can be used in anything from an economic forecast to a hand of poker, and while Bayes’ theorem can be a formal affair, Bayesian reasoning also works as a rule of thumb. We tend to either dismiss new evidence, or embrace it as though nothing else matters. Bayesians try to weigh both the old hypothesis and the new evidence in a sensible way.

Limitations of the Bayesian

Don’t walk away thinking the Bayesian approach will enable you to predict everything! In addition to seeing the world as an ever-shifting array of probabilities, we must also remember the limitations of inductive reasoning.

A high probability of something being true is not the same as saying it is true. Consider this example from Bertrand Russell’s The Problems of Philosophy:

A horse which has been often driven along a certain road resists the attempt to drive him in a different direction. Domestic animals expect food when they see the person who usually feeds them. We know that all these rather crude expectations of uniformity are liable to be misleading. The man who has fed the chicken every day throughout its life at last wrings its neck instead, showing that more refined views as to the uniformity of nature would have been useful to the chicken.

In the final analysis, though, picking up Bayesian reasoning can change your life, as observed in this Big Think video by Julia Galef of the Center for Applied Rationality:

After you’ve been steeped in Bayes’ rule for a little while, it starts to produce some fundamental changes to your thinking. For example, you become much more aware that your beliefs are grayscale. They’re not black and white and that you have levels of confidence in your beliefs about how the world works that are less than 100 percent but greater than zero percent and even more importantly as you go through the world and encounter new ideas and new evidence, that level of confidence fluctuates, as you encounter evidence for and against your beliefs.

So much of making better decisions hinges on dealing with uncertainty. The most common thing holding people back from the right answer is holding on to previous beliefs. Instead of instinctively rejecting new information, take in what comes your way through a system of evaluating probabilities.

153. Reciprocity: Getting What You Give

This article is an excerpt from the bestselling book The Great Mental Models Volume 2: Physics, Chemistry and Biology



Reciprocity teaches us why win-win relationships are the way to go, why waiters leave candies with the bill, why it's a good idea to use the least force possible to secure an outcome, and why a lot of companies don't permit their employees to accept gifts.

This model demonstrates why we should view giving as being as valuable as having. It prompts us rewrite the Golden Rule to say, "Do unto others knowing that something will be done unto you." So what exactly is reciprocity?

In physics, reciprocity is Newton's third law, which states that for every force exerted by object A on object B, there is an equal but opposite force exerted by object B on object A. Every force involves the interaction of two objects where the force asserted by one is reciprocated with an equally powerful and directionally opposite force by the other object. Forces always occur in pairs of the same type of force, and it is not possible for one object to exert a force without experiencing a reciprocal force.

For every action, there is an equal and opposite reaction.

Newton's third law

When I land on the ground after jumping, I am exerting a force on the ground. At the moment of landing, the ground is also applying a force that is equal but opposite in direction on me. The earth applies a force on me even when I am just standing. This force is gravity. But the gravitational force exerted on me by Earth is reciprocated by me through the force I am exerting on the earth.

In the natural world, this third law of Newton's explains jet propulsion. The word propulsion comes from two Latin terms meaning "forward" and "drive"—propulsion is a force that drives an object forward.¹ Jet propulsion works by forcing matter, such as gas produced by burning fuel, in one direction, leading to a corresponding movement of the vehicle in the opposite direction. This holds true for everything from fireworks and guns to huge spacecraft.

Jet propulsion only works if the forward push is stronger than the forces acting on the object, like air friction and its own weight. The greater the force in comparison to drag (the amount of force opposing the motion), the faster the object can move. Octopi and squid force water through their mantle and out through a siphon at a high speed that compensates for their weight and the viscosity of the water. As the animal asserts a force on the water, the water exerts a force on the animal, and this makes the octopus or squid move.

Consider the tackle in American football. The force that the defender puts on the receiver's body in order to bring him to the ground is equivalent to the force felt by the defenseman's body during the tackle. You can't initiate force without having a force put on you. For the tackle, this is very important. If the defenseman felt nothing there would be no incentive for him to be strategic in the application of his force on the receiver. And who would actually want to be a receiver if this were the case? If the guy who initiates the force feels nothing—much better to be him.

Since this is not the case, the tackle is more about using the least amount of force required to bring the receiver to the ground. It's better for the receiver, and it's also better for the guy doing the tackling, because the more force you apply to others, the more damage you do to yourself. Reciprocity can be summed up like this: when you act on things, they act on you.

What we give

It would be amazing if every time you did something good for the world, you received a corresponding amount of positive effect in your life. We all know that unfortunately this is not true. Sometimes positive intentions produce negative results, or bad things happen to people who do good things for others. Although the connection between good deeds and a good life isn't perfect, there is a documented relationship between the two. Using the model of reciprocity can help us understand why people benefit themselves when they work for what they believe is good. The life of Norman Bethune,* a Canadian surgeon, is one that can teach us a lot about the nuances of reciprocity.

Bethune was not a volunteer in the sense we often use the term now to describe activities that are an adjunct to daily life. His efforts to help others were completely integrated into his work and life. What made him a volunteer is that he did it of his own volition, at no obvious personal benefit. Therefore, his story provides an interesting example to really explore reciprocity. What do you get when you give? What kind of tensions are created when the two forces interact?

Norman Bethune grew up wanting to be a surgeon, inspired by his doctor grandfather. He completed his studies during the First World War, during which he also volunteered providing medical support on the battlefield. During the 1920s he practiced medicine in the United States and Canada, eventually settling in Montreal. He initially specialized in thoracic surgery and developed a solid reputation as a surgeon. However, he had an ongoing commitment to help people beyond what he did in his practice. This goal he pursued in a variety of ways.

During the early 1930s, while in Montreal, Bethune provided medical services free to the poor and established a free-of-charge clinic he ran once per week. He vocally advocated for universal health protection, explaining that many medical issues were created by poverty and negligent employers. In addition, and unique for the time, he used radio broadcasts to educate the public on tuberculosis. Bethune volunteered his time, energy, and intelligence to try to bring about meaningful improvements in the lives of the most impoverished.

During the 1930s he became a supporter of communism and joined the Communist Party, mostly on account of what he saw of the benefits of the Soviet socialized health care system. These political beliefs took him further afield in his efforts to improve access to and outcomes in healthcare.

In 1936 in Spain during the Spanish Civil War, Bethune designed and developed the first ever mobile blood transfusion unit. This vehicle could draw and store blood, was used to give transfusions, and most importantly, could be used on the front lines of the battlefield. It was a remarkable innovation that saved countless lives and inspired the medical approach used in World War II.

All of the work that Bethune did in Spain, and later China, was not for profit. The mobile blood unit and all his other surgical innovations and inventions did not make Bethune any money.

In 1938 Bethune went to China, desiring again to help people. China was fighting a war with the Japanese, the Sino-Japanese War, and Bethune's belief in communism led him to deploy his efforts in support of Mao and the Communist Party of China. He was made commander of all Chinese medical forces and immediately set about modernizing the existing primitive health care in China.

Helping the Chinese in their fight, he again deployed his practice of bringing the surgeon to the battlefield, designing mobile operating equipment and improving the survival rate of the injured. He also extensively trained doctors and nurses and established hospitals in areas that had neither. In their article, "The Medical Life of Norman Bethune," Deslauriers and Goulet write, "His courage, determination and will to fully employ his talents of ingenuity, aggressiveness and selfless response to social concerns when the time came is truly remarkable." He accomplished so much in his 18 months in China that when he died of septicemia after operating on a soldier, Mao delivered his eulogy, describing him as "a man who is of value to the people."

Bethune's achievements continue to be regarded as heroic by the Chinese. The first hospital he founded still exists, and his story is mandatory learning for primary school students in China.

Bethune's story, however, is not solely one of accolades and recognition, heaps of positive effects achieved as a result of a life spent trying to bring about good. He died at age 49 as a direct result of his efforts to improve health outcomes on the battlefield. The fact that he was a communist led him to be written out of Canadian history during the Cold War years, when communism was seen as a direct threat to Western democracy. His personal life wasn't great, and his aggressive personality earned him enmity from many colleagues. Many, many men have been just as troubled morally and spiritually as you are right now. Happily, some of them kept records of their troubles. You'll learn from them—if you want to. Just as someday, if you have something to offer, someone will learn something from you. It's a beautiful reciprocal arrangement.

j.d. salinger

Normally one would talk about a life like Norman Bethune's in terms of sacrifice. He sacrificed personal relationships, social acceptance, and ultimately his life in order to take actions in accord with his beliefs and values. But using the lens of reciprocity suggests there is another way to interpret the story.

In a paper on the health benefits of volunteering in adults, the authors explain, "The beneficial effects of volunteering on health outcomes have been well documented. Research has found that participation in voluntary services is significantly predictive of better mental and physical health, life satisfaction, self-esteem, happiness, lower depressive symptoms, psychological distress, and mortality and functional inability."⁶ Multiple studies have demonstrated the positive consequences of volunteering that are conferred on the volunteer. We may volunteer for a variety of reasons, based on our interests, goals or values, but regardless, we reap health benefits when we do so. The studies on the positive aspects of volunteering for the volunteer bring to mind the concepts we outlined above in the science of reciprocity, like how forces always occur in

pairs. Although volunteering is not governed by the laws of physics, using reciprocity as a metaphor can help us understand why volunteering appeals to so many people. And consequently, why some people make the choice to help others at seemingly great cost to themselves.

The research on volunteering makes it clear that when we give, we get. We improve our physical health; we feel better about ourselves and our place in the world. We evaluate our lives as having more meaning. One way of understanding people who take the kinds of actions that Bethune did, which on their face seem to risk so much, is that they receive a benefit from the world proportional to what they put out there. It's not a benefit that can always be measured in legacy or reward. Sometimes those things come; for Bethune, although North America struggled for decades to appreciate him as the dedicated medical innovator he was on account of his political views, China continues to go all out in its appreciation of his contributions to their country.

However, perhaps the benefit is better conceptualized as the reciprocity received by the individual in terms of the satisfaction they have regarding the choices they've made. The act of doing good causes an equal reaction in terms of feeling good. In reading Bethune's story it is clear that he was not motivated by recognition, but rather a genuine desire to help people that gave him an exceptional amount of energy and drive. It is highly possible that he didn't evaluate his life as one of sacrifice, but instead derived satisfaction from his efforts. (See tit-for-tat.)

The rise of the "win-win"

In the physical world, the law of reciprocity works 100% of the time. The harder you punch a wall, the more force pushes against your fist, the more damage is caused to both you and the wall. In the biological world, reciprocity doesn't have the same perfect record. However, it has been discovered to work much more often than not, and thus harnessing it has significant long-term benefits.

Evolutionary biologists argue that our tendency to engage in reciprocal behavior is a natural product of evolution. You are more likely to survive if you receive help from others. And you are more likely to receive that help if you have offered assistance in the past. So the genes that encode the reciprocal instinct were more likely to be passed on. And thus the fact that the human species has made it to now is directly dependent on our building social interactions that are reliable, useful, and trustworthy.

Humans engage in two types of reciprocity with each other: direct, which is "I help you and you help me;" and indirect, which is either a pay-it-forward concept, "I help you and then you help someone else," or more about reputation building—"I help you, building a reputation as one who helps, so that someone else helps me in the future." Both kinds work.

While reciprocity isn't as reliable when it comes to humans as it is with physics, the concept can help you achieve better outcomes. Sometimes we go first and go positive and get nothing back, as is the case if we smile at a stranger walking on the street. Most times they'll smile back at you, but every once in a while, you're met with a scowl. We tend to forget the times our smile elicited a smile in response and remember the times when we received nothing in return, and so we stop smiling. However, the small loss we occasionally experience as a result of putting ourselves out there and not having it reciprocated is more than compensated for by the gains the rest of the time. If you want to get an idea of the true value of engaging in positive reciprocal behavior, just make a list of your outcomes in any given week. Life is easier and more enjoyable when we act on starting and maintaining win-win relationships with everyone. And as we explained, reciprocity has been part of our biological makeup for a very long time.

Tsze-Kung asked, "Is there one word with which to act in accordance throughout a lifetime?" The Master said, "Is not reciprocity such a word? What you do not want done to yourself, do not do to others."

confucius

Let's go back to the eastern Mediterranean around 1250 BCE. The bulk of the power in the region was held by the four kings of Egypt, Hatti (a region in present day Turkey), Assyria and Babylon. They didn't like each other much—in fact, “they deeply distrusted each other and frequently squabbled.” Demonstrating military prowess was often a way that a king achieved legitimacy in the eyes of his subjects, and there were constant conflicts, from skirmishes to full-on battles between these four areas. Fighting was the norm.

Then, one day, as Trevor Bryce chronicles in his article on “The Eternal Treaty”, 15 years after a “great military showdown” between the Egyptians and the Hittites, an interesting thing happened. The two kings decided to enter into the world's first known peace treaty. The treaty was not about peace in the global sense, stemming from a desire to have a world without war. It was about peace in the immediate sense; two parties trying to establish a mutually beneficial relationship. The treaty, known as the Eternal Treaty, was the laying out of a directly reciprocal relationship between two civilizations.

Egypt was led by Ramesses, whose primary goal was to build “monumental construction projects, and to build his kingdom's wealth through trade and the exploitation of its mineral-rich regions.”¹⁰ He had other security issues, most notably the Libyans to the west. So his interest in the treaty was to give himself some space to accomplish the legacy that mattered to him. The reality is, if you're fighting with everyone all of the time you have to spread your resources along many fronts and you likely don't have time to do anything else. One less border to defend was an opportunity to put his efforts elsewhere.

The Hittites had a similar problem, in a growing military threat from the Assyrians. In addition, their ruler Hattusili had usurped the throne from his nephew and was badly in need of some external power to legitimize his rule. Ramesses commanded great respect in the region, and his acknowledgment of Hattusili's leadership would go a long way to maintaining stability. In pursuing the treaty with Egypt, “his hope was that Ramesses' endorsement of his own position, and by implication that of his lineal descendants, would provide some security against future challenges.”

The treaty contained provisions for future military support, the kind of alliance in which an attack on one is an attack on the other. Assyria, despite having both interest and a good position did not, in fact, invade Hatti during Hattusili's reign, so “quite possibly, the Egyptian-Hittite alliance did prove an effective deterrent against such an enterprise.”

Reciprocity based on self-interest is still reciprocity. Engaging in positive behavior to then be a receiver of positive behavior is about the long game. For both Ramesses and Hattusili, the benefits of trying to develop an alliance were clear. It gave them both an opportunity to exit fighting that consumed resources and allowed them to focus those resources on long-term stability and their legacies. Over time, the likelihood of reciprocal interactions increases, and thus it's a much better strategy to try to make them positive. The more people you help, the more people you will have willing to help you.

154. Tit For Tat

Tit for tat is a strategy which, according to game theory, is the most effective choice for iterated games based on mutual cooperation or defection. Both players benefit if they cooperate, but one benefits and the other loses out if only they defect, and both lose out to a lesser extent if they simultaneously defect. As abstract as such games sound, they have important implications for understanding everything from group selection in biology to cooperation in economics.

Under tit for tat, a player will begin by cooperating, then in subsequent iterations will replicate whatever their opponent did last time. So if their initial cooperation is punished with defection, they will then reciprocate in kind. In games that are not iterated and only consist of a single round, defection is thought to be the best strategy.

Tit for tat was codified as a game theory strategy by mathematical psychologist Anatol Rapoport, but it builds upon our instinctual notions of reciprocity. It teaches us that our best option when dealing with other people we cannot trust entirely is to reciprocate their choices. Seeing as we can rarely place full trust in anyone, especially if they stand to gain by screwing us over, we lean toward tit for tat. In general, we view this as fair and just. If someone helps us, we're quite happy to assist them the next time they need help. But if they ignore our plight when we need help, we're highly unlikely to care in the inverse situation. For this reason, evolution tends to select for cooperative behavior in groups—it benefits everyone in the long run.

However, straightforward tit for tat is not as effective as the strategy known as tit for tat with forgiveness. This strategy involves occasionally cooperating in the face of defection. It is easy for two opponents to get stuck in a cycle of mutual defection from which they cannot escape unless and until one decides to cooperate. If both are using tit for tat, a cycle of mutual cooperation will then commence.

Life is an iterative and compounding game. In the words of Peter Kaufman, it pays to “go positive and go first.” Also, remember that people make mistakes. Assuming there is no maliciousness, it pays to forgive.

This article is an excerpt from the bestselling book The Great Mental Models Volume 2: Physics, Chemistry and Biology

155. Chesterton's Fence: A Lesson in Second Order Thinking

A core component of making great decisions is understanding the rationale behind previous decisions. If we don't understand how we got "here," we run the risk of making things much worse.

When we seek to intervene in any system created by someone, it's not enough to view their decisions and choices simply as the consequences of first-order thinking because we can inadvertently create serious problems. Before changing anything, we should wonder whether they were using second-order thinking. Their reasons for making certain choices might be more complex than they seem at first. It's best to assume they knew things we don't or had experience we can't fathom, so we don't go for quick fixes and end up making things worse.

Second-order thinking is the practice of not just considering the consequences of our decisions but also the consequences of those consequences. Everyone can manage first-order thinking, which is just considering the immediate anticipated result of an action. It's simple and quick, usually requiring little effort. By comparison, second-order thinking is more complex and time-consuming. The fact that it is difficult and unusual is what makes the ability to do it such a powerful advantage.

Second-order thinking will get you extraordinary results, and so will learning to recognize when other people are using second-order thinking. To understand exactly why this is the case, let's consider Chesterton's Fence, described by G. K. Chesterton himself as follows: *There exists in such a case a certain institution or law; let us say, for the sake of simplicity, a fence or gate erected across a road. The more modern type of reformer goes gaily up to it and says, "I don't see the use of this; let us clear it away." To which the more intelligent type of reformer will do well to answer: "If you don't see the use of it, I certainly won't let you clear it away. Go away and think. Then, when you can come back and tell me that you do see the use of it, I may allow you to destroy it."*

Chesterton's Fence is a heuristic inspired by a quote from the writer and polymath G. K. Chesterton's 1929 book, *The Thing*. It's best known as being one of John F. Kennedy's favored sayings, as well as a principle Wikipedia encourages its editors to follow. In the book, Chesterton describes the classic case of the reformer who notices something, such as a fence, and fails to see the reason for its existence. However, before they decide to remove it, they must figure out why it exists in the first place. If they do not do this, they are likely to do more harm than good with its removal. In its most concise version, Chesterton's Fence states the following:

Do not remove a fence until you know why it was put up in the first place.

Chesterton went on to explain why this principle holds true, writing that fences don't grow out of the ground, nor do people build them in their sleep or during a fit of madness. He explained that fences are built by people who carefully planned them out and "had some reason for thinking [the fence] would be a good thing for somebody." Until we establish that reason, we have no business taking an ax to it. The reason might not be a good or relevant one; we just need to be aware of what the reason *is*. Otherwise, we may end up with unintended consequences: second- and third-order effects we don't want, spreading like ripples on a pond and causing damage for years.

Elsewhere, in his essay collection *Heretics*, Chesterton makes a similar point, detailed here:

Suppose that a great commotion arises in the street about something, let us say a lamp-post, which many influential persons desire to pull down. A grey-clad monk, who is the spirit of the Middle Ages, is approached upon the matter, and begins to say, in the arid manner of the Schoolmen, "Let us first of all consider, my brethren, the value of Light. If

Light be in itself good—” At this point he is somewhat excusably knocked down. All the people make a rush for the lamp-post, the lamp-post is down in ten minutes, and they go about congratulating each other on their un-mediaeval practicality. But as things go on they do not work out so easily. Some people have pulled the lamp-post down because they wanted the electric light; some because they wanted old iron; some because they wanted darkness, because their deeds were evil. Some thought it not enough of a lamp-post, some too much; some acted because they wanted to smash municipal machinery; some because they wanted to smash something. And there is war in the night, no man knowing whom he strikes. So, gradually and inevitably, to-day, to-morrow, or the next day, there comes back the conviction that the monk was right after all, and that all depends on what is the philosophy of Light. Only what we might have discussed under the gas-lamp, we now must discuss in the dark.

As simple as Chesterton’s Fence is as a principle, it teaches us an important lesson. Many of the problems we face in life occur when we intervene with systems without an awareness of what the consequences could be. We can easily forget that this applies to subtraction as much as to addition. If a fence exists, there is likely a reason for it. It may be an illogical or inconsequential reason, but it is a reason nonetheless.

“Before I built a wall I’d ask to know

What I was walling in or walling out,

And to whom I was like to give offence.”

— Robert Frost, “Mending Wall”

Chesterton also alluded to the all-too-common belief that previous generations were bumbling fools, stumbling around, constructing fences wherever they fancied. Should we fail to respect their judgement and not try to understand it, we run the risk of creating new, unexpected problems. By and large, people do not do things for no reason. We’re all lazy at heart. We don’t like to waste time and resources on useless fences. Not understanding something does not mean it must be pointless.

Take the case of supposedly hierarchy-free companies. Someone came along and figured that having management and an overall hierarchy is an imperfect system. It places additional stress on those at the bottom and can even be damaging to their health. It leaves room for abuse of power and manipulative company politics. It makes it unlikely that good ideas from those at the bottom will get listened to.

However, despite the numerous problems inherent in hierarchical companies, doing away with this structure altogether belies a lack of awareness of the reasons why it is so ubiquitous. Someone needs to make decisions and be held responsible for their consequences. During times of stress or disorganization, people naturally tend to look to leaders for direction. Without a formal hierarchy, people often form an invisible one, which is far more complex to navigate and can lead to the most charismatic or domineering individual taking control, rather than the most qualified.

It is certainly admirable that hierarchy-free companies are taking the enormous risk inherent in breaking the mold and trying something new. However, their approach ignores Chesterton’s Fence and doesn’t address why hierarchies exist within companies in the first place. Removing them does not necessarily lead to a fairer, more productive system. Yes, doing things the way they’ve always been done means getting what we’ve always got. There’s certainly nothing positive about being resistant to any change. Things become out

of date and redundant with time. Sometimes an outside perspective is ideal for shaking things up and finding new ways. Even so, we can't let ourselves be too overconfident about the redundancy of things we see as pointless.

Or, to paraphrase Rory Sutherland, the peacock's tail is not about efficiency. In fact, its whole value lies in its inefficiency. It signals a bird is healthy enough to waste energy growing it and has the strength to carry it around. Peahens use the tails of peacocks as guidance for choosing which mates are likely to have the best genes to pass on to their offspring. If an outside observer were to somehow swoop in and give peacocks regular, functional tails, it would be more energy efficient and practical, but it would deprive them of the ability to advertise their genetic potential.

All of us, at one point or another, make some attempt to change a habit to improve our lives. If you're engaging in a bad habit, it's admirable to try to eliminate it—except part of why many attempts to do so fail is that bad habits do not appear out of nowhere. No one wakes up one day and decides they want to start smoking or drinking every night or watching television until the early hours of the morning. Bad habits generally evolve to serve an unfulfilled need: connection, comfort, distraction, take your pick.

Attempting to remove the habit and leave everything else untouched does not eliminate the need and can simply lead to a replacement habit that might be just as harmful or even worse. Because of this, more successful approaches often involve replacing a bad habit with a good, benign, or less harmful one—or dealing with the underlying need. In other words, that fence went up for a reason, and it can't come down without something either taking its place or removing the need for it to be there in the first place.

To give a further example, in a classic post from 2009 on his website, serial entrepreneur Steve Blank gives an example of a decision he has repeatedly seen in startups. They grow to the point where it makes sense to hire a Chief Financial Officer. Eager to make an immediate difference, the new CFO starts looking for ways to cut costs so they can point to how they're saving the company money. They take a look at the free snacks and sodas offered to employees and calculate how much they cost per year—perhaps a few thousand dollars. It seems like a waste of money, so they decide to do away with free sodas or start charging a few cents for them. After all, they're paying people enough. They can buy their own sodas.

Blank writes that, in his experience, the outcome is always the same. The original employees who helped the company grow initially notice the change and realize things are not how they were before. Of course they can afford to buy their own sodas. But suddenly having to is just an unmissable sign that the company's culture is changing, which can be enough to prompt the most talented people to jump ship. Attempting to save a relatively small amount of money ends up costing far more in employee turnover. The new CFO didn't consider why that fence was up in the first place.

Chesterton's Fence is not an admonishment of anyone who tries to make improvements; it is a call to be aware of second-order thinking before intervening. It reminds us that we don't always know better than those who made decisions before us, and we can't see all the nuances to a situation until we're intimate with it. Unless we know why someone made a decision, we can't safely change it or conclude that they were wrong.

The first step before modifying an aspect of a system is to understand it. Observe it in full. Note how it interconnects with other aspects, including ones that might not be linked to you personally. Learn how it works, and *then* propose your change.

156. Multiplicative Systems: Understanding The Power of Multiplying by Zero

We all learned in math class that anything times zero is zero. But if you stop thinking about the idea here, you don't see all the practical applications that understanding multiplicative systems can give you in life.

Let's run through a little elementary algebra. Try to do it in your head: What's $1,506,789 \times 9,809 \times 5.56 \times 0$?

Hopefully, you didn't have to whip out the old TI-84 to solve that one. It's a zero.

This leads us to a mental model called Multiplicative Systems and understanding it can get to the heart of a lot of issues.

The Weakest Link in the Chain

Suppose you were trying to become the best basketball player in the world. You've got the following things going for you:

1. God-given talent. You're 6'9", quick, skillful, can leap out of the building, and have been the best player in a competitive city since you can remember.
2. Support. You live in a city that reveres basketball and you're raised by parents who care about your goals.
3. A proven track record. You were the player of the year in a very competitive Division 1 college conference.
4. A clear path forward. You're selected as the second overall pick in the NBA Draft by the Boston Celtics.

Sounds like you have a shot, right? As good as anyone could have, right? What would you put the odds at of this person becoming one of the better players in the world? Pretty high? Let's add one more piece of information:

5. You've developed a cocaine habit.

What are your odds now?

This little exercise isn't an academic one, it's the sad case of Leonard "Len" Bias, a young basketball prodigy who died of a cocaine overdose after being selected to play in the NBA for the Boston Celtics in 1986. Many call Bias the best basketball player who never played professionally.

What the story of Len Bias illustrates so well is the truth that anything times zero must still be zero, no matter how large the string of numbers preceding it. In some facets of life, all of your hard work, dedication to improvement, and good fortune may still be worth nothing if there is a weak link in the chain.

Something all engineers learn very early on is that a system is no stronger than its weakest component. Take, for example, the case of a nuclear power plant. We have a very good understanding of how to make the nuclear power plant quite safe, nearly indestructible, which it must be considering the magnitude of a failure.

But in reality, what is the weakest link in the chain for most nuclear power plants? *The human beings running them.* We're part of the system! And since we've yet to perfect the human being, we have yet to perfect the nuclear power plant. How could it be otherwise? An additive system does not work this way. In an additive system, each component adds on to one another to create the final outcome. Going back to algebra, let's say our equation was additive rather than

multiplicative: $1,506,789 \text{ plus } 9,809 \text{ plus } 5.56 \text{ plus } 0$. The answer is 1,516,603.56 — still a pretty big number!

Think of an additive system as something like a great Thanksgiving dinner. You've got a great turkey, some whipped potatoes, a mass of stuffing, and a lump of homemade cranberry sauce, and you're hanging with your family. Awesome!

Let's say the potatoes get burnt in the oven, and they're inedible. Problem? Sure, but dinner still works out just fine. Someone shows up with a pie for dessert? Great! But it won't change the dinner all that much.

The interaction of the parts makes the dinner range from good to great. Take some parts away or add new ones in, and you get a different outcome, but not a *binary*, win/lose one. The meal still happens. Additive systems and multiplicative systems react differently when components are added or taken away.

Most businesses, for example, operate in a multiplicative system. But they too often *think* they're operating in additive ones: Ever notice how some businesses will add one feature on top of another to their products but fail at basic customer service, so you leave, never to return? That's a business that thinks it's in an additive system when they really need to be resolving the big fat *zero* in the middle of the equation instead of adding more stuff.

Financial systems are, of course, multiplicative. General Motors, founded in 1908 by William Durant and C.S. Mott, came to dominate the American car market to the tune of 50% market share through a series of brilliant innovations and management practices and was for many years the dominant and most admirable corporation in America. Even today, after more than a century of competition, no American carmaker produces more automobiles than General Motors.

And yet, the original shareholders of GM ended up with a *zero* in 2008 as the company went into bankruptcy due to years of financial mismanagement. It didn't matter that they had several generations of leadership: All of that becomes naught in a multiplicative system.

On a smaller scale, take the case of a young corporate climber who feels they just can't get ahead. They seem to have all their ducks in a row: great resume, great background, great experience...the problem is that they suck at dealing with other people and treat others like stepping stones. That's a *zero* that can negate *all* of the big numbers preceding it. The rest doesn't matter.

And so we arrive at the "must be true" conclusion that understanding when you're in an additive system versus a multiplicative system, and which components need absolute reliability for the system to work, is a critical model to have in your head. Multiplicative thinking is a model related to the greater idea of systems thinking, another mental model well worth acquiring.

157. 349 mental models

Mental Models in Economics and Strategy

Opportunity Cost

The value of what you have to give up in order to choose something else. As with any other cost, the goal is to minimize it. Opportunity costs are very real.

A central component of economics is the time value of money which means that money today is worth more than money in the future. Economically, this relationship is entirely based on opportunity costs.

Creative Destruction

Sometimes called Schumpeter's gale and formulated after Austrian economist Joseph Schumpeter, creative destruction is a theory of economic innovation and the business cycle in a free-market economy. It refers to the incessant product and process innovation mechanism by which new production units replace outdated ones – or ones stuck without innovation.

In capitalistic competition, the absence of innovation does not result in stasis. It results in decay.

Primary source: Joseph Schumpeter

Double-Entry Bookkeeping

The invention of the double-entry bookkeeping system traces all the way to Genoa in 1494 when the first book on the subject was published by Luca Pacioli. Ever since then, the system of balancing the books by using two accounts for every entry has hardly changed. The duality that is an essential part of an accountant's view of the world is a remarkably powerful model for understanding economic and other events.

Primary source: Luca Pacioli

Comparative Advantage

As a foundational model in the theory of international trade, Scottish economist David Ricardo found that all actors, at all times, can mutually benefit from cooperation and voluntary trade if those actors focus on what they are comparatively best at in terms of opportunity cost.

The party with the lower opportunity cost of producing a good or service, and thus the smallest potential lost benefit, holds the comparative advantage of that good or service.

Primary source: David Ricardo

Rent-Seeking

An attempt to make a profit (economic rent) at the expense of others rather than by creating new value. An example is using resources on political lobbying to promote specific legislation that serves one's own interests.

Primary source: David Ricardo

Switching Cost

The transaction costs or disadvantages a buyer incurs from switching to another seller.

Nash Equilibrium

When two or more participants in a non-cooperative game have no incentive to deviate from their respective equilibrium strategies after considering their opponent's choices and strategies on a rational basis.

Named after mathematician John Nash, the model proves that decisions that are good for individuals can sometimes be terrible for groups.

Primary source: John Nash

AD-AS Model

Based on John Maynard Keynes's general theory, the AD-AS model explains the level of prices and national income through the relationship of aggregate demand and aggregate supply. Being a fundamental tool in economics, it's an incredibly powerful model when thinking about macroeconomic effects in the short, medium, and long term.

The model is flexible enough to accommodate both Keynes's law approach, which focuses on aggregate demand and the short run, while also including Say's law approach, which focuses on aggregate supply and the long run.

Controlling the Center

Controlling the center of something provides greater flexibility and mobility of choices compared to one's competitor. In chess, if you don't control the center squares and let your opponent control them, they will have an easier game than if they have to fight for their control. A piece does not have to physically be on a central square to control the center. For example, the bishop can control the center from afar.

In business, controlling the center of a value chain can prove mightily profitable. Examples include the business model of brokerage firms or indispensable internet marketplaces such as Alibaba.

Specialization

Sometimes termed division of labor, specialization refers to the process by which participants in a free-market system divide into different sets of skills to increase efficiency. By increasing productivity within each field of specialization, the whole system benefits.

Primary source: Adam Smith

Intellectual Property

The introduction of intellectual property rights into society has been a huge accelerator of societal creativity. Such rights include intangible creations of the human intellect. There are many types of them, and some countries recognize more than others. The most well-known are copyrights, patents, trademarks, and trade secrets. If individuals and corporations get these right, they can create defensible economic moats against the competition. And as long as ongoing research and development and capital expenditures can be managed, there is tremendous leverage in this model.

However, very few, if any, economic moats originating from intellectual property seem to be able to stand the test of time. Either they're expiring or becoming obsolete due to societal progress and creative destruction. But they can last for very long.

Utility

The concept used to assess how satisfaction levels affect consumer decisions. The law of diminishing marginal utility describes how the initial units of a good or service carry more utility than each additional unit.

The concept has its roots from the 19th century as economists worked on explaining price discovery. This mechanism was originally thought to be solely driven by a product's utility. Adam Smith then proposed the problem known as "the paradox of water and diamonds" which made it very difficult to explain why diamonds should be valued more highly than an essential good such as water.

That was until the discovery was made to explain that economic decisions are made based on marginal benefit rather than total benefit. In other words, consumers are not choosing between all the diamonds in the world vs. all the water in the world. Clearly, water is more valuable. Instead, they are choosing between one additional diamond versus one additional unit of water.

Primary source: John Stuart Mill

Elasticity

The economic measure of how responsive an economic variable, such as demand, is to a change in another, such as price. An elastic variable has an absolute elasticity value greater than 1 and responds more than proportionally to changes in the dependent variable. An inelastic variable has an absolute elasticity value less than 1 and changes less than proportionally to changes in the dependent variable.

Supply and Demand

Being the main model of price determination used in economic theory, the supply and demand relationship explains a lot of things in the world. The basic premise is that prices settle at equilibrium when demand equals supply.

While it's easy to take the model of supply and demand for what it is, it's important to know that there are blind spots. In some situations, the model is not as rigid as economics presumes when seen in the context of behavioral psychology, incentives, contrast, etc. As Charlie Munger puts it: Suppose that you raise the price and use the extra money to bribe the other guy's purchasing agent.

Deadweight Loss

A loss of economic efficiency that is caused by supply and demand being out of equilibrium. Such causes may include price and rent controls, minimum wages, taxation, and monopolies.

Moral Hazard

A situation where either party to an entered agreement changes its behavior after the contract is completed so that the probabilities attributed to either party's way of acting no longer apply. It's called moral hazard because the party is no longer fully affected by the negative effects of its own actions. Thus, it might be incentivized to act less cautiously than otherwise.

Bottlenecks

Matter, either tangible or intangible, can get clogged if pushed too quickly through a system than what that system can handle. Every system is limited by various constraints with some critical and some less critical. No change to the system will result in overall improvement unless that change addresses the bottleneck. The term is named after the narrow point of a typical bottle.

Bribery

Bribery is a form of a moral-breaking bottleneck in human systems which is hard to eliminate. The concept can in some circumstances significantly affect other models such as price discovery, incentive-induced bias, and so on.

Arbitrage

The attempt to profit by exploiting price differences in identical or similar financial instruments, capitalizing on the imbalance. As more and more arbitrageurs participate, such opportunities diminish and eventually vanish. The traditional definition of arbitrage concerns a 100% risk-free activity after transaction costs. But in practice, that is rarely certain.

Scarcity

Limited availability of something gives rise to trade-off. Rarely is something of limitless supply, except maybe the need for it. Scarcity involves making a sacrifice by giving something up—or making a trade-off—in order to obtain more of the scarce resource that is wanted.

Mr. Market

Benjamin Graham proposed imagining the stock market as a somewhat manic and not too intelligent profile who would stop by every day to call out prices. Mr. Market will not care if you are interested but will show up every day. However, his mood is subject to extreme changes. There will be times when he is optimistic about the future and so his prices will be high. There will be times when he is pessimistic about the future and so his prices will be low. For the most part, it's best to ignore his shouting. But when Mr. Market becomes extremely worked up—either excited or depressed—you can exploit his out-of-boundary prices.

The model of Mr. Market is simple, but here's the problem: it sounds easy to put into practice. But the truth of the matter is that there's a collective mass of real people on the other side of every transaction. This group might be better educated, have more capital, have more power, and have more experience. So after a while, one might feel that Mr. Market and these people are all superior.

But even then, the model of Mr. Market is paramount.

Primary source: Benjamin Graham

Fisher Effect

A direct relation to the concept of money neutrality, named after economist Irving Fisher. The Fisher effect states that the real rate of interest in an economy is stable over time so that changes in nominal interest rates are the result of changes in expected inflation. Therefore, the nominal interest rate in an economy is the sum of the required real rate of interest and the expected rate of inflation over any given time horizon.

Primary source: Irving Fisher

Cancer Surgery Formula

Charlie Munger explains: I've had many friends in the sick-business-fix-up-game over a long lifetime. And they practically all use the following formula — I call it the cancer surgery formula: They look at this mess and they figure out if there's anything sound left that can live on its own if they cut away everything else. And if they find anything sound, they just cut away everything else. Of course, if that doesn't work, they liquidate the business. But it frequently does work.

Primary source: Charlie Munger

Surfing

You won't be able to surf if you don't catch the wave. And if you do catch it, you can stay on it for long. The trick is catching the one that lasts the longest as early as possible and not to get off. Microsoft was a result of a 16-year-old catching a wave of software revolution right on the edge.

Primary source: Charlie Munger

Porter's Five Forces

Developed by Michael Porter in 1979, Porter's Five Forces is a framework to look at competitive forces in an industry. The five undeniable forces are: 1) threat of new entrants, 2) threat of substitutes, 3) bargaining power of customers, 4) bargaining power of suppliers, and 5) competitive rivalry.

Primary source: Michael Porter

Phillips Curve

A historical inverse relationship between rates of unemployment and corresponding rates of rises in wages that result within an economy.

Primary source: Williams Phillips

Parity Conditions

Where two (or more) things are equal to each other. In economics, this might include equality in price, rate of exchange, purchasing power, or wages. Parity conditions typically make simplifying assumptions, such as zero transaction costs, perfect information that is available to all market participants, risk neutrality, and freely adjustable market prices.

International exchange rate parity conditions:

1. Covered interest rate parity
2. Uncovered interest rate parity
3. Forward rate parity
4. Purchasing power parity
5. International Fisher effect.

The covered interest rate parity is the only parity condition that is enforced by arbitrage.

Transaction Costs

Transaction costs can essentially be divided into three broad categories:

1. Search and information costs are costs associated with determining whether the desired good is available in the market, where the lowest price exists, and so on.
2. Bargaining and decisions costs are costs used to reach an acceptable agreement with the counterparty in the transaction, write an appropriate contract, and so on. In asset markets and in market microstructure, the transaction cost is some function of the distance between the bid and ask.
3. Policing and enforcement costs are costs incurred to ensure that the counterparty complies with the agreement or to respond appropriately (often through the judicial system) if it proves that the counterparty doesn't.

Founder's Syndrome

The situation where leaders of companies are so emotionally invested in them that they can't effectively delegate decisions, leading to micromanagement and stasis.

Luxury Paradox

More expensive goods are less likely to be used regularly than cheaper alternatives even though the higher price might indicate higher quality. The relationship between price and utility is an inverted U.

Winner's Curse

In open cry auctions and bidding wars, the winning bid has a tendency to exceed the intrinsic value of the item won. The smartest side to take in a bidding war is the losing side.

Ratchet Effect

During times of crisis, government spending increases but has a tendency to not fall back to pre-crisis levels when the crisis is over.

Primary source: Alan Peacock; Jack Wiseman

Iron Law of Civilization 3.0

A freely competitive market is a mechanism that is constantly self-evolving, self-advancing, and self-perfecting. When there is more than one market, the largest will eventually become the only one, since if any individual, society, enterprise, or nation is removed from this single market, it will start to steadily fall behind and will ultimately be forced to join in. So, the best way for any nation to build its own strength is to abandon all trade barriers and join the largest international free market system in the world. The best way to fall behind is to close itself off from other countries.

Primary source: Li Lu

Say's Law

According to Say's law, supply creates demand because the income generated by past production and sale of goods is the source of spending that creates the demand to purchase current production. The reasoning is that to have the means to buy, a buyer must first have produced something to sell. And thus, the source of demand is production itself. As actor Kevin Costner says in the movie, Field of Dreams: If you build it, he will come.

Primary source: Jean-Baptiste Say

Paradox of Choice

The effect of how eliminating consumer choices can greatly reduce anxiety for users. There are, however, certain limitations about this paradox. Should there then be no choice at all? And if that be the case, how would business look like? If so, would all industries operating in an oligopoly switch to a monopoly leading to higher prices?

Primary source: Barry Schwartz

Hick's Law

Related to the paradox of choice, Hick's law poses that increasing the number of choices will increase decision time logarithmically. The more choices presented to users, the longer it will take them to reach a decision but the marginal decision time per extra choice decreases.

Primary source: William Edmund Hick

Free Rider Problem

A form of market failure where those who benefit from resources, goods, or services do not pay for them, which results in an under-provision of those goods or services. If someone builds a lighthouse, all sailors will benefit from its illumination.

When people are asked how much they value a particular public good, with that value measured in terms of how much money they would be willing to pay, their tendency is to under-report their valuations.

Cockroach Theory

When bad news is revealed, there may be many more related negative events yet to be revealed. There's never just one cockroach in the kitchen.

Evolutionary Stable Strategy

A subject in game theory indicating a strategy that is impenetrable by competitors once initiated. The evolutionary stable strategy creates a form of Nash equilibrium that is "evolutionarily" stable: once it is fixed in a population, natural selection alone is sufficient to prevent alternative strategies from successfully invading.

Two conditions must be present for such a circumstance:

1. The entity employing the strategy must be better than any other entity that employs the same strategy or any other strategy
2. Should a new strategy evolve that is equally as good, the entity employing the original strategy must do better than any entity employing both strategies.

Primary source: John Maynard Smith

Unknown Unknowns

Known unknowns are risks one is aware of, such as canceled flights or worker injuries.

Unknown unknowns are risks coming from situations that are so out of this world that they are not imagined in advance.

Critical Mass

A term borrowed from physics, critical mass is the minimum amount of something required to sustain itself going forward. In the scene of social networks, critical mass refers to the number of adopters for a system that is required for the further adoption rate to be self-sustaining. In nuclear physics, it's the smallest amount of fissile material needed for a sustained nuclear chain reaction.

Freemium

A pricing strategy by which a good or service is offered for free to spur the growth of adoption but with a price charged for proprietary features or functionality. The business strategy has been used in the software industry since the 1980s.

Crowdsourcing

A sourcing model for soliciting ideas or finances from a large group of participants rather than from employees or suppliers. It's a method of "outsourcing work to the crowd".

Diversification

When multiple uncorrelated subjects move with certain volatilities, splitting the interest between them produces collective volatility which is lower than either of those subjects' volatilities. The strategy of diversification is commonly used in portfolio management by allocating capital to a mix of different investments with the ultimate goal of reducing volatility.

3-6-3 Rule

The value of a bank is easier to value based on how efficiently it utilizes the 3-6-3 rule which goes like this: a bank pays 3% on savings accounts, loans out money to businesses with solid financials at 6%, and then the banker leaves the office at 3 p.m. to play golf. Excessive presence of derivatives on a bank's books undermines the 3-6-3 rule.

First-Mover and Last-Mover Advantage

The advantage gained by the initial significant occupant of a market. First-mover advantage may be gained by technological leadership or early purchase of resources. However, in certain growth markets, the last-mover might be better positioned competitively if it's able to introduce the last great development in that market to gain years of monopoly profits.

Related to inversion, Grandmaster chess player José Raúl Capablanca said: You must study the endgame before everything else.

Principal-Agent Problem

The theory of delegation and accountability between individuals used in many areas of social sciences, but primarily political science and economics.

The theory deals with relationships where one party (the principal) delegates the performance of a given task to another party (the agent). The principal wants the agent to perform the task satisfactorily, but the principal has a problem that consists in establishing a payment structure – a reward – that gives the agent sufficient incentive to perform the task in accordance with the principal's wishes.

Principal-agent problems are a frequent cause of market failure.

Market for Lemons Problem

The quality of goods traded in a market can degrade in the presence of information asymmetry between buyers and sellers, leaving only "lemons" behind – e.g. a car that is found to be defective after purchase.

Primary source: George Akerlof

Minsky Moment

A sudden collapse of asset values marking the end of a credit cycle or an economic cycle.

Primary source: Hyman Minsky

Zero to One Theory

A thought experiment by Peter Thiel stating that technology and globalization are different modes of progress. Globalization is horizontal progress that goes from 0 to n while technology is vertical and goes from 0 to 1.

Primary source: Peter Thiel

Winner's and Loser's Games

Any game should either be played as a Winner's Game or a Loser's Game.

Winner's Games are ones in which the outcome of the game is entirely dependent on the player's ability, such as chess or sprinting.

Loser's Games are ones in which the players struggle to compete against *the game itself*. In Loser's Games you make more progress getting ahead by avoiding mistakes rather than making brilliant decisions.

What's important is whether you can assess which one you are dealing with and adjust your winning strategy accordingly.

Primary source: Simon Ramo

Exit, Voice, and Loyalty Model

A model used in assessing how a negative change to an agent's environment by another agents affects their actions. Commonly used in political science and organizational behavior, the model essentially proposes that agents have two possible responses to a negative outside effect: they can either *exit* (withdraw from the relationship) or they can *voice* (attempt to repair or improve the relationship).

Primary source: Albert Hirschman

Lucas Critique

It is naive to try to predict the effects of a change in economic policy entirely on the basis of relationships observed in historical data, especially highly aggregated historical data

Primary source: Robert Lucas

Mental Models in Human Nature and Judgment

Trust

Trust is a fundamental part of human nature and is pretty much all-encompassing in all we do. Trust produces increased speed, efficiency, empower ethical decision making, and hence, decreases costs.

Availability Heuristic

The tendency to judge the frequency of events in the world by the ease with which examples come to mind. We tend to most easily recall what is salient, important, frequent, and recent. So, we make decisions based on what we most easily recall but this undermines our ability to accurately judge frequency and magnitude.

Primary source: Daniel Kahneman; Amos Tversky

Anchoring

The tendency to rely too much on an initial piece of information when making subsequent judgments. The cognitive bias of anchoring is closely related to availability heuristic since the mind anchors to what information is familiar.

Primary source: Daniel Kahneman; Amos Tversky

Reciprocity

A social norm of responding to a positive action with another positive action, even if the action received has been unwanted. The interesting thing is that the positive action returned is oftentimes bigger than the initial action received.

Primary source: Robert Cialdini

Envy and Jealousy

Trying to avoid envy in an interconnected world is very difficult. It's a phenomenon that lies deep in human nature going back to ancient times. The Stoics warned against the consequences of envy, but yet it's still ingrained in human nature as ever. Warren Buffett says: It is not greed that drives the world, but envy.

Denial

Denial is a powerful psychological effect. When reality is too painful to bear, denial just distorts it until it's bearable. The refusal to accept reality or fact is a primitive defense or survival mechanism.

Stress

A situation that triggers a particular biological response when perceiving threat or standing in front of a major challenge. Stress triggers your fight-or-flight response and traces all the way back to assisting hunter-gatherer ancestors to survive.

Yerkes-Dodson law states that performance increases with anxiety and excitement, but only to a point.

Social Proof

In a study, researchers arranged for a man to violate the law by crossing the street against red light right into traffic. In half the instances, he was dressed in a business suit and tie. In the other half, he wore a work shirt and trousers. The study showed that three times as many pedestrians were swept along behind the man into traffic, against the light, and against the law, when he wore a suit.

Social proof, coined by Robert Cialdini, is a powerful psychological phenomenon of assuming the actions of others in an attempt to reflect correct behavior for a given situation.

Primary source: Robert Cialdini

Framing

The way a question or situation is framed can determine your response and lead to an action decided based on whether the options are presented with positive or negative connotations. Mixed with the narrative fallacy, framing can turn out dangerous for errors in decision making and might be used as power over others' behavior.

Primary source: Daniel Kahneman; Amos Tversky

Mental Accounting

A tendency to divide money into different pots and then treat them all separately based on subjective criteria. According to Richard Thaler, people think of value in relative rather than absolute terms. They derive pleasure not just from an object's value, but also the quality of the deal – its transaction utility. The phenomenon helps explain why people are willing to spend more when they pay with a credit card than cash.

Primary source: Richard Thaler

Pavlovian Association

Ivan Pavlov's learning procedure of pairing a stimulus with a conditioned response. The idea emerged from an experiment on Pavlov's dogs demonstrating how the ring of a bell and the presence of a bowl of dog food (stimulus) would trigger an unconditioned response (salivation). Pavlov also came to notice that his dogs started to associate his lab assistant with food, creating a learned and conditioned response.

Primary source: Ivan Pavlov

Operant Conditioning

A method of learning through rewards and punishment. Such methods take place in many natural settings as well as in more structured settings such as the classroom or therapy sessions.

Primary source: B. F. Skinner

Commitment and Consistency Bias

A tendency to want to be consistent with one's prior actions. Because human actions, beliefs, and commitments help form self-perception, the commitment and consistency bias creates a reluctance to change a course of action once it's chosen even though that action may be forced by someone else.

Primary source: Robert Cialdini

Sunk Cost Fallacy

Linked to anchoring bias and commitment bias, the sunk cost fallacy is the tendency to continue an endeavor due to resources and effort invested in that endeavor even though cutting it loose seems to be a wise choice. Research suggests that rats, mice, and humans are all sensitive to sunk costs after they have made the decision to pursue a specific reward.

Liking Tendency

As Robert Cialdini puts it: It's no surprise that people prefer to say yes to a request to the degree that they know and like the requester. A simple way to make things happen in your direction is to uncover genuine similarities or parallels that exist between you and the person you want to influence, and then raise them to the surface. That increases rapport.

Primary source: Robert Cialdini

Stereotyping

A tendency to over-generalize a population or class of people. The concept is closely related to the availability heuristic.

Groupthink

The strive and desire for harmony, conformity, and compromise in a group can result in an irrational or dysfunctional decision-making outcome, although the opposite might be the purpose of creating the group.

Primary source: William H. Whyte Jr.

Authority Bias

The behavioral tendency to attribute greater weight and accuracy to the opinion of someone with an authority. This sometimes happens even when an individual believes that there's something wrong with following the authority, and even when there wouldn't be a penalty for defying them.

In 1961, the now-famous Milgram experiment was conducted by Stanley Milgram, a professor of psychology at Yale University. In it, participants were ordered to administer painful and potentially harmful electric shocks to another person they could not see. Many of them did so, even when they felt that it was wrong, and even when they wanted to stop because they felt pressured by the perceived authority of the person leading the experiment.

Primary source: Stanley Milgram

First-Conclusion Bias

A tendency to settle on the first information or conclusion adopted for a given problem, thus remaining resistant to the search for any more alternatives.

Confirmation Bias

The tendency to interpret a situation or seek out reinforcing evidence according to pre-existing beliefs. Charles Darwin is said to not have been able to come up with the theory of evolution without applying a constant process of destroying confirmation bias in his studies. He constantly sought out and noted observations that were opposed to what he thought and made an intense effort to investigate them.

Hindsight Bias

Also called creeping determinism, it's the tendency of overestimating one's ability to have predicted an outcome that could not possibly have been predicted. Hindsight bias is dangerous because it hinders one from learning from past mistakes. If we feel like we knew it all along, it means we won't stop to examine why something really happened.

Recommended reading: [Looking Back at 2020 \(in Hindsight\)](#)

Survivorship Bias

A form of selection bias where the survivors—or the illuminated data—of a particular subject are disproportionately evaluated.

A commonly held belief is that machinery, equipment, and goods manufactured in previous generations often is better built and last longer than comparable items built during present times. You usually hear someone say: They don't make 'em like they used to. But because of the selective pressures of time and usage, it is inevitable that only those items which were built to last will have survived into the present day.

Curse of Knowledge

Once we learn something, we find it hard to imagine what it was like not to know it and thus find it difficult to think about problems from the perspective of lesser-informed people. The more knowledgeable you became on a subject, the more unnatural it becomes to communicate that idea in a simple and clear way. In short, knowledge itself becomes a barrier to its own propagation.

Primary source: Colin Camerer; George Loewenstein; Martin Weber

Reductive Bias

The need to treat non-linear complex systems as if they are linear. Mistakes generally arise from the mismatch between the complex reality one faces and the simplifying mental routines one uses to cope with that complexity.

Incentive-Caused Bias

People do what they're incentivized to do. If someone is paying someone to be irresponsible, that someone is likely to be irresponsible. You generally get the outcome that you reward for. So you need to be very careful about how you design those rewards.

Representativeness Heuristic

Consider the following: Linda is 31, bright, single, and outspoken. She majored in philosophy at the university. As a student, she was deeply concerned with issues of discrimination and social injustice, and also participated in antinuclear demonstrations. Is it more likely that Laura works at a bank? Or, is it more likely that she works at a bank and is active in the feminist movement?

Opting for the last option is prone to representativeness heuristic—the tendency to let the similarity of objects or events confuse one's thinking about the probability of an outcome. Because the possibility that Linda is active in the feminist movement is a subset of a more inclusive category, the probability of her just working at a bank is simply higher.

Primary source: Daniel Kahneman; Amos Tversky

Narrative Instinct

Because we have a strong tendency to make sense from cause-and-effect, stories help us make sense of the world and are therefore remarkably powerful. But you could imagine the kinds of tripwires of errors this might cause. Just think back to the story of Linda in the prior model of representativeness heuristics.

Bizareness Effect

Bizarre or controversial information is easier to recall than what is common.

Baader-Meinhof Phenomenon

Also known as a frequency illusion, this phenomenon is an illusion where once something has recently come to one's attention, it suddenly seems to appear with improbable frequency shortly afterward, making one overestimate its prevalence. Closely related to selection and recency bias.

Cobra Effect

At the time of British rule of colonial India, the British government was concerned about the number of venomous cobra snakes in Delhi and so it offered a bounty for every dead cobra. The policy initially appeared successful. Eventually, however, the number of dead cobras being presented for bounty payment began to increase over time and it was discovered that people began to breed cobras for the income. When the government became aware of this, the reward program was scrapped, causing the cobra breeders to set the now-worthless snakes free. As a result, the wild cobra population further increased. The apparent solution to the problem made the situation even worse.

Hence, the Cobra effect is when an attempted solution to a problem makes the very problem worse. The root of the cause is often applying too linear thinking to the problem while neglecting the effect of feedback loops. The model shows that simplistic policies can come back to bite you.

Boomerang Effect

An unintended consequence of people being persuaded to do one thing but then turning around to the opposite. Sometimes referred to as the theory of psychological reactance, the boomerang effect basically occurs when individuals perceive that someone attempts to restrict their freedom.

Curiosity Instinct

Curiosity opens up for exploration, investigation, and learning. Without the human curiosity instinct, science and technology would not be present. Companies do not survive without curiosity.

Language Instinct

Humans are born with an innate capacity for language and this capacity shows a lot about our cognitive organization. Steven Pinker sees language as an ability unique to humans, produced by evolution to solve the specific problem of communication among social hunter-gatherers.

Primary source: Steven Pinker

Hasty Generalization

Closely related to stereotyping, the human mind tends to generalize based on general rules from a sample set of data. But sometimes when the data does not fit the population, it leads to overgeneralization. As Daniel Kahneman puts it: Extreme outcomes (both high and low) are more likely to be found in small than in large samples. This explanation is not causal.

Relative Satisfaction

The tendency to determine one's own level of satisfaction by comparing circumstances to others' circumstances. Envy and jealousy are strongly caused by relative satisfaction. As Charlie Munger said: Envy is a really stupid sin because it's the only one you could never possibly have any fun at.

Kantian Fairness Tendency

Emmanuel Kant's ethical theory of fairness requires that, for an action to be permissible, it must be possible to apply it to all people without a contradiction occurring.

The human psyche is strongly tended towards the idea of fairness. But life isn't fair and many can't accept this. Tolerating a little unfairness should be okay if it means greater fairness for all. We want things to balance but balance is not the order of life.

Fundamental Attribution Error

The tendency to overemphasize personal characteristics and ignore situational factors when judging others' actions and behavior. It results in believing that what people do reflects who they are.

Consider the case where Alice, a driver, is cut off in traffic by Bob. Alice instantly attributes Bob's behavior to his fundamental personality, e.g. that he's selfish and an unskilled driver. She does not immediately consider that Bob might be late for a flight, his son's birth, or an accident. Inversely, Alice might well make the opposite mistake and excuse herself by saying she herself was influenced by situational causes. Also termed the actor-observer symmetry.

Primary source: Lee Ross

Action Bias

Waiting and watching is torture, so humans have a tendency to act even when no action is needed. The best decision is sometimes to watch the grass grow.

Principle of Least Effort

A theory postulating that animals, humans, and well-designed machines will naturally seek the path of least resistance, and that effort declines as the minimum acceptable result is attained.

Primary source: Guillaume Ferrero

Cognitive Dissonance

The effect of simultaneously trying to believe two incompatible things at the same time. When people smoke even though they know it's pretty bad for them, they experience cognitive dissonance.

Primary source: Leon Festinger

Hard-Easy Effect

We tend to overestimate our ability to do something hard and underestimate our ability to do something easy. And so we attempt to focus on what's hard even though the thing that's easy might bring the same, or larger, rewards. Related to the Dunning-Kruger effect.

Primary source: Leon Festinger

Focusing Effect

The tendency to put too much emphasis on limited factors that do not matter much as part of a larger system. In other words, it's when someone doesn't see the forest for the trees. Daniel Kahneman once said: Nothing in life is as important as you think it is, while you are thinking about it.

Recency

The tendency to weigh recent information more heavily because that information seems more vivid even though it might be less important than past information. It's closely related to the availability heuristic.

Planning Fallacy

Tasks often take longer than expected. First proposed by Daniel Kahneman and Amos Tversky in 1979, the planning fallacy is an effect of optimism bias and is describing not only the underestimation of time but also of costs and risks.

Primary source: Daniel Kahneman; Amos Tversky

Reputation Fragility

As Warren Buffett says: It takes 20 years to build a reputation and 5 minutes to ruin it.

Noise Bottleneck

Coined by Nassim Taleb, a noise bottleneck is when more sampling of something decreases the signal-to-noise relation, increasing the amount of randomness, and decreasing the probability of sound conclusions. We tend to think that consuming more information is better except when that causes us to place too much emphasis on irrelevant data.

Primary source: Nassim Taleb

Keynesian Beauty Contest

Closely related to the pari-mutuel system, a Keynesian beauty contest is a concept used to describe an action that is based not on one's own perception but an inference of what one thinks the public perception will be of a subject. This can be carried one step further to take into account the fact that other entrants would each have their own opinion of what public perceptions are. Thus, the strategy can be extended to the next order and the next, and so on, at each level attempting to predict the eventual outcome of the process based on the reasoning of other rational agents.

To demonstrate this, John Maynard Keynes used an analogy based on a fictional newspaper contest in which contestants were asked to choose the six most attractive faces from a hundred photographs. Those who picked the most popular faces would win a prize.

Keynes then argued: It is not a case of choosing those [faces] that, to the best of one's judgment, are really the prettiest, nor even those that average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth, and higher degrees.

Primary source: John Maynard Keynes

Serpico Effect

Named after Frank Serpico, who became known for whistleblowing on police corruption in the late 1960s and early 1970s, the Serpico effect is the tendency to rationalize an action because everyone else is doing it.

Depressive Realism

A hypothesis stating that depressed people make more realistic inferences than non-depressed people. It's the opposite of being blissfully unaware. While a useful mental model, the evidence for depressive realism is largely debated and remains a hypothesis.

Primary source: Lauren Alloy; Lyn Yvonne Abramson

Skill Compensation

People who are relatively good at one thing might tend to be relatively poor at another. An effect of trade-offs in deciding the time spent developing one skill over another.

Compassion Face

The tendency to have more compassion for victims within small groups than larger groups, because the smaller the group the easier it is to identify individual victims. One victim can break our hearts while larger groups seem more distanced.

Three Men Make a Tiger

A Chinese proverb that underlines the tendency to accept absurd information as long as it is repeated enough times by enough people. If one person tells you there's a tiger roaming around town, you might assume they're lying. If two people tell you, you begin to wonder. If three say it's true, you're getting closer to believing it.

Primary source: Pang Cong

Buridan's Ass

Coined after French philosopher Jean Buridan, Buridan's ass is a type of decision paralysis where two equally good options lead to no decision.

The paradox is explained by the story of a donkey that is equally hungry and thirsty and placed precisely midway between a stack of hay and a pail of water. Since the paradox assumes the donkey will always go to whichever option is closer, it dies of both hunger and thirst since it cannot make any rational decision between its two options.

Primary source: Jean Buridan

Imposter Syndrome

The fear of being exposed as less talented than one's surroundings think about one. Also termed impostorism, the phenomenon occurs when individuals feel they do not deserve all they have achieved.

Primary source: Pauline R. Clance; Suzanne A. Imes

Semmelweis Effect

Related to first-conclusion bias, the Semmelweis reflex is the tendency to reject new evidence or new information because it contradicts established norms, beliefs, or paradigms. It's named after a Hungarian doctor named Ignaz Semmelweis who discovered that patients treated by doctors who wash their hands get fewer infections but struggled to convince others that his finding was true.

Primary source: Ignaz Semmelweis

False-Consensus Effect

The tendency to erroneously believe that your views or beliefs are more widely held within a population than they are. This false consensus increases or decreases self-esteem, overconfidence effect, or a belief that everyone knows one's own knowledge. Relation to the curse of knowledge.

McNamara Fallacy

Named after Robert McNamara, the US Secretary of Defense during the Vietnam War, it's the belief that rational decisions are made solely on the basis of quantitative evidence, ignoring all other factors. McNamara measured success during the war solely on the measure of enemy body counts, causing the US army to lose track of the war's strategic objectives. Don't presume that what can't be measured isn't really important.

Courtesy Bias

The resistance to giving an honest opinion due to a desire not to offend the person or organization responding to. A frequent example is of employees hesitant to giving an honest opinion to their superiors, clogging information flow for rational decision making in the company.

Lucid Fallacy

Identified by Nassim Taleb and described in *The Black Swan*, the ludic fallacy is the tendency to falsely associate simulations with real life. Because simulations are designed as "narrow worlds of game and dice", they fail to account for chaos regarding future events in the real world.

Primary source: Nassim Taleb

Dunning-Kruger Effect

The cognitive bias that can be observed when people with beginning-level competencies tend to overestimate their own abilities. The effect, documented by and named after psychologists David Dunning and Justin Kruger, is explained by the fact that at this level of understanding and competence, one has not yet learned to recognize the limits of one's own competencies. Knowing the limits of one's intelligence requires a certain level of intelligence.

Primary source: David Dunning; Justin Kruger

Abilene Paradox

The situation where a group decides to make a decision that is counter to the thoughts and feelings of its individual members in the group. It happens because the members fail to communicate their individual beliefs.

Primary source: Jerry B. Harvey

In-Group Favoritism

Related to the liking tendency, in-group favoritism is the inclination to give preference to people within your own social group. Nepotism is an example.

Primary source: William Sumner

Collective Narcissism

The tendency to exaggerate the positive image and importance of a group that one belongs to.

Primary source: Sigmund Freud

Normalcy Bias

The tendency to believe threats and disasters are not at all probable due to a belief that things will remain as they always have.

Texas Sharpshooter Fallacy

The action of picking the target to go for after making the shot, making it impossible to miss. When the same data is used both to construct and test a hypothesis, conclusions are misguided.

Plain Folks Fallacy

A logical fallacy involving speakers attempting to convince an audience that they, and their ideas, are “of the people” and that they themselves are Average Joes.

Poisoning the Well

Also called a smear tactic, it's the act of presenting negative information that is irrelevant before presenting an argument, which makes that argument, or person, seem untrustworthy. Before you listen to what he has to say, may I remind you that he has been in jail.

Primary source: John Henry Newman

Appeal to Consequences

An argument that attempts to prove a hypothesis true or false because the consequences of it being true or false are desirable or undesirable. It's a logical fallacy.

Behavioral Inevitability

The notion that human behavior, and its inherent biases, will always remain. As Voltaire said: History never repeats itself; man always does.

Self-Handicapping

The tendency to resist putting in an effort to do something because of a worry that failing might put a dent in one's self-esteem.

Primary source: Edward E. Jones; Steven Berglas

False Uniqueness Effect

An attributional cognitive error of assuming that one's qualities, traits, and personal attributes are unique when in reality they are not. In essence, it's the opposite of imposter syndrome.

Backfiring Effect

The tendency to enforce one's existing beliefs about something when presented with disconfirming evidence. A study that looked at political voting showed that introducing people to negative information about their favored political candidate would often cause them to increase their support for that candidate.

Positive Illusions

A form of self-deception that causes individuals to think inflatedly about themselves, their decisions, and abilities to avoid short-term discomfort or raise self-esteem. A positive illusion might cause a negative spiral of justifications about worse and worse decisions.

Primary source: Shelley Taylor; Jonathon Brown

Ironi Process Theory

The psychological process of attempting to suppress certain thoughts, making those thoughts more likely to resurface in one's mind.

Primary source: Daniel Wegner

Aumann's Agreement Theorem

Named after Israeli-American mathematician Robert Aumann, it's the notion that two rational people in an opposing argument can't and shouldn't come to the conclusion of agreeing to disagree if they have common knowledge of each other's beliefs.

Primary source: Robert Aumann

Ostrich Effect

As ostriches bury their heads in the sand to avoid danger, the ostrich effect is the tendency to avoid opposing information to what one desperately wants to be right.

Primary source: Dan Galai; Orly Sade

Bounded Rationality

Limits to the capacity of the human mind make it impossible to contain and recall all information obtained, and therefore, rationality is also limited.

Primary source: Herbert Simon

Fluency Heuristic

Related to the narrative fallacy, fluency heuristic is the tendency to believe more in ideas that are easy to explain rather than those that are hard to comprehend.

Persian Messenger Syndrome

The act of blaming the bearer of negative news.

As Charlie Munger has said: The Persians really did kill the messenger who brought the bad news. You think that is dead? I mean you should've seen Bill Paley in his last 20 years. He didn't hear one damn thing he didn't want to hear. People knew that it was bad for the messenger to bring Bill Paley things he didn't want to hear. Well that means that the leader gets in a cocoon of unreality, and this is a great big enterprise, and boy, did he make some dumb decisions in the last 20 years.

Okrent's Law

A law stated by writer Daniel Okrent referring to the phenomenon of the press providing legitimacy to unsupported fringe viewpoints in an effort to appear even-handed.

He once said: The pursuit of balance can create imbalance because sometimes something is true.

Primary source: Daniel Okrent

Vierordt's Law

In 1868, German physiologist Karl von Vierordt created this law stating that humans perceive time at different magnitudes over different durations. We underestimate long periods of time and overestimate short periods of time.

Primary source: Karl von Vierordt

Cunningham's Law

Ward Cunningham, the creator of the first wiki, said: The best way to get the right answer on the Internet is not to ask a question. It's to post the wrong answer.

If you constantly express anger in your private conversations, your friends will likely find you tiresome, but when there's an audience, the payoffs are different; outrage can boost status.

The internet promotes the same dynamic as road rage: once you're arguing with a computer (or vehicle) rather than a person, social norms tend to vanish.

Primary source: Ward Cunningham

Tyranny of Small Decisions

A situation where a series of small, individually rational decisions creates a path dependence that might negatively alter the context of decisions made subsequently to the point where the original desire is irreversibly destroyed.

Primary source: Alfred Kahn

Hyperbolic Discounting

The tendency to show a higher preference for the reward that comes sooner rather than later. Humans discount future events. This is why we have interest rates.

Primary source: Richard Herrnstein

Delayed Gratification

The process an individual undergoes when resisting the temptation of an immediate reward in preference for a later reward.

Observer Effect

A situation where an individual is being observed, but the very observation alters that individual's actions. Merely observing a phenomenon inevitably changes the same phenomenon.

Golem Effect

Related to the observer effect, performance tends to decline when supervisors, teachers, or bosses have low expectations of one's abilities.

Maslow's Hierarchy of Needs

A motivational theory created by psychologist Abraham Maslow in a 1943 paper stating that humans have five categories of needs in order: physiological, safety, love, esteem, and self-actualization. Higher needs in the hierarchy emerge when the previous need is appropriately satisfied.

Primary source: Abraham Maslow

Bystander Effect

A social observation that people are less likely to help a victim when others are present as an audience. The greater the number of bystanders, the less likely is it that one of them will help.

Primary source: John M. Darley; Bibb Latané

Hot Hand Fallacy

Describes the positive expectation that an event will occur that has already been preceded by a consequence of the same event. Sports fans have a tendency to assume that a particular player having a streak of successful shots has an increased probability of making the next shot, irrespective of the player's historical shooting record.

Primary source: Amos Tversky; Thomas Gilovich; Robert Vallone

Gambler's Fallacy

Also known as the Monte Carlo fallacy, it's the mistaken belief that a run of specific results in a random process makes it less or more likely to occur the next time.

For example, a series of 10 coin flips might all land on heads. Under the gambler's fallacy, a person might expect that the next coin flip is more likely to land on tails the next time.

Primary source: Daniel Kahneman; Amos Tversky

Acton's Law

Power tends to corrupt, and absolute power corrupts absolutely.

Primary source: John Dalberg-Acton

Brandolini's Law

The amount of energy needed to refute bullshit is an order of magnitude larger than to produce it.

Primary source: Alberto Brandolini, an Italian programmer

Peltzman's Law

People are more likely to engage in risky behavior when security measures have been mandated.

Primary source: Sam Peltzman

Mental Models in Numeracy and Interpretation

Power Laws

When a relative change in one quantity results in a proportional relative change in the other quantity. Few empirical distributions fit a power law for all their values but rather follow a power law in the tail. For example, the distribution of income in a market economy is following a power law because inequality is built into the process of wealth accumulation itself. Big cities draw more people. Capital in corporations attracts more capital. Profits generate greater profit. The Pareto principle is a type of power law.

Permutations and Combinations

With permutations, we care about the order of the elements, whereas with combinations we don't. The mathematics of permutations and combinations leads us to understand the practical probabilities of the world around us and is enormously important.

Primary source: Blaise Pascal; Pierre de Fermat

Algebra

The study and manipulation of mathematical symbols or letters to demonstrate equivalence or inequivalence of subjects. Algebra is considered an essential part of any study within mathematics, science, or engineering, as well as such applications as medicine and economics.

Multiplying by Zero

Any number multiplied by zero, no matter how large, becomes zero. And yet, this is often learned the hard way. When trying to compound returns it's fatal to multiply your capital by zero.

Randomness

Randomness is present everywhere in the real world but it often doesn't fit how we think about the world. An erroneous strive for pattern-seeking sometimes makes us see patterns that are not there. As Nassim Taleb puts it, we are "fooled by randomness".

Stochastic Processes

A family of random variables on the same probability space. Brownian motion and the random walk theory are stochastic processes.

Gambler's Ruin

Playing a negative-probability game persistently enough guarantees to go broke.

Gambler's ruin might also explain the case where a gambler goes broke even if he might have a positive expected value on each bet. This happens if the gambler raises the bet to a fixed fraction of the bankroll when winning, but doesn't reduce it when losing.

Primary source: Blaise Pascal; Pierre de Fermat

Read: [The Kelly Criterion Applied to Long-Term Value Investing](#)

Compounding

A powerful force that happens when interest is regularly added to the sum which earned interest on the previous sum. Said to be called the "8th wonder of the world" by Albert Einstein, it's a mathematical concept that lays the foundation for the field of finance but is clearly not bounded by the realm of finance itself. Knowledge, capability, ideas, relationships, and so on all build on the basis of compound interest. Naval Ravikant has said: Play iterated games. All the returns in life, whether in wealth, relationships, or knowledge, come from compound interest.

Understanding the time value of money is crucial because compounding plays out over the long term. In the short term, incremental gains are often hardly noticed.

Churn

Churn is a form of entropy. Basically, it's the measure of the number of people or items moving out of a collective group over a specified period of time (think customers of insurance companies or subscription services). Reducing churn requires constant care of the group.

Churn and growth rates are diametrically opposed factors as one measures the loss of a group and the other measures acquisition into the group.

Law of Large Numbers

The law stating that the average of the results obtained from a large number of events should be close to the expected value of those events and will tend to become closer to the expected value as even more events occur. It was proved in 1713 by Swiss mathematician Jakob Bernoulli.

In business, the law of large numbers is evident in relation to percentage-wise growth rates. As a business grows larger, the percentage rate of growth becomes increasingly difficult to maintain.

Read: [The Kelly Criterion Applied to Long-Term Value Investing](#)

Probability Distributions

Statistical functions that describe all the possible values and likelihoods that a random variable can take within a given range. How the distribution of these values is laid out is dependent on its standard deviation, skewness, and kurtosis. The most common of these is the normal distribution—or bell curve—which is found frequently in finance, investing, science, and engineering.

Central Limit Theorem

If you add a large number of independent random variables, possibly with different probability distributions, but with finite variances, the sum will go towards a normal distribution.

Primary source: Pierre-Simon Laplace

Confidence Interval

The measure that explains to what degree a sample estimate might explain the true value of a parameter when tested on a population. It's the range of values we are fairly sure our true value lies in. Not understanding the confidence interval is often what creates financial trouble.

Regression to the Mean

The occurrence that happens when a number of observations follow the law of large numbers. If a random variable is extreme on its first measurement, regression to the mean suggests that it will be closer to the mean or average on its subsequent measurements. It's easy to understand the concept. But not understanding its limitations or where it's applicable can prove very dangerous. For example, large amounts of money have been subject to opportunity cost in the stock market by erroneously buying below-average price-to-book companies believing their values will follow the regression to the mean principle. That is until the investor realizes that the price is just the numerator and the book value—the denominator—starts to turn on the thesis.

Order of Magnitude

A quantitative measure generally used to make very approximate comparisons. If two numbers differ by one order of magnitude, one is about ten times larger than the other.

Kelly Criterion

In 1956, a young scientist at Bell Labs named John Larry Kelly Jr. came up with a simple formula for optimal bet sizing based on the better's edge and odds of winning. It was essentially built on Claude Shannon's information theory and Bernoulli's St. Petersburg Paradox.

The formula is:

Edge / odds = Fraction of your bankroll to bet each time

As an example, taking a positive risk/reward bet of 1:2 with a 50% chance of either outcome, the Kelly criterion suggests that the optimal bet size of the bankroll is 25% (reward, if positive odds play out, is 2 and edge is 0.5, so $0.5 / 2 = 25\%$). No other approach can increase wealth faster than the Kelly criterion without increasing the odds of wiping out the bankroll.

Primary source: John Larry Kelly, Jr.

J-Curve

An effect where a curve initially falls, then steeply rises above the starting point.

The model is usually applied in terms of analyzing the path of a country's terms of trade following a devaluation or depreciation of its currency, under a set of conditions.

In private equity, the J-curve is used to illustrate the historical tendency of private equity funds to deliver negative returns in early years and investment gains in the outlying years as the portfolios of companies mature.

Base Rate Neglect

A tendency to ignore the a priori probability of something by putting heavier weight on appealing information about an individual's case. Only 6% of applicants make it into this school, but my son is brilliant. I'm sure they're going to accept him!

Primary source: Daniel Kahneman; Amos Tversky

Anscombe's Quartet

Developed by statistician Francis Anscombe, Anscombe's quartet is when presumably identical sets of numbers do not at all look identical when graphed. Numerical calculations are exact, but graphs are rough.

Primary source: Francis Anscombe

Selection Bias

An experimental error that happens when sample data is not representative of the population as a whole.

Berkson's Paradox

A case where conditional probability and correlations are counterintuitive due to a sampling or selection bias.

Suppose a stamp collector has 1000 postage stamps, of which 300 are pretty and 100 are rare, with 30 being both pretty and rare. 10% of all the collector's stamps are rare and 10% of the pretty stamps are rare, so prettiness tells nothing about the rarity of the stamps.

Primary source: Joseph Berkson

Apophenia

A psychological phenomenon where random and meaningless impressions are perceived as meaningful. It's a way to comfort the mind in explaining how the world works. To see patterns and connections when none are present is also called patternicity.

Primary source: Klaus Conrad

Neglect of Probability

The tendency to disregard probability in decision making under uncertainty. Small risks are either neglected entirely or hugely overrated. Hindsight bias is a common result of the tendency to neglect probability.

Ergodicity

Born from the field of thermodynamics, ergodicity is a case where population probabilities don't apply to individual events but are evened out as time passes. One might not die from a single game of Russian roulette but will most certainly die if playing the game enough times.

Primary source: Ludwig Boltzmann

Moral Luck

The act of praising a person for a good deed they didn't have full control over. As Nassim Taleb puts it: Avoid calling heroes those who had no other choice.

Primary source: Bernard Williams

Friendship Paradox

Most people have fewer friends than their friends have, on average. The reason is a type of sampling bias in which people with more friends are more likely to be one of your friends. In reality, the friendship paradox is a contradiction because most people believe that they have more friends than their friends have.

Primary source: Scott L. Feld

Clustering Illusions

Falsely assuming that streaks or clusters of small samples in a large pool of data in random distributions indicate a non-random distribution.

Primary source: Thomas Gilovich

Nonlinearity

Closely related to the Kantian fairness tendency, nonlinearity is a situation where there is not a straight-line or direct relationship between an independent variable and a dependent variable. The output is not proportional to the change of the input, posing to sometimes appear chaotic, unpredictable, or counterintuitive. A very important topic to understand.

Moderation

A situation where the relationship between two variables depends on a third variable. If two objects are stuck together in thick and thin, that might be due to a third variable – glue.

Denomination Effect

Even though a \$50 bill has the same value as 10 \$5 bills, we tend to feel that the 10 bills are worth less. The denomination effect is also evident in the case of stock splits.

Primary source: Priya Raghubir; Joydeep Srivastava

Woozle Effect

When frequent citation of previous information that lacks evidence misleads individuals into believing it's evidence. As Daniel Kahneman puts it: A reliable way to make people believe in falsehoods is frequent repetition, because familiarity is not easily distinguished from truth.

The Scientific Method

An empirical method of acquiring knowledge through systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses.

Proxy

A variable that serves instead of an immeasurable other variable. The proxy must be close to the replaced value in order for it to be a good proxy.

Inflection Point

A point on a curve at which the curve changes from being concave (concave downward) to convex (concave upward), or vice versa.

Simpson's Paradox

A case where a certain trend seems evident in different groups of data but is not evident when these groups are combined.

Primary source: Edward H. Simpson

Surface Area

The amount of space that is outside of a solid object. If building a tank larger than it is, the amount of steel used to grow the tank will be able to hold more. It's a non-linear relationship.

Maxima and Minima

Known collectively as the extrema, maxima and minima are the highest and lowest points of value in a function. Pierre de Fermat was one of the first mathematicians to propose a general technique, adequality, for finding the maxima and minima of functions.

Sensitivity Analysis

A method of assessing the stability of research results by changing conditions in each variable.

Benford's Law

Describes how different figures are distributed as first figures in statistics. For example, Benford's law states that the number 1 should be the first digit in 30.1% of the cases, the number 2 in 17.6% of the cases and the figure 9 in 4.6% of the cases in a very large amount of data.

Primary source: Frank Benford

Black Swan Events

Rare events that have a large impact are difficult to predict and are beyond normal estimates.

Primary source: Nassim Taleb

Goodhart's Law

When a measure becomes a target, it ceases to be a good measure. When we set one specific goal, people will tend to optimize for that objective regardless of the consequences.

Primary source: Charles Goodhart, economist

Mental Models in Thinking**Decision Trees**

A tree-like visualization of how action leads to another series of possible consequences and outcomes. Algorithms are largely based on decision trees.

Probabilistic Thinking

Probabilities are the rules of the world, and thus probabilistic thinking is one of the most critical traits and skills to adopt. But John Maynard Keynes also said: It's better to be roughly right than precisely wrong.

Second-Order Thinking

Thinking in terms of effects and the effects of those effects. Second-order thinkers ask themselves the question; "and then what"?

Second-order thinking is largely related to thinking in terms of permutations and combinations in combination with decision trees. This is crucial in the investment business. As Ray Dalio says: Failing to consider second and third-order consequences is the cause of a lot of painfully bad decisions, and it is especially deadly when the first inferior option confirms your own biases.

Bayesian Updating

The method of updating a probability estimate for a hypothesis as new evidence or information becomes available. It's hugely in line with how the world works because Bayesian updating is closely related to subjective probability. It was named after Reverend Thomas Bayes.

Primary source: Thomas Bayes

Bloom's Taxonomy

Created by Benjamin Bloom in 1956, Bloom's taxonomy is a set of three hierarchical orders of thinking of any subject in terms of levels. It consists of three learning domains: the cognitive, affective, and psychomotor, and it then assigns to each of these domains a hierarchy that corresponds to different levels of learning where each level subsumes the levels that come before it.

The levels of the cognitive domains are ordered as knowledge, comprehension, application, analysis, synthesis, and evaluation.

Primary source: Benjamin Bloom

Circle of Competence

Moving out of one's circle of competence is prone to blind spots that one is unaware of. Yet often, when one is not able to define or think about one's circle of competence, it leads to the same degree of confidence as to when one is really operating within the circle of competence. This is dangerous.

The concept is important because it allows bright people to utilize limited, really valuable insights in a very competitive world when they're fighting against other very bright, hardworking people.

Primary source: Warren Buffett

First Principles

The basic assumptions that can't be deduced any further in a specific field. Aristotle defined first principles as; the first basis from which a thing is known. It's the idea of breaking down complicated problems into its basic and only essential elements.

Primary source: Aristotle

Thought Experiment

An imaginary experiment used to solve difficult problems and their potential consequences. The concept was very effectively used by Einstein to discover the theory of relativity by imagining traveling on a beam of light.

Inversion

A thinking tool to get to the root of a problem by thinking of it in reverse. Carl Gustav Jacob Jacobi told his students that when looking for a research topic they should; invert, always invert.

Primary source: Carl Gustav Jacob Jacobi

The 5 Whys

Asking yourself 5 whys about a given subject is a great way to push yourself to find the truth and achieve rationality.

Primary source: Sakichi Toyoda

Occam's Razor

All else equal, Occam's razor is the idea of preferring the theory with the fewest assumptions. Also called the parsimony principle, it's a basic idea to all science and suggests to choose the simplest scientific explanation that fits the evidence. In terms of tree-building, this means that, *ceteris paribus*, the best hypothesis is the one that requires the fewest evolutionary changes.

Primary source: William of Ockham

Hanlon's Razor

Inspired by Occam's razor, it's a way of eliminating unlikely explanations for human behavior. Robert J. Hanlon said: Never attribute to malice that which can be adequately explained by stupidity.

Primary source: Robert J. Hanlon

Maslow's Hammer

If all you have is a hammer, everything looks like a nail. Also known as the law of the instrument. It's a law because an instrument can pretty much only be used in one way to fulfill its purpose of creation.

Primary source: Abraham Maslow

Divergent vs. Convergent Thinking

Divergent thinking is the process of thinking by exploring multiple possible solutions in order to generate creative ideas. Convergent thinking is the process of figuring out a concrete solution to any problem. The key is to strike a balance.

Primary source: Joy Paul Guilford

Chronological Snobbery

The argument or thinking that the stuff of earlier times is inferior to that of the present, simply due to societal progress.

As C.S. Lewis puts it: The assumption that whatever has gone out of date is on that account discredited. You must find why it went out of date. Was it ever refuted (and if so by whom, where, and how conclusively) or did it merely die away as fashions do? If the latter, this tells us nothing about its truth or falsehood. From seeing this, one passes to the realization that our own age is also 'a period,' and certainly has, like all periods, its own characteristic illusions.

Lewis made it a rule of thumb that one should read at least as many old books as new ones.

Primary source: C. S. Lewis; Owen Barfield

Weasel Words

The illusion that when someone wants to make it seem like they've given a clear answer to a question or made a direct statement when actually they've said something inconclusive or vague. Words like "better", "improved", "gains" do not say how much in terms of a complete argument.

Knightian Uncertainty

Economist Frank Knight argued that risk applies to situations where we don't know the outcome of a situation but can measure its probabilities. On the other hand, uncertainty applies to situations where we can't know all the information needed in order to set accurate probabilities in the first place.

Primary source: Frank Knight

Map-Territory Relation

The relationship between an object and a representation of that object is always abstract – like a map vs. the territory it represents. A person who has seen and heard descriptions of an apple, but has never tasted it, will not know how it tastes.

Primary source: Alfred Korzybski

All Models Are Wrong

Closely related to the map-territory relation, it's an aphorism in statistics commonly stating: All models are wrong, but some are useful. Attributed to statistician George Box, the thinking is considered applicable to all scientific models.

Primary source: George Box

Middle Ground Fallacy

The fallacy of compromising two opposing views to land on the middle ground just because it's the middle ground. For example, if one person says that all elephants can fly, another says that no elephants can fly, it's a fallacy to agree that perhaps some elephants can fly.

Eisenhower Matrix

Dwight Eisenhower, the 34th President of the United States, had to make tough decisions continuously about which of the many tasks he should focus on each day. And so he created the Eisenhower matrix to decide on and prioritize tasks by urgency and importance, sorting out less urgent and important tasks which he should either delegate or not do at all. He said: What is important is seldom urgent, and what is urgent is seldom important.

Primary source: Dwight Eisenhower

Systemics

The study of systems, how they work, how they are related to larger systems, and how they break down or are prone to bottlenecks. It's a disciplined approach for examining problems more completely.

Primary source: Mario Bunge

Lateral Thinking

First coined by Edward de Bono in 1967, it's a method of thinking across otherwise irreconcilable dialectical disciplines and then arriving at solutions that cannot be arrived at via deductive or logical means. We might call this "thinking outside the box".

Consider this: A man walks into a bar and asks the barman for a glass of water. The barman pulls out a gun and points it at the man. The man says "thank you" and walks out. Why?

The man had hiccups.

Primary source: Edward de Bono

Historical Wisdom

Studying the past intensely to understand the present and the future because the past makes up the vast majority of events. Scottish historian Niall Ferguson has said: The dead outnumber the living 14 to 1, and we ignore the accumulated experience of such a huge majority of mankind at our peril.

Paradigm Shift

When an important change occurs that replaces the usual way of thinking about or doing something.

Primary source: Thomas Kuhn

Abduction

A term related to both induction and deduction, where the researcher moves between theory and empiricism to gradually allow understanding to emerge.

Primary source: Thomas Kuhn

Chauffeur Knowledge

Charlie Munger explains in the story of Max Planck and his chauffeur: I frequently tell the apocryphal story about how Max Planck, after he won the Nobel Prize, went around Germany giving the same standard lecture on the new quantum mechanics.

Over time, his chauffeur memorized the lecture and said, "Would you mind, Professor Planck, because it's so boring to stay in our routine. [What if] I gave the lecture in Munich and you just sat in front wearing my chauffeur's hat?" Planck said, "Why not?" And the chauffeur got up and gave this long lecture on quantum mechanics. After which a physics professor stood up and asked a perfectly ghastly question. The speaker said, "Well I'm surprised that in an advanced city like Munich I get such an elementary question. I'm going to ask my chauffeur to reply.

Planck knowledge has paid the dues and gained the aptitude. Chauffeur knowledge just learned the talk.

Primary source: Charlie Munger

Pascal's Wager

Blaise Pascal's famous argument for believing in God. Pascal argued that it's always a better "bet" to believe in God because the expected value of the gain to be achieved by believing in God is always greater than the expected value in the case of unbelief.

On the question of God's existence, a third option is excluded (*tertium non datur*). There are only two options:

1. God exists
2. God does not exist

Thus, one will be forced to bet on one of the options:

1. If one bets that God exists, one would win everything if one is right and would lose nothing.
2. If one bets that God doesn't exist, nothing can be won, but one can lose everything.

Primary source: Blaise Pascal

Alder's Law

If something cannot be settled by experiment then it is not worthy of debate.

Mental Models in Systems.

Scale

As a system or an organization performs more and more of the same type of work, it will tend to acquire efficiencies over time, but it might also acquire inefficiencies – like bureaucracy. When scale turns into an advantage, it's due to positive feedback loops.

It's safe to conclude that scale advantages can create extremely durable economic moats, but it's also important to recognize that economies of scale don't necessarily create moats.

As other car producers closed the gap with Ford's level of productivity, Ford's scale advantage disappeared.

Pareto Principle

Also known as the 80/20 rule and as a form of power law, the Pareto principle states that, for many situations, roughly 80% of the situation's effects come from 20% of the causes. It was developed by Vilfredo Pareto who showed that approximately 80% of the land in Italy was owned by 20% of the population.

The principle can be applied in a wide range of areas such as manufacturing, management, human resources, and personal time management. However, though broadly applied, it does not apply to any scenario. Be careful with it.

Primary source: Vilfredo Pareto

Law of Diminishing Returns

In all productive processes, adding more of one factor of production will, *ceteris paribus*, at a certain point result in lower incremental per-unit returns. The law is existing because there are always constraints in the world. Too many cooks spoil the broth.

Algorithms

A way to solve a problem by way of termination. An algorithm consists of sets of rules to complete the task in a series of steps. An obvious example is a recipe.

Primary source: Muḥammad ibn Mūsā al-Khwārizmī

Margin of Safety

Warren Buffett has said on the margin of safety: You have to have the knowledge to enable you to make a very general estimate about the value of the underlying business. But you do not cut it close. That is what Ben Graham meant by having a margin of safety. You don't try to buy businesses worth \$83 million for \$80 million. You leave yourself an enormous margin. When you build a bridge, you insist it can carry 30,000 pounds, but you only drive 10,000-pound trucks across it. And that same principle works in investing. While useful in investing, the margin of safety is a methodological issue that is an incredibly useful concept in nearly any life endeavor.

Primary source: Benjamin Graham

Network Effects

If only one person is participating in a social network, that social network will have no value. Since network effects work in terms of returns to scale, the network's value is driven by the number of users coming into the network. Sometimes, that turns into a winner-take-all scenario.

Primary source: Theodore Vail

The Tipping Point

Popularized by Malcolm Gladwell, the tipping point is the point at which a product or trend goes viral – or turns into an epidemic. Gladwell introduces three variables that create the tipping point: the law of the few, the stickiness factor, and the power of context. A powerful mental model for how things gain traction in society.

Primary source: Malcolm Gladwell

Entropy

A measure of the number of possible arrangements the atoms in a system can have. In other words, it's a measure of uncertainty or randomness. Essentially, entropy is evident because of probability since there are only a limited set of ordered states in a system but an infinite amount of chaotic states.

Primary source: Rudolf Clausius

The Second Law of Thermodynamics

Directly related to entropy, the second law of thermodynamics states that the total entropy of an isolated system will inevitably increase over time and will only remain still if all processes in the system are reversible.

Imagine a bunch of balls bouncing around in a box in an initially ordered way as a pattern. Over time, the balls will inevitably bounce around more chaotically and the entropy of the system thus increases.

Primary source: Rudolf Clausius

Principle of Minimum Energy

As a restatement of the second law of thermodynamics, the principle of minimum energy states that for a closed system with fixed entropy, the total energy is minimized at equilibrium.

Feedback Loops

When the outcome of a system amplifies and reinforces the system itself in either positive or negative fashion. The output is rooted back as an input for the next stage. A great way to think about really difficult problems is to try and depict cause-and-effect relationships by connecting them in loops.

It's largely related to systems thinking. Systems thinking is not linear and it doesn't happen in a straight line — it happens in cycles, loops, contours.

Reflexivity

With George Soros as its primary proponent, reflexivity is a theory that feedback loops between expectations and economic fundamentals can cause price developments that substantially and persistently deviate from equilibrium prices. Soros's theory of reflexivity runs counter to the ideas of economic equilibrium, rational expectations, and the efficient market hypothesis.

Primary source: George Soros

Complex Adaptive Systems

An extremely important mental model in which a perfect understanding of the individual parts in a system does not automatically convey a perfect understanding of the system's behavior as a whole. Examples of complex adaptive systems include cities, large corporations, markets, governments, and so on.

Michael Mauboussin explains: If you examine the colony on the colony level, forgetting about the individual ants, it appears to have the characteristics of an organism. It's robust. It's adaptive. It has a life cycle. But the individual ant is working with local information and local interaction. It has no sense of the global system. And you can't understand the system by looking at the behavior of individual ants. That's the essence of a complex adaptive system—and the thing that's so vexing. Emergence disguises cause and effect. We don't really know what's going on.

Pari-Mutuel Systems

Betting systems in which all bets are placed in a collective pool and payoff odds are calculated by sharing the pool among all winning bets after house take. A common example is horse race betting.

Charlie Munger has said: The model I like—to sort of simplify the notion of what goes on in a market for common stocks—is the pari-mutuel system at the racetrack. If you stop to think about it, a pari-mutuel system is a market. Everybody goes there and bets and the odds change based on what's bet. That's what happens in the stock market.

Butterfly Effect

A phenomenon where a small change in an initial condition can have a huge effect in a future condition. The term comes from an analogy where a butterfly flaps its wings in Chicago and a tornado occurs in Tokyo.

The social impact of the butterfly effect theory is undeniable in today's inter-connected world. Butterfly effects make social systems fundamentally unpredictable.

Preferential Attachment

When what is popular or perceived as better grows even more than what is less popular. Network effects feed on preferential attachment.

Emergence

When the sum of something cannot be explained by simple additions of its components, e.g. when the sum is greater than the parts.

Irreducibility

When a system or object is incapable of being reduced, diminished, or simplified further.

Tragedy of the Commons

When a depletable resource is shared in a system where the individual users act in their own self-interest, it will tend to be depleted.

If fishing provides an income and no one is there to regulate the fishing pond, then each fishers would act according to their own interest and try to catch as many fish as possible even if all the other fishers are doing the same thing.

Primary source: William Forster Lloyd

Gresham's Law

A system named after financier Sir Thomas Gresham where "bad money drives out good". The law was originally based on how minted coins tended to decrease in terms of the amount of precious metals used in them.

Consider two coins with the same legal tender face value. One of them is made of silver and the other of copper. According to Gresham's law, individuals will hold onto the silver coins and use just the copper ones for payment.

The law is not only applicable to currencies. Avoid participating in systems where good behavior cannot win.

Primary source: Sir Thomas Gresham

Antifragility

Nassim Taleb, the originator of the term, said the following on antifragility: Some things benefit from shocks; they thrive and grow when exposed to volatility, randomness, disorder, and stressors and love adventure, risk, and uncertainty. Yet, in spite of the ubiquity of the phenomenon, there is no word for the exact opposite of fragile. Let us call it antifragile. Antifragility is beyond resilience or robustness. The resilient resists shocks and stays the same; the antifragile gets better.

Primary source: Nassim Taleb

Redundancy

The concept of backup systems in engineering. It involves duplication of critical components or functions of a system with the intention of increasing its reliability, or robustness. A suspension bridge's numerous cables are a form of redundancy.

Via Negativa

The action of improving a system by removing elements from it. The paradox of choice states that more options can lead to poorer decisions. Via negativa is the solution.

Warren Buffett's 5/25 rule is a method of via negativa: List 25 goals you want to achieve in the next ten years. Select the top five and ignore the remaining 20 at all costs.

Lindy Effect

The idea that non-perishable objects, ideas, or technologies are expected to live proportionally to their current age. If something has lived for X years, it can be expected to live for another X years. Because every additional period of survival implies a longer remaining life expectancy, expected mortality decreases with time.

Primary source: Albert Goldman

Bullwhip Effect

A chain reaction where an initial reaction to an expected outcome turns to bigger reactions later in the chain because of a lack of complete information about expectations earlier in that chain.

Primary source: Jay Forrester

Parkinson's Law

Work expands to fill the time available for its completion. It was first coined by Cyril Northcote Parkinson in a humorous essay for the Economist in 1955.

Primary source: Cyril Northcote Parkinson

Symmetry of Ignorance

When a problem is so difficult or impossible to solve that every participant attempting to solve it is basically shooting in the dark.

It's a notion suggested by Horst Rittel in a 1972 article in which he wrote: The expertise and ignorance is distributed over all participants in a wicked problem. There is a symmetry of ignorance among those who participate because nobody knows better by virtue of his degrees or his status. There are no experts (which is irritating for experts), and if experts there are, they are only experts in guiding the process of dealing with a wicked problem, but not for the subject matter of the problem.

Base Rates

The a priori probability of an activity about to be done, e.g. the success rate of everyone who's done what you're about to try.

System Justification Theory

People tolerate unjust and inefficient systems if their personal incentives are aligned to defend or maintain it. The theory was initially proposed by John T. Jost and Mahzarin R. Banaji in 1994.

Primary source: John T. Jost; Mahzarin R. Banaji

Sturgeon's Law

An adage cited as ninety percent of everything is crap. Quoted by science fiction author Theodore Sturgeon, it represents the belief that in general, the vast majority of the work that is produced in any given field is of low quality.

Primary source: Theodore Sturgeon

Ringelmann Effect

As a group increases its amount of members, individuals of that group tend to become increasingly less productive. It was named after French agricultural engineer Maximilien Ringelmann.

Consider a tug of war. As more people are involved in it, their average performance tends to decrease because each participant feels that their own effort is not critical.

Primary source: Maximilien Ringelmann

Planck's Principle

Max Planck said: A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it.

Primary source: Max Planck

Group Attribution Error

Falsely assuming that the views and decision outcomes of a collective group reflect the view of each member in that group.

Primary source: Scott T. Allison; David M. Messick

90-9-1 Rule

In a social media network, only 1 percent of users will actively create content; another 9 percent will participate by commenting, rating, or sharing the content; and the last 90 percent will watch, look and read without responding.

Braess's Paradox

An observation by German mathematician Dietrich Braess who noticed that adding a road to a particular congested road traffic network would make traffic worse due to an increase in shortcuts becoming popular and overcrowded.

Primary source: Dietrich Braess

Perfect Solution Fallacy

Also called the Nirvana fallacy, it's a false dichotomy suggesting that a perfect solution exists to a problem and that courses of action should be rejected if just a small part of the problem remains.

Primary source: Voltaire

Peter Principle

Employees rise in an organization through promotion until they end in a position in which they are incompetent. A principle developed by Laurence J. Peter.

Primary source: Laurence J. Peter

Foundational Species

Species that have a pillar role in supporting an ecosystem or community. Without the presence of these foundational species, many other species in the ecosystem couldn't sustain their existence. Coral is a foundational species in nature and the Federal Reserve is one in the world economy.

Primary source: Paul K. Dayton

Google Scholar Effect

Google Scholar's algorithm is an enhancer of preferential attachment since highly cited papers appear in top positions and gain more citations. Meanwhile, new papers hardly appear in top positions and therefore get less attention, regardless of their contribution to their fields.

Primary source: Paul K. Dayton

Rebound Effect

If a 5% improvement in car fuel efficiency results in only a 2% drop in fuel use, it means there is a 60% rebound effect. The 3% discrepancy might be explained by driving faster or further than before.

Murphy's Law

All that can happen, will happen.

Primary source: Edward Murphy

Campbell's Law

Social scientist Donald T. Campbell has said: The more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor. Quantitatively measuring the wrong stuff and, as a result, accidentally setting the wrong incentives is a very dangerous position to put oneself in because it's rarely noticed before the system collapses. Take Enron's accounting procedures. It's an example of the cobra effect.

Primary source: Donald T. Campbell

Path Dependence

In accordance with decision trees, history matters in terms of what options there are to decide on for the future. The set of decisions people face for any given circumstance is limited by the decisions they have made in the past. As explained through the tyranny of small decisions, path dependence might end up as an irreversible negative surprise if not properly applying second-order thinking.

Externality

When a third party is subject to the cost or benefit that it did not have any control over. Industry pollution is a negative externality that may affect the health of nearby residents. A positive externality might be an individual who maintains an attractive house that benefits the neighbors in the form of increased market values of their properties.

Primary source: Henry Sidgwick

Open vs. Closed Platform

An open platform, or system, is one in which its contents or functionalities are able to be altered in other ways than the original creator of the platform intended. On the other hand, a closed platform is one which is "off the rack" – the creator keeps control over its contents.

Moore's Law

The observation that the number of transistors on a microchip doubles roughly every two years while the cost of computers is halved. Experts agree that computers should reach the physical limits of Moore's Law at some point in the 2020s because the high temperature of transistors would make it impossible to make smaller circuits.

Gordon E. Moore said himself about the limits to the law: It can't continue forever. It is the nature of exponential functions. They eventually hit a wall.

Primary source: Gordon Moore

Metcalfe's Law

The value of a communication system grows proportionally to the square of the number of users of the system (N^2) – or, more precisely, with the rate: $N(N-1)$.

Metcalfe's law was originally formulated by Robert Metcalfe about Ethernet, but the law explains a number of network effects of technologies such as the Internet, the World Wide Web, and Microsoft Windows.

Primary source: Robert Metcalfe

Theory of Constraints

A philosophy of governance introduced by Dr. Eliyahu M. Goldratt which helps and leverages organizations to achieve their goals. The title comes from the assertion that any manageable system is limited to achieving several of its goals by a very small number of constraints and that there is always at least one constraint.

Primary source: Eliyahu M. Goldratt

Amara's Law

Technology is overestimated in the short run and underestimated in the long run.

Primary source: Roy Amara

Mental Models in the Biological World

Incentives

Contingent encouragers that motivate humans and animals to do certain actions. It's based on the idea that people do what is in their own best interest. It might be extraordinarily difficult to discourage a behavior if that behavior is incentivized, and it might be equally difficult to encourage a behavior if it's disincentivized.

Ecosystems

An ecosystem is used to describe a complete environment in nature with all living organisms and non-living elements.

The first basic principle of ecology is that every living organism has an ongoing and lasting relationship with every other element that is part of its environment. Therefore, it is crucial to see all ecological conditions as part of systems development.

Primary source: Arthur Tansley

Niches

In ecosystems, a participant of the system might flourish more in a niche to which it is adapted than it would any other way. Closely related to the circle of competence.

Evolution by Natural Selection

The process by which organisms change over time as a result of changes in heritable physical or behavioral traits – or what is called phenotype. Developed by Charles Darwin in 1859, the theory is one of the best-substantiated in the history of science, supported by evidence from a wide variety of scientific disciplines.

When Darwin worked on the theory, he was a relentless destroyer of his own ideas. He once said: To kill an error is as good a service as, and sometimes even better than, the establishing of a new truth or fact.

Primary source: Charles Darwin; Alfred Russel Wallace

Cooperation

When organisms, animals, or humans find a common good to work for, which is greater than the cooperators' individual selfish benefits, they tend to cooperate towards that common good.

Prisoner's Dilemma

Individual self-interest may not favor cooperation.

The prisoner's dilemma is a problem in which two individuals acting in their own self-interests do not create an optimal outcome. The typical dilemma is set up in such a way that both individuals choose to protect themselves at the expense of the other individual.

Primary source: Merrill Flood; Melvin Dresher

Adaptation

Changes in the structure, function, or behavior of living organisms act in increasing their adaptation to the environment.

Red Queen Effect

Species must continuously adapt and evolve to pass on genes to the next generation as well as to resist extinction when other opposing species are evolving. In the sequel to Alice's Adventures in Wonderland, the Red Queen said to Alice: Now, here you see, it takes all the running you can, to keep in the same place.

Primary source: Leigh Van Valen

Replication

The biochemical process of copying the DNA in a cell. It's a prerequisite for successful cell division since each daughter cell needs a complete set of DNA to function.

Hedonic Treadmill

People repeatedly return to their baseline level of happiness despite major positive or negative events or life changes. Expectations rise with results and the feeling of satisfaction is thus ever fleeting.

Primary source: Campbell Brickman

Self-Preservation

Pain and fear are integral parts of all living organisms, and self-preservation is the behavior that ensures their survival. Sigmund Freud proposed that self-preservation was one of two instincts that motivated human behavior, with the other being the sexual instinct. Later, he combined the two into eros.

It's interesting because self-preservation is not always in the heart. For instance, a mother might sacrifice her own life for her child.

Reward System

Also known as the pleasure center, organisms' reward center is made up of a group of neural structures that are responsible for incentive salience (the desire and craving for a reward), associative learning, and emotions such as joy, ecstasy, and euphoria. Sometimes, unhealthy addictions hijack our reward system if no discipline is exercised.

Exaptation

Evolution through natural selection allows traits that are originally meant for one purpose to enlist for a new main purpose.

Introduced by biologist Steven Jay Gould and Elisabeth Vrba, exaptation makes the point that a trait's current use does not necessarily explain its historical origin. Feathers are one example of a trait that has evolved through exaptation. First, they were meant for keeping warm or attracting mates. Later on, feathers became essential for modern birds' flight.

Primary source: Stephen Jay Gould; Elisabeth Vrba

Hormesis

Small doses of something can be good or beneficial for an individual but dangerous or deadly if applied at too large doses – e.g. alcohol or excessive exercise. It's when less is more.

Primary source: Hugo Schulz

Dunbar's Number

In the 1990s, anthropologist Robin Dunbar made a study on the correlation between primate brain size and average social group size. He found that it takes brainpower, specifically through the neocortex, to interact with other animals, to socialize and bond with them, and to remember past interactions. Dunbar then measured the human neocortex and estimated humans' ability to maintain social relationships, concluding that they can handle around 150 contacts.

Primary source: Robin Dunbar

Epidemic Models

Models used to study and predict epidemics of infectious diseases, with the most commonly known being the SIR model. In their simplest form, epidemic models assume that a disease has a given infection rate and a given removal rate. How the epidemic develops is always a function of these two factors.

While epidemic models are great at mostly explaining the spread of diseases in a biological setting, they are also great mental models for explaining how herd behavior can occur out of small inflections in various other domains. For example, using epidemic models to understand the transmission of attitude can be used to comprehend the feedback mechanisms that support speculative financial bubbles or religious/political propaganda.

Pollyanna Principle

It's easier to remember pleasant things than bad ones. Research indicates that the mind tends to focus on the optimistic at the subconscious level, while it tends to focus on the negative at the conscious level.

Declinism

The belief that society is heading towards a decline by putting a stronger emphasis on the negatives in accordance with the Pollyanna principle. One remembers the past as better than it was and expects the future to be worse than it will likely be.

Primary source: Edward Gibbon

Empathy Gap

Underestimating the way behavior is largely affected by one's mental state when an individual is not currently in that mental state. An individual currently feeling calm might find it difficult to predict how they will act if someone angers them.

Primary source: George Loewenstein

Meat Paradox

Socrates thought no one intentionally does anything morally wrong. However, individuals have the ability to adapt their attitude to action. For example, people care less about cows' well-being when they have just eaten beef jerky.

Primary source: George Loewenstein

Emotional Contagion

Empathy acts in transferring emotions from some individuals to others through observation. Happiness and misery love company.

Punctuated Equilibrium

Once species appear in the fossil record, they will become stable, showing little evolutionary change for most of their geological history.

Primary source: Niles Eldredge; Stephen Jay Gould

Luck Surface Area

Like emotional contagion, excitement and passion pull others into your orbit. Coined by Jason Roberts, he writes: The amount of serendipity that will occur in your life, your Luck Surface Area, is directly proportional to the degree to which you do something you're passionate about combined with the total number of people to whom this is effectively communicated. It's a simple concept, but an extremely powerful one because what it implies is that you can directly control the amount of luck you receive. In other words, you make your own luck.

Primary source: Jason Roberts

Tribalism

The division into or support for a tribe or tribes, especially policies characterized by tribal loyalty. In conformity, tribalism can refer to a way of thinking or behavior in which one is more loyal to one's tribe than to one's friends, one's country, or another social group.

Mental Models in the Physical World

Velocity

Velocity is a vector size that describes how far and in which direction something moves per unit of time. The size (length) of this vector is the scalar known as speed. Going one step forward and one step back shows no velocity but shows speed.

Relativity

The natural world allows no ruling frames of reference. When something is moving in a straight line at a constant speed with no acceleration, the laws of physics are the same for everyone. A man moving inside a train will not experience movement like an outside observer of the train would.

And because of matter, the faster you go, the heavier things become, and the more it will resist efforts to go faster. Albert Einstein proved that nothing that has a mass can ever reach the speed of light.

Primary source: Albert Einstein

Activation Energy

The energy needed to produce a certain reaction. The sparks that occur when steel is rubbed against flint provide the activation energy to initiate combustion in a Bunsen burner. The blue flame will sustain itself after the sparks have been extinguished because the continued combustion of the flame is now energetically favorable.

Primary source: Svante Arrhenius

Catalysts

A catalyst is a substance that increases the rate of a chemical reaction without itself being converted or consumed by the reaction. A catalyst is therefore involved in a reaction but is neither a reactant nor a product.

Leverage

Archimedes said: Give me a lever long enough and I shall move the world. Leverage is a very sensitive area since, depending on its application, its force might be incredibly powerful or incredibly devastating.

Read: [The Kelly Criterion Applied to Long-Term Value Investing](#)

Inertia

All things with a certain even rectilinear speed will continue to move in that direction until it is affected by an external force that causes it to either lose speed through negative acceleration (e.g. the braking effect in a car), increasing its speed through positive acceleration (e.g. giving a vehicle gas), or caused to change direction.

Consider a billiard ball that has just been pushed. Only when the ball strikes the band or another bullet does it change speed and direction under the influence of the force (reaction) that occurs at the encounter with the object it bumps into.

Primary source: Isaac Newton

Kinetics

A sub-area of technical mechanics that describes the change in movement quantities (location, speed, and acceleration) under the influence of forces and also takes into account the mass of the moving body. Kinematics, on the other hand, describes the movement of a body (location, speed, acceleration) without taking into account forces or masses.

Alloying

When a metal is combined with other substances, it can create a new metal with superior properties. The alloy may be stronger, harder, tougher, or more malleable than the original metal.

Viscosity

The inertia of a liquid, gas, or plasma – or its internal friction. Water is “thin” whereas honey is “thick”, which is why water has a lower viscosity than honey.

When measuring viscosity, the substances are divided into two groups: Newtonian and non-Newtonian fluids.

Newtonian fluids are homogeneous and viscosity is independent of how fast the liquid is stirred. Such fluids are defined by exact proportionality between the viscosity of the liquid and the tension it takes to make shifts in the liquid. Non-Newtonian fluids are heterogeneous and change viscosity as the rate of stirring changes. Rubbing resistance – or friction – is an expression of the force that pulls opposite of moving bodies and inhibiting movement.

Irreversibility

A concept arising frequently in thermodynamics, irreversibility means that the state of a system cannot be precisely restored to its initial state by infinitesimal changes in some property of the system without spending energy. Irreversible processes increase the entropy of the universe.

Primary source: Rudolf Clausius

Clark's Third Law

Any sufficiently advanced technology is indistinguishable from magic. And Clark's fourth law: For every expert, there is an equal and opposite expert.

Primary source: Arthur C. Clarke

Flywheel

A classic mechanical device that can retain kinetic energy in rotation over a shorter or longer period.

Another purpose of the flywheel is the gyroscope effect with an ability (tendency) of the rotating body to maintain a steady direction of its axis of rotation.

Primary source: James Watt

Half-Life

The time elapsed before an exponentially decreasing size is halved. The concept is mainly applied to decay processes that are exponential, e.g., radioactive decay, or approximately exponential such as biological decay.

Heisenberg Uncertainty Principle

Certain pairs of physical magnitudes cannot be determined with arbitrary accuracy. The more accurately one can measure the momentum (or velocity) of a particle, the less accurately one can know its position, and vice versa.

Primary source: Werner Heisenberg

Atomism

According to ancient atomism, the world is made up of countless small particles, atoms, separated by voids. Atoms differ in shape and size and cannot be perceived through senses. They constitute the basic substance of the world and are, as the name implies, indivisible. When atoms are combined in different formations, the physical objects that constitute the phenomena of the sensory world arise. From an initially unstructured state, the world evolves gradually as a result of the random movements of atoms. Any explanation is thus strictly mechanistic and materialistic.

Primary source: Leucippus

Autocatalysis

A chemical reaction in which an end product acts as a catalyst for the reaction. The continuous formation of this catalyst accelerates the reaction as long as sufficient starting materials are still available. It's a positive feedback loop.

Recursion

When something is defined in terms of itself. Recursion is used in a variety of disciplines, from linguistics to logic. The most common application is in mathematics and computer science, where a function is defined as applied to itself. Although this clearly defines an infinite number of instances (function values), it is often done in such a way that no loop or infinite chain of references can occur.

Electromagnetism

Electromagnetic force gives rise to most everyday phenomena, such as induction, friction, normal force (the force that prevents objects from flowing into each other), chemical reactions, and so on.

Primary source: Hans Christian Ørsted

Quantum Mechanics

A physical theory that describes the properties and laws of states and processes in matter. In contrast to the theories of classical physics, it allows the correct calculation of physical properties in the size of atoms and smaller.

Quantum mechanics forms the basis for describing the phenomena of atomic physics, solid-state physics, and nuclear and elementary particle physics, but also related sciences such as quantum chemistry.

Primary source: Werner Heisenberg

The Shannon-Hartley Law

A formula for calculating transmission capacity over any communication channel. The law provides the theoretical maximum that can be achieved with a hypothetical optimal channel coding, without providing information about which method can be used to achieve this optimum.

Primary source: Claude Shannon; Ralph Hartley

Mental Models in Military and War

Asymmetric War

A type of warfare in which two parties have different military capabilities or methods of war. In such a case, the weak party must take advantage of its special advantages or the opponent's weaknesses in order to have any opportunity to achieve its goals.

Attrition Warfare

A warfare where the warring parties are so strong that an end can only be reached through an extended and mutual depletion of each other's resources. The winner becomes the one with the largest reserves.

Two-Front War

Usually, parties prefer to fight on one front only since it makes it easier for them to concentrate on military efforts.

Another front usually arises when an ally intervenes in the war which means that both fronts will be weaker as it is more difficult to move forces from one front to another than moving them back and forth along a single front.

Choke Point

A small or narrow area that a larger number of soldiers cannot pass at the same time. They thus have a harder time attacking and can be more easily defeated by a less powerful enemy.

Counterinsurgency

As one of the more extensive areas of asymmetrical warfare, counterinsurgency describes various tactics and strategies used to combat armed insurgency. It's the blend of comprehensive civilian and military efforts designed to simultaneously contain insurgency and address its root causes.

Mutually Assured Destruction

A strategic doctrine originally formulated by Robert McNamara in response to the Cuban crisis of 1962. The doctrine implies that if one of two parties to a conflict uses its nuclear weapons, it results in the destruction of both parties. It is based on theories of terror balance, which argue that powerful weapons are essential in the effort to deter the enemy from using the same weapons. As a consequence of the doctrine, the warring parties had to point the weapons at the enemy's big cities.

Guerilla Warfare

Denotes an organized, armed struggle intended to influence or govern a state government. The states concerned will generally have an interest in classifying such movements as guerrilla movements. This implies that actions that are regarded as resistance struggles or freedom struggles on one side are regarded as armed rebellion and guerrilla movement on the other.

Fighting the Last War

The act of using strategies or tactics that worked successfully in the past, but are no longer useful.

Empty Fort Strategy

Contains elements of psychology and consists of convincing the opponent that an empty fortification is really full of hidden soldiers or traps which in turn induces the enemy to retreat.

Potemkin Village

A construction (literal or figurative) built solely to deceive others into thinking that a situation is better than it really is. It's named after the Russian prince Grigorij Potemkin who, before the emperor Catherine II's trip to Crimea in 1787, built theater decorations along her route depicting prosperous villages to give the impression that he had quickly achieved prosperity on the newly conquered peninsula.

Trojan Horse

A strategy in which a warring party is lured into letting in the enemy behind his defenses. Originally conceived by Odysseus.

Blitzkrieg

A strategy that is intended to prevent a conflict from escalating into total war and to achieve this through a rapid operational victory.

Primary source: Heinz Guderian

Decapitation

A massive strategic attack on the political and military leadership structures of the opponent with the intention of eliminating or at least significantly reducing its ability to counterattack.

Defeat in Detail

Bringing a large portion of one's own force to attack small enemy units in sequence, rather than engaging the bulk of the enemy force all at once.

Pincer Ambush

A strategy in which the opponent is enclosed by coordinated attacks around both flanks. If the military units carrying out the pincer ambush make contact with each other on the opposite side, the opponent is closed in and cannot retreat, but must strike out of the ring or get help from outside.

Shock and Awe

A strategy of using overwhelming power to try and achieve rapid dominance over the enemy.

Swarming

Use of a decentralized force against an opponent in a manner that emphasizes mobility, communication, unit autonomy, and coordination/synchronization.

Turning Movement

A strategy that allows an attacking force to reach the opposing rear guard by separating the defenders from their main defensive positions.

Win Without Fighting

Sun Tzu argued that a brilliant general was one that could win without killing anybody.

Defense in Depth

A strategy in which the defending side places its units so that they gradually absorb the strength of an attacking enemy.

Fortification

A semi-permanent or permanent defensive structure that gives physical protection to a military unit.

Fabian Strategy

A strategy that aims to avoid field battles and frontal attacks by wearing out the opponent instead, e.g. through disruptions in logistics or by affecting morale. Used by warring parties who have time on their side or when there is no other alternative.

Primary source: George Washington

Scorched Earth

A tactic that consists of destroying buildings, factories, fields, and the like during a retreat. The purpose is to prevent them from falling into the hands of the enemy and thus contributing to its resources.

Turtling

Continuous reinforcement of the military front until it has reached its full strength followed by an attack with the now-superior force.

Mental Models in Political Failure

Chilling Effect

The reluctance or unwillingness to exercise one's right due to fear of legal sanctions. A common example is that of free speech.

Primary source: John Milton

Third Rail of Politics

A metaphor for any subject so controversial that it is "untouchable" in the measure that any politician or public official who dares to approach the subject, invariably suffers politically.

Primary source: Kirk O'Donnell

Regulatory Capture

A form of political corruption that occurs when a government body, rather than acting in the interests of society, represents the commercial or special interests of a particular interest group (lobby) that dominates the industry or sector.

Primary source: George Stigler

State Capture

A type of systemic political corruption in which private interests significantly influence a state's decision-making processes to its advantage.

Shirky Principle

Institutions will try to preserve the problem to which they are the solution.

Primary source: Clay Shirky

Mental Models in Rule of Law

Burden of Proof

A party's obligation to present evidence of a claim in a conflict.

Common Law

Legal systems characterized by the fact that courts have legislative function in the sense that they have the opportunity not only to interpret law but also create it through precedents.

Precedents

Prior judgments, decisions, or rulings in a court of law used as a rule or guide in later cases or cases with similar circumstances.

Due Process

A procedural legal principle according to which everyone has the right to certain minimum guarantees, aimed at ensuring a fair and equitable result in the process.

Duty of Care

An obligation to pay certain attention and reasonable care required by law while performing any acts that could foreseeably harm others.

Good Faith

Also called bona fides, it denotes a party's excusable ignorance of a particular relationship. What matters in this context is an assessment of what a sensible person would have done in the same concrete situation.

Negligence

When something is caused by carelessness amongst specified circumstances.

Presumption of Innocence

The basic principle of criminal procedure that gives the person suspected of a crime the right to be regarded as innocent until the contrary has been proved. The principle is considered so important that many democracies have explicitly stated it in their laws or constitutions.

Reasonable Doubt

Evidence that is beyond reasonable doubt is the standard of evidence required to validate a criminal conviction in most prosecution systems.

Mental Models in other things

Return on investment

Return on investment is a powerful mental model for decision-making in real life. Here are some real-life examples of ROI in action. "**Should I make a financial investment?**" ROI calculations are a hallmark of actual investing. The objective of an investment is to secure a return; there's no point investing and risking your money unless there's a benefit.

Synergy and systems

Synergy is when a combination of companies, talents, or ideas creates **more value** than the sum of them alone.

Google's YouTube acquisition is a good example.

It gave YouTube enormous resources to deal with challenges. And Google a social platform as a new advertising channel.

The **synergy** between Google and YouTube didn't create value only for them. Today 2.6 billion people use it for entertainment or to learn anything they want. And millions of creators earn their living from YouTube.

Yin-yang effect

Yin-Yang celebrates duality. Opposites are needed to sustain and balance each other. Just like we need to balance risk and opportunity for innovation to thrive, a correct balance between different workspaces will help us become more productive and find the right work-life balance.

Iterative cycles

Iterative (agile) life cycles are composed of several iterations, which repeat one or more of the phases before proceeding to the next one. Iterative approaches can only proceed when user feedback is available to be used as the basis for initiating new cycles of development, refinement and improvement.

Feedback loop.

Feedback loops are typically used to accomplish regulation and control. A feedback loop is like an input, but its origin is from within the system itself, not from outside the system. In many systems, the output reenters the system as another input.

Galilean relativity

Galilean relativity, if Newton's laws are true in any reference frame, they are also true in any other frame moving at constant velocity with respect to the first one.

Pattern Interrupt

Originating from neuro-linguistic programming, pattern interrupt involves recognizing an unwanted pattern, disrupting it, and leading someone to the desired behavior.

Psychologists use pattern interrupts to break people out of unwanted or unconscious responses they've developed throughout a lifetime.

Loss Aversion

The pain of losing is twice as immense as the pleasure of gaining. We tend to avoid losses over earning gains. This can lead to an overly conservative portfolio that does not deliver the returns needed for an investor to achieve their financial goals.

Mean Reversion

Most things revert to the mean. In investing, this usually refers to profitability, growth & valuation. If an industry is high profitability, it'll start attracting competition. Unless there's an economic moat, excess profits will be competed away.

Economic Moat

A strong economic moat exists when there's a long-term competitive advantage. Moat protects a company's profitability and growth from competition. Examples:

- High switching costs
- Economies of scale
- Network effects
- Regulations
- Branding

Luck Skill Continuum

Unlike chess, investing is more like a game of poker. Success in investing is partially determined by luck. A good outcome may be the result of either a good or bad process. Evaluate your investments by your process, and less on outcomes.

The 5/25 Rule

List the 25 things you want to achieve.

Decide on the 5 most important ones from the list.

Now you have 5 goals that you'll focus on this year.

What will you do with the rest?

You'll **avoid them** at all costs until you achieve the 5 first. Because they are distractions that will stop you from achieving your priorities.

Lateral Thinking

Sometimes, logic becomes a burden to find the right solution to complex problems. Because it limits us to **logical constraints** before we discover all other possibilities. Lateral thinking forces you to break the barriers that limit your creativity. Like asking “*What would Napoleon do?*” to solve a business problem.

Compartmentalization

Napoleon’s secret to handling many complex topics with full attention. It’s not multitasking; it’s extreme **unitasking**. To use it, give your full attention to one single task (or project) every time. Never multitask.

Input Goals

Most of the goals you set are output goals, based on outcomes (becoming a millionaire or getting a six-pack). But the outcomes are never under your control. Focus on input goals to achieve your goals.

Information Arbitrage

Everybody has specific knowledge that they can leverage by trading it. Information Arbitrage is benefiting from the knowledge gap between you and others. Observe people, companies, and sectors to find where your skills are **more valuable**. As an example, Facebook/Google Ads knowledge is common for digital businesses. But many physical businesses lack this knowledge, which creates an information arbitrage **opportunity**.

Leverage

Leverage —as a concept— is getting the maximum output with the same input. Money, labor, code, and media are forms of leverage. You can write 300 words on a paper (low leverage) or on a blog (high leverage). If you publish it on a blog, millions of people can read it **without any additional effort** from you. So use it as a filter to amplify your impact. Simple example: If you keep receiving the same questions from your customers or followers; don’t answer them one by one. Either create a product or an FAQ

The Snowball Effect

The power of compounding. Money, effort, and knowledge compound in the long term in ways you cannot imagine. Many people don’t get the benefits from the snowball effect as they’re impatient and interrupt the snowball’s momentum.

Talent Stacking

Talent stacking is increasing your chances of success by becoming good at many skills, rather than trying to become the best at one. Because becoming the best at **one thing** is *almost* impossible. While becoming good at different skills is an easier way to extraordinary success. One example is Alexandra Botez. She is a good chess player, entertainer, and social media creator. But she is not the best at any of them.

Optionality

An *option* in life is having the right, but not the obligation, to perform an action.

And **optionality** is having many *options* to choose from.

But a good option should have **asymmetry** between its cost and potential benefit. The bigger the asymmetry is, the better the option.

So with optionality, the idea is to have more options with low cost, but unlimited upside.

As an example, writing online has more optionality than keeping a private journal. It has the same cost, but unlimited upside potential if people like what you write about.

Picasso's Bull

Hundreds of discarded ideas and prototypes allowed the Apple team to come up with the iPhone.

Thousands of iterations and paintings made Picasso one of the best painters of history.

Picasso's Bull shows us the **power of iteration**.

Whatever you'd like to achieve in life, the path to success is the same: *Quantity* brings **quality**.

The Pygmalion Effect

Pygmalion Effect is when higher expectations lead to better performance.

Because they affect others' actions toward you, hence your beliefs about yourself, and your actions toward others.

It's a **self-fulfilling prophecy**.

So have higher expectations from people around you, and make sure they are aware of your expectations.

Personal SWOT Analysis

SWOT Analysis is a tool that executives use to have situational awareness of their companies: strengths, weaknesses, opportunities, and threats.

Personal SWOT analysis makes you reflect on your life as you haven't done before.

It paints a picture of your current situation, so you can find the best path for yourself.

Control the Centre

Controlling 4 squares in the middle of the chess board has massive advantage, as the piece in the middle has maximum influence. High ground is important as this gives more reach, not necessarily exposing to more risks. Where is the centre of the board. What do I need to do to get pieces there so that they have maximum influence? This mental model gives you strategic thinking, and allows you to see where you should be focusing at any given moment.

The true value of Piece

All pieces in chess have different values. The true pieces worth is truly shown in the board dynamic. If you're struggling with the problem, like weight loss, then a question often asked is how should I solve this. The better question is who do I know to help me to solve this.

Position over submission

Whoever has more powerful army on chess this is winning. However, smaller army occupying better terrain, can hold off more powerful army. Like in Brazilian jiu-jitsu, the lower belt trying to submit you by trying quick submit, but the higher belts are trying to dominate position, before submitting. What does it mean to control the position here? don't just go for the ending move, first get the upper hand.

Owning The Initiative

Determining in chess who is dictating the action. Which player is acting and which player is reacting. Object in motion stays in motion. Get momentum (activation energy (high) --> maintenance energy (low))

The hardest move to Find (Tactical retreat).

Tactical retreat (sometimes the best move is to take a step back, sometimes the only way to move forward is to take a step back).

Swiss Army knife approach

You need to learn multiple things how to drive a car, like steering wheel, clutch, breaks etc. If you want to be successful in the world, you need to learn many different ideas. Few if the models carry most of the freight. Charles Munger stated: by the definition where you going to play with multiple techniques and multiple models, and the a lot of experience is very helpful. Be like a man with Swiss army knife, realised that different problems requires different tools and applies the best tool for given situation.

Anchoring: a cognitive bias where an individual relies too heavily on an initial piece of information—the “anchor”—when making decisions.

Backward chaining: working backward from your goal.

Classical conditioning: you've probably heard about Pavlov's dog. Classical conditioning is a learning method in which a biologically potent stimulus—such as food—is paired with a previously neutral stimulus—let's say a bell. The neutral stimulus comes to create a response (salivation) that is usually similar to the one created by the potent stimulus (in this case, food).

Commitment and consistency bias: the desire to be and appear consistent with what we have already done.

Common knowledge: knowledge that is known by everyone or nearly everyone, usually with reference to a particular community. Common knowledge doesn't necessarily mean truth, but most people will accept it as valid.

Comparative advantage: the ability to carry out a particular economic activity—such as making a specific product—more efficiently than another activity.

Diversification: the process of allocating your resources in a way that reduces the exposure to any one particular risk.

Economies of scale: the cost advantages that businesses obtain due to their scale of operation. The larger the scale, the smaller the cost per unit.

Efficient-market hypothesis: a theory that states that prices fully reflect all available information. The hypothesis implies that it should be impossible to consistently beat the market, since market prices should only react to new information.

Game theory: an umbrella term for the science of logical decision making in humans, animals, and computers.

Hyperbolic discounting: a model which states that, given two similar rewards, people show a preference for one that arrives sooner rather than later.

Illusion of control: the tendency for people to overestimate their ability to control events.

Incentive: something that motivates or encourages someone to do something.

Inversion principle: the process of looking at a problem backward. For example, instead of brainstorming forward ideas, imagine everything that could make your project go terribly wrong.

Loss aversion: people's tendency to prefer avoiding losses to acquiring equivalent gains. We are basically more upset about losing \$10 than we are happy about finding \$10

Margin of safety: in a business, how much sales level can fall before a company reaches its break-even point.

The sailboat metaphor: a dynamic model of human needs devised by Scott Barry Kaufman, such as physiological needs, safety needs, love and belonging, esteem, and self-actualisation.

Mechanical advantage: also called the *law of the lever*, it's a measure of how much your strength is amplified by using a tool or mechanical device.

Mere-exposure effect: a psychological phenomenon by which people tend to develop a preference for things merely because they are familiar with them.

Norm of reciprocity: the expectation that we repay in kind what another has done for us.

Normal distribution: a theory which states that averages of samples of observations of random variables become normally distributed when the number of observations is sufficiently large.

Operant conditioning: a learning process where the strength of a behaviour is modified by reinforcement or punishment.

Redundancy: the duplication of critical components of a system with the intention of increasing its reliability. For example, a backup or a fail-safe.

Scarcity: the limited availability of a commodity, which may be in demand in the market. Basically, when something is in short supply.

Signalling theory: the science of determining whether people with conflicting interests should be expected to provide honest signals rather than cheating.

Status quo bias: a preference for the current state of affairs, where the current baseline is taken as a reference point, and any change from that baseline is perceived as a loss.

Supply and demand: an economic model which postulates that, in a competitive market, the unit price for a particular good or service will vary until it settles at a point where the quantity demanded will equal the quantity supplied, resulting in an equilibrium for price and quantity transacted.

Surfing: the business principle of “riding the wave” of a new technology, product, or trend.

Survivorship bias: the logical error of concentrating on the people that made it past some selection process and overlooking those that did not, typically because of their lack of visibility. Happens a lot in entrepreneurship.

Tribalism: a way of thinking in which people are loyal to their social group above all else. Creating a detailed expansion for each mental model would be quite lengthy, but I can provide a brief explanation for each one:

1. **Occam's Razor:** This principle states that among competing hypotheses, the one with the fewest assumptions should be selected. In essence, it encourages simplicity and parsimony in explanations.
2. **Pareto Principle (80/20 Rule):** This principle suggests that roughly 80% of effects come from 20% of causes. It's commonly used to prioritize efforts, focusing on the most significant factors that yield the greatest results.
3. **Inversion:** Inversion involves solving problems by considering the opposite or reversing the problem statement. By thinking about what you want to avoid, you can often uncover solutions more effectively.
4. **First Principles Thinking:** This approach involves breaking down complex problems into fundamental truths or principles and then building solutions from the ground up. It encourages independent thinking and innovation.
5. **Circle of Competence:** This model suggests that individuals should focus on areas within their expertise or knowledge. By staying within their circle of competence, individuals can make better-informed decisions and avoid unnecessary risks.
6. **Confirmation Bias:** This cognitive bias refers to the tendency to seek out information that confirms existing beliefs or opinions while ignoring or dismissing contradictory evidence.
7. **Availability Heuristic:** This heuristic involves making judgments based on how easily relevant examples or instances come to mind. It can lead to biases in decision-making, as vivid or recent events may be overemphasized.

8. **Anchoring Bias:** Anchoring bias occurs when individuals rely too heavily on initial information (the "anchor") when making subsequent judgments or decisions, even if the anchor is irrelevant or misleading.
9. **Loss Aversion:** Loss aversion refers to the tendency for individuals to prefer avoiding losses over acquiring equivalent gains. It can influence decision-making by causing people to take risks to avoid losses.
10. **Sunk Cost Fallacy:** This fallacy occurs when individuals continue investing resources (time, money, etc.) into a project or endeavor simply because they've already invested heavily in it, despite diminishing returns or future costs outweighing benefits.

These are just brief explanations to get started. Each mental model has rich implications and applications across various contexts, so diving deeper into each one can yield valuable insights for decision-making and problem-solving.

11. Match Mental model or mental models to factors.

Evaluate each potential mental model against the identified factors of the problem or situation. Consider how well each mental model aligns with the complexities and nuances of the issue you're addressing. Some mental models may be more applicable to certain types of problems or contexts than other.

12. Using Mental Models to Stay Calm In Charged Situations.

When polarizing topics are discussed in meetings, passions can run high and cloud our judgment. Learn how mental models can help you see clearly from this real-life scenario.

Mental models can sometimes come off as an abstract concept. They are, however, actual tools you can use to navigate through challenging or confusing situations. In this article, we are going to apply our mental models to a common situation: a meeting with conflict. A recent meeting with the school gave us an opportunity to use our latticework. Anyone with school-age kids has dealt with the bureaucracy of a school system and the other parents who interact with it. Call it what you will, all school environments usually have some formal interface between parents and the school administration that is aimed at progressing issues and ideas of importance to the school community.

The particular meeting was an intense one. At issue was the school's communication around a potentially harmful leak in the heating system. Some parents felt the school had communicated reasonably about the problem and the potential consequences. Others felt their child's life had been put in danger due to potential exposure to mold and asbestos. Some parents felt the school could have done a better job of soliciting feedback from students about their experiences during the previous week, and others felt the school administration had done a poor job about communicating potential risks to parents. The first thing you'll notice if you're in a meeting like this is that emotions on all sides run high. After some discussion you might also notice a few more things, like how many people do the following:

- Confuse correlation with causation in determining why certain things happened
- Extrapolate from too small a sample size when providing "evidence" to prove their point
- Don't recognize hindsight bias when suggesting what should have been done
- Don't pay attention to base rates when assessing the severity of events
- Assume maliciousness on the part of decision-makers

Any of these occurrences, when you hear them via statements from people around the table, are a great indication that using a few mental models might improve the dynamics of the situation.

The first mental model that is invaluable in situations like this is Hanlon's Razor: don't attribute to maliciousness that which is more easily explained by incompetence. (Hanlon's Razor is one of the 9 general thinking concepts in The Great Mental Models Volume One.) When people feel victimized, they can get angry and lash out in an attempt to fight back against a perceived threat. When people feel accused of serious wrongdoing, they can get defensive and withhold information to protect themselves. Neither of these reactions is useful in a situation like this. Yes, sometimes people intentionally do bad things. But more often than not, bad things are the result of incompetence. In a school meeting situation, it's safe to assume everyone at the table has the best interests of the students at heart.

School staff and administrators usually go into teaching motivated by a deep love of education. They genuinely want their schools to be amazing places of learning, and they devote time and attention to improving the lives of their students.

It makes no sense to assume a school's administration would deliberately withhold harmful information. Yes, it could happen. But, in either case, you are going to obtain more valuable information if you assume poor decisions were the result of incompetence versus maliciousness.

When we feel people are malicious toward us, we instinctively become a negatively coiled spring, waiting for the right moment to take them down a notch or two. Removing malice from the equation, you give yourself emotional breathing room to work toward better solutions and apply more models.

The next helpful model is relativity, adapted from the laws of physics. This model is about remembering that everyone's perspective is different from yours. Understanding how others see the same situation can help you move toward a more meaningful dialogue with the people in the meeting. You can do this by looking around the room and asking yourself what is influencing people's approaches to the situation.

In our school meeting, we see some people are afraid for their child's health. Others are influenced by past dealings with the school administration. Authorities are worried about closing the school. Teachers are concerned about how missed time might impact their students' learning. Administrators are trying to balance the needs of parents with their responsibility to follow the necessary procedures. Some parents are stressed because they don't have care for their children when the school closes. There is a lot going on, and relativity gives us a lens to try to identify the dynamics impacting communication.

After understanding the different perspectives, it becomes easier to incorporate them into your thinking. You can diffuse conflict by identifying what it is you think you hear. Often, just the feeling of being heard will help people start to listen and engage more objectively. Now you can dive into some of the details. First up is probabilistic thinking. Before we worry about mold levels or sick children, let's try to identify the base rates. What is the mold content in the air outside? How many children are typically absent due to sickness at this time of year? Reminding people that severity has to be evaluated *against* something in a situation like this can really help diffuse stress and concern. If 10% of the student population is absent on any given day, and in the week leading up to these events 12% to 13% of the population was absent, then it turns out we are not actually dealing with a huge statistical anomaly.

Then you can evaluate the anecdotes with the model of the Law of Large Numbers in mind. Small sample sizes can be misleading. The larger your group for evaluation, the more relevant the conclusions. In a situation such as our school council meeting, small sample sizes only serve to ratchet up the emotion by implying they are the causal outcomes of recent events.

In reality, any one-off occurrence can often be explained in multiple ways. One or two children coming home with hives? There are a dozen reasonable explanations for that: allergies, dry skin, reaction to skin cream, symptom of an illness unrelated to the school environment, and so on. However, the more children that develop hives, the more it is statistically possible the cause relates to the only common denominator between all children: the school environment.

Even then, correlation does not equal causation. It might not be a recent leaky steam pipe; is it exam time? Are there other stressors in the culture? Other contaminants in the environment? The larger your sample size, the more likely you will obtain relevant information.

Finally, you can practice systems thinking and contribute to the discussion by identifying the other components in the system you are all dealing with. After all, a school council is just one part of a much larger system involving governments, school boards, legislators,

administrators, teachers, students, parents, and the community. When you put your meeting into the bigger context of the entire system, you can identify the feedback loops: Who is responding to what information, and how quickly does their behavior change? When you do this, you can start to suggest some possible steps and solutions to remedy the situation and improve interactions going forward.

How is the information flowing? How fast does it move? How much time does each recipient have to adjust before receiving more information? Chances are, you aren't going to know all this at the meeting. So you can ask questions. Does the principal have to get approval from the school board before sending out communications involving risk to students? Can teachers communicate directly with parents? What are the conditions for communicating possible risk? Will speculation increase the speed of a self-reinforcing feedback loop causing panic? What do parents need to know to make an informed decision about the welfare of their child? What does the school need to know to make an informed decision about the welfare of their students?

In meetings like the one described here, there is no doubt that communication is important. Using the meeting to discuss and debate ways of improving communication so that outcomes are generally better in the future is a valuable use of time.

A school meeting is one practical example of how having a latticework of mental models can be useful. Using mental models can help you diffuse some of the emotions that create an unproductive dynamic. They can also help you bring forward valuable, relevant information to assist the different parties in improving their decision-making process going forward.

At the very least, you will walk away from the meeting with a much better understanding of how the world works, and you will have gained some strategies you can implement in the future to leverage this knowledge instead of fighting against it.

- 13. Assess Suitability and Effectiveness:** Assess the suitability and effectiveness of each candidate mental model. Consider whether the mental model provides useful insights, helps simplify complexity, or offers actionable guidance. Additionally, think about whether the mental model aligns with your cognitive style and preferences.
- 14. Select the Most Appropriate Model:** Based on your assessment, choose the mental model that best fits the problem or situation you're facing. Keep in mind that you may need to adapt or combine multiple mental models to address different aspects of complex problems.
- 15. Apply and Evaluate:** Apply the selected mental model to analyze the problem or situation. Pay attention to the insights gained and the impact on your decision-making process. Afterward, evaluate the effectiveness of the chosen mental model in helping you achieve your objectives.
- 16. Iterate and Learn:** If the selected mental model doesn't yield the desired results, don't hesitate to iterate and try a different approach. Learning from your experiences will enhance your ability to select and apply mental models effectively in the future.

Step 77-Charles Munger Look at the world

Charles Munger, the Vice Chairman of Berkshire Hathaway and Warren Buffett's longtime business partner, is known for his multidisciplinary approach to decision-making and problem-solving. Munger has often emphasized the importance of mental models in achieving success in various endeavors. Let's explore some of the mental models Charles Munger has advocated for and their expansions:

1. **Elementary Worldly Wisdom:** Munger emphasizes the importance of cultivating a broad understanding of various disciplines, including psychology, economics, and physics. By acquiring a diverse toolkit of mental models from different fields, individuals can make more informed decisions and anticipate consequences across a wide range of situations.
2. **Inversion:** Munger frequently employs the principle of inversion, which involves considering the opposite of what you want to achieve. By identifying and avoiding potential pitfalls or obstacles, individuals can enhance their decision-making and problem-solving abilities. Inversion encourages a proactive approach to risk management and planning.
3. **Circle of Competence:** Munger stresses the importance of staying within one's circle of competence—the areas where one has expertise or deep understanding. By focusing on what you know and understand well, you can make more accurate judgments and avoid costly mistakes. Munger advises against venturing into unfamiliar territory without thorough research and understanding.

4. **Latticework of Mental Models:** Munger advocates for building a latticework of mental models—a network of interconnected concepts and principles from various disciplines. By integrating insights from diverse sources, individuals can develop a more robust framework for understanding complex systems and making sound decisions. This approach encourages continuous learning and synthesis of new ideas.
5. **Psychology and Human Behavior:** Munger emphasizes the importance of understanding human psychology and behavior in decision-making. He acknowledges the role of cognitive biases, such as confirmation bias and overconfidence, in shaping our judgments and actions. By being aware of these biases, individuals can mitigate their effects and make more rational choices.
6. **Incentives and Disincentives:** Munger recognizes the power of incentives and disincentives in shaping human behavior and organizational dynamics. He advocates for aligning incentives with desired outcomes to encourage positive behavior and discourage undesirable actions. Understanding the underlying motivations of individuals and stakeholders is essential for designing effective incentive structures.
7. **Margin of Safety:** Munger stresses the importance of incorporating a margin of safety—a buffer or cushion—into decision-making processes. Whether investing in stocks or making business decisions, having a margin of safety provides protection against unforeseen risks and uncertainties. It allows individuals to withstand adverse conditions and capitalize on opportunities that may arise.
8. **Multidisciplinary Thinking:** Munger encourages multidisciplinary thinking—the ability to draw insights from various disciplines and apply them to different contexts. By embracing diverse perspectives and approaches, individuals can uncover innovative solutions and gain a competitive edge.

Multidisciplinary thinking fosters creativity, adaptability, and resilience in the face of complexity.

9. **Long-Term Perspective:** Munger advocates for adopting a long-term perspective in decision-making and investing. Instead of focusing solely on short-term gains, he emphasizes the importance of considering the enduring value and sustainability of investments and initiatives. Taking a long-term view encourages patience, discipline, and strategic thinking.
10. **Continuous Learning and Adaptation:** Munger underscores the value of continuous learning and adaptation in an ever-changing world. He encourages individuals to embrace intellectual curiosity, humility, and a willingness to update their beliefs in light of new evidence. By remaining open-minded and flexible, individuals can stay ahead of the curve and thrive in dynamic environments.

Step Multidisciplinary, Interdisciplinary, transdisciplinary

Applying a latticework of mental models involves integrating various mental models into your thinking and decision-making processes. Here's how you can do it:

1. **Familiarize Yourself with Mental Models:** Start by learning about different mental models from various disciplines such as psychology, economics, biology, and physics. Understand the underlying principles and how they can be applied to different situations.
2. **Identify Relevant Mental Models:** Consider the specific challenges or decisions you're facing and identify which mental models might be most relevant. For example, if you're trying to understand a complex problem, systems thinking or probabilistic thinking might be useful.
3. **Analyze from Multiple Perspectives:** Instead of relying on a single mental model, analyze situations from multiple perspectives by applying different mental models. This helps you gain a more comprehensive understanding and uncover insights that might not be apparent from a single viewpoint.
4. **Synthesize Insights:** Look for patterns, connections, and relationships between different mental models. Synthesize insights from various models to develop a more nuanced understanding of the problem or situation at hand.
5. **Test and Validate Assumptions:** Use mental models to test and validate assumptions underlying your thinking or decisions. Challenge your beliefs and consider alternative explanations or scenarios.
6. **Apply Mental Models Holistically:** Integrate mental models into your decision-making process holistically rather than applying them in isolation. Consider how different models interact and complement each other to inform your actions.

7. **Practice Mental Model Flexibility:** Be flexible in your application of mental models and adapt them to different contexts or situations. What works in one scenario may not work in another, so be open to adjusting your approach accordingly.
8. **Reflect and Learn:** After applying mental models, reflect on the outcomes and lessons learned. Consider how effective the models were in helping you understand and address the problem, and identify opportunities for improvement.
9. **Continuous Learning and Iteration:** Cultivate a mindset of continuous learning and iteration by constantly seeking new mental models, refining your understanding, and updating your thinking based on new insights and experiences.
10. **Share and Collaborate:** Share your knowledge of mental models with others and collaborate with them to apply them in various contexts. Engaging in discussions and exchanging perspectives can enrich your understanding and enhance your ability to apply mental models effectively.

By following these steps, you can build a robust latticework of mental models that enables you to approach problems and make decisions with greater clarity, depth, and effectiveness.

Applying multidisciplinary thinking involves integrating knowledge and perspectives from multiple disciplines to solve complex problems and generate innovative solutions. Here's a step-by-step guide:

1. **Identify the Problem or Challenge:** Clearly define the problem or challenge you're facing. Break it down into its component parts and consider the various factors contributing to it.
2. **Gather Information from Different Disciplines:** Research and gather information from diverse disciplines that are relevant to the problem or challenge. This may include fields such as psychology, economics, biology, sociology, engineering, and more.
3. **Understand Core Concepts and Principles:** Develop a basic understanding of the core concepts and principles from each discipline. This will help you identify key insights and connections between different areas of knowledge.

4. **Analyze Interconnections and Interdependencies:** Explore how concepts and principles from different disciplines intersect and influence each other in relation to the problem or challenge at hand. Look for patterns, relationships, and potential causal mechanisms.
5. **Synthesize Insights and Perspectives:** Integrate insights and perspectives from multiple disciplines to develop a holistic understanding of the problem or challenge. Consider how different factors interact and contribute to the overall complexity of the situation.
6. **Identify Opportunities for Innovation:** Use multidisciplinary thinking to identify new opportunities for innovation and creative problem-solving. Look for unconventional approaches or solutions that leverage insights from different disciplines.
7. **Evaluate Risks and Trade-offs:** Assess the potential risks and trade-offs associated with different approaches or solutions. Consider the implications from various perspectives, including ethical, social, economic, and environmental considerations.
8. **Develop and Test Solutions:** Generate potential solutions based on your multidisciplinary analysis and insights. Test these solutions through experimentation, prototyping, or simulation to evaluate their feasibility and effectiveness.
9. **Iterate and Refine:** Iterate on your solutions based on feedback and new information. Continuously refine your approach by incorporating insights from ongoing learning and reflection.
10. **Communicate and Collaborate:** Communicate your findings and recommendations effectively to stakeholders from diverse backgrounds. Collaborate with experts from different disciplines to leverage their expertise and perspectives in refining and implementing solutions.
11. **Reflect and Learn:** Reflect on your multidisciplinary thinking process and outcomes. Identify lessons learned and areas for improvement to enhance your ability to apply this approach in future challenges.

By following these steps, you can leverage the power of multidisciplinary thinking to tackle complex problems, drive innovation, and create value in various domains.

Sure, let's break down each approach and provide comprehensive steps for applying them:

Multidisciplinarity:

1. **Identify the Problem:** Clearly define the problem or topic you want to address, considering its complexity and potential intersection with multiple disciplines.
2. **Identify Relevant Disciplines:** Determine which disciplines are likely to provide valuable insights or perspectives on the problem. This may involve fields such as psychology, economics, biology, sociology, etc.
3. **Engage Experts from Different Disciplines:** Collaborate with experts from the identified disciplines to gather diverse perspectives and insights. Encourage open communication and knowledge-sharing among team members.
4. **Analyze Insights from Each Discipline:** Analyze the contributions from each discipline to identify common themes, patterns, or contradictions. Look for opportunities to integrate different perspectives into a cohesive understanding of the problem.
5. **Synthesize Findings:** Synthesize the insights and findings from each discipline to develop a comprehensive understanding of the problem. Identify connections, interdependencies, and potential solutions that emerge from the multidisciplinary analysis.
6. **Develop Solutions or Recommendations:** Based on the synthesized findings, develop solutions or recommendations that leverage insights from multiple disciplines. Consider the feasibility, effectiveness, and ethical implications of proposed solutions.
7. **Communicate and Collaborate:** Communicate the multidisciplinary findings and recommendations effectively to stakeholders, policymakers, or relevant audiences. Collaborate with stakeholders to refine and implement solutions in a collaborative manner.

Interdisciplinarity:

1. **Define the Research Question or Problem:** Clearly articulate the research question or problem that requires an interdisciplinary approach. Ensure that it involves aspects that cannot be adequately addressed within a single discipline.
2. **Identify Relevant Disciplines and Perspectives:** Identify the disciplines and perspectives that are necessary to address the research

question comprehensively. This may involve conducting a literature review or consulting with experts from different fields.

3. **Establish a Collaborative Team:** Assemble a collaborative team of researchers or experts from the identified disciplines. Ensure diversity in expertise, backgrounds, and perspectives within the team.
4. **Integrate Disciplinary Insights:** Facilitate open dialogue and knowledge exchange among team members to integrate insights from different disciplines. Encourage interdisciplinary collaboration and brainstorming sessions to generate novel ideas and approaches.
5. **Develop an Integrative Framework or Model:** Develop an integrative framework or model that synthesizes insights from the various disciplines involved. This framework should provide a holistic understanding of the research question and guide subsequent analysis and interpretation.
6. **Collect and Analyze Data:** Collect data from relevant sources using interdisciplinary methods and approaches. Analyze the data using appropriate techniques that account for the complexity and diversity of disciplinary perspectives.
7. **Interpret Findings and Draw Conclusions:** Interpret the findings within the context of the integrative framework, considering the interactions and interdependencies between different factors. Draw conclusions that reflect the multidimensional nature of the research question.
8. **Communicate Results:** Communicate the interdisciplinary findings and implications effectively to academic audiences, practitioners, policymakers, or other stakeholders. Use clear and accessible language to convey complex ideas and facilitate understanding across disciplinary boundaries.

Transdisciplinarity:

1. **Identify a Complex Social or Environmental Issue:** Select a complex social or environmental issue that transcends disciplinary boundaries and requires collaboration between academia, practitioners, and stakeholders.
2. **Form a Transdisciplinary Team:** Form a transdisciplinary team comprising researchers, practitioners, policymakers, and

representatives from affected communities or stakeholders. Ensure diverse perspectives, expertise, and experiences within the team.

3. **Define Shared Goals and Objectives:** Establish shared goals and objectives that reflect the common interests and aspirations of all stakeholders involved. Foster a shared sense of purpose and commitment to addressing the issue collaboratively.
4. **Engage in Reflexive Dialogue and Knowledge Integration:** Facilitate reflexive dialogue and knowledge integration among team members to explore diverse perspectives, assumptions, and values. Emphasize mutual learning and co-production of knowledge throughout the process.
5. **Co-design and Co-implement Interventions:** Co-design and co-implement interventions or strategies that address the root causes of the issue and promote sustainable solutions. Involve stakeholders in decision-making and action planning to ensure relevance and ownership.
6. **Monitor and Evaluate Impact:** Continuously monitor and evaluate the impact of interventions on the issue and the broader system. Use participatory and adaptive evaluation approaches to engage stakeholders in ongoing learning and improvement.
7. **Reflect and Adapt:** Reflect on the transdisciplinary process and outcomes to identify lessons learned and areas for improvement. Adapt the approach and strategies based on feedback and evolving understanding of the issue and context.
8. **Share Insights and Lessons Learned:** Share insights, best practices, and lessons learned from the transdisciplinary process with other stakeholders, organizations, and communities. Contribute to collective learning and capacity-building efforts to address similar issues in different contexts.

By following these comprehensive steps, you can effectively apply multidisciplinary, interdisciplinarity, and transdisciplinarity to tackle complex problems and promote sustainable solutions that integrate diverse perspectives and expertise.

Certainly! Integrating mental models into multidisciplinary, interdisciplinary, and transdisciplinary approaches can enhance problem-solving, decision-making, and knowledge integration across disciplines. Here are comprehensive steps for each approach:

Multidisciplinary with Mental Models:

1. **Identify the Problem:** Define the problem or topic requiring a multidisciplinary approach, considering its complexity and potential intersections with various disciplines.
2. **Select Relevant Mental Models:** Identify relevant mental models that can provide insights into different aspects of the problem. Choose models from psychology, economics, sociology, biology, etc., based on their applicability.
3. **Engage Experts from Different Disciplines:** Collaborate with experts from relevant disciplines and introduce them to the selected mental models. Facilitate discussions to explore how these models can inform their understanding of the problem.
4. **Analyze Insights Using Mental Models:** Encourage experts to apply the selected mental models to analyze different aspects of the problem. Help them identify patterns, relationships, and potential solutions based on their interdisciplinary analysis.
5. **Synthesize Findings with Mental Models:** Synthesize the insights and findings from each discipline using the selected mental models. Look for common themes, connections, or contradictions that emerge across disciplines.
6. **Develop Solutions Integrating Mental Models:** Based on the synthesized findings, develop solutions or recommendations that integrate insights from multiple disciplines and mental models. Consider how different models can complement each other to address the problem comprehensively.
7. **Communicate and Collaborate with Stakeholders:** Communicate the multidisciplinary findings and solutions effectively to stakeholders, policymakers, or relevant audiences. Emphasize the role of mental models in enhancing interdisciplinary understanding and problem-solving.

Interdisciplinarity with Mental Models:

1. **Define the Research Question or Problem:** Articulate a research question or problem that requires an interdisciplinary approach and is amenable to mental model analysis.
2. **Identify Relevant Disciplines and Mental Models:** Identify disciplines and associated mental models that can provide valuable insights into different aspects of the research question. Choose models that offer complementary perspectives and methodologies.
3. **Establish a Collaborative Team:** Form a collaborative team of researchers or experts from the identified disciplines, ensuring diversity in expertise and familiarity with mental models. Facilitate team discussions to introduce and integrate mental models into the research process.
4. **Integrate Mental Models into Data Collection and Analysis:** Incorporate mental models into the data collection and analysis process, using them as frameworks for interpreting and synthesizing interdisciplinary data. Encourage team members to apply their respective mental models to generate insights.
5. **Develop an Integrative Framework with Mental Models:** Develop an integrative framework that incorporates insights from different disciplines and mental models. Use the framework to guide the analysis and interpretation of research findings.
6. **Interpret Findings Using Mental Models:** Interpret the research findings within the context of the integrative framework and associated mental models. Explore how different models illuminate different aspects of the research question and contribute to a comprehensive understanding.
7. **Communicate Results Highlighting Mental Model Integration:** Communicate the interdisciplinary findings and implications to academic audiences, practitioners, or stakeholders, emphasizing the role of mental models in facilitating interdisciplinary collaboration and knowledge integration.

Transdisciplinarity with Mental Models:

1. **Identify a Complex Issue Requiring Transdisciplinary Collaboration:** Select a complex social or environmental issue that transcends disciplinary boundaries and can benefit from a transdisciplinary approach informed by mental models.

2. **Form a Transdisciplinary Team with Mental Model Expertise:** Assemble a transdisciplinary team comprising researchers, practitioners, and stakeholders with expertise in relevant disciplines and mental models. Foster a shared understanding of the issue and the potential contributions of mental models to its analysis.
3. **Define Shared Goals and Objectives Incorporating Mental Models:** Establish shared goals and objectives that reflect the collective vision of the transdisciplinary team, integrating insights from relevant mental models. Use the goals to guide collaborative research and problem-solving efforts.
4. **Engage in Reflexive Dialogue and Knowledge Integration with Mental Models:** Facilitate reflexive dialogue and knowledge integration among team members, incorporating mental models as tools for exploring diverse perspectives, assumptions, and values. Encourage mutual learning and co-production of knowledge.
5. **Co-design and Co-implement Interventions Informed by Mental Models:** Co-design and co-implement interventions or strategies informed by insights from relevant mental models. Involve stakeholders in decision-making and action planning, drawing on interdisciplinary and transdisciplinary expertise.
6. **Monitor and Evaluate Impact Using Mental Models:** Continuously monitor and evaluate the impact of interventions on the complex issue and the broader system, using mental models to guide the assessment of outcomes and feedback mechanisms. Adapt interventions as needed based on insights gained.
7. **Reflect and Adapt the Transdisciplinary Approach with Mental Models:** Reflect on the transdisciplinary process and outcomes, considering the role of mental models in facilitating collaboration and knowledge integration. Adapt the approach and strategies based on feedback and evolving understanding of the issue.

By following these steps and integrating relevant mental models into multidisciplinary, interdisciplinary, and transdisciplinary approaches, researchers and practitioners can enhance their ability to address complex problems and generate holistic solutions that draw on diverse perspectives and insights.

Certainly! Integrating mental models into multidisciplinary, interdisciplinary, and transdisciplinary approaches can enhance problem-solving, decision-

making, and knowledge integration across disciplines. Here are comprehensive steps for each approach:

Multidisciplinary with Mental Models:

1. **Identify the Problem:** Define the problem or topic requiring a multidisciplinary approach, considering its complexity and potential intersections with various disciplines.
2. **Select Relevant Mental Models:** Identify relevant mental models that can provide insights into different aspects of the problem. Choose models from psychology, economics, sociology, biology, etc., based on their applicability.
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4. **Analyze Insights Using Mental Models:** Encourage experts to apply the selected mental models to analyze different aspects of the problem. Help them identify patterns, relationships, and potential solutions based on their interdisciplinary analysis.
5. **Synthesize Findings with Mental Models:** Synthesize the insights and findings from each discipline using the selected mental models. Look for common themes, connections, or contradictions that emerge across disciplines.
6. **Develop Solutions Integrating Mental Models:** Based on the synthesized findings, develop solutions or recommendations that integrate insights from multiple disciplines and mental models. Consider how different models can complement each other to address the problem comprehensively.
7. **Communicate and Collaborate with Stakeholders:** Communicate the multidisciplinary findings and solutions effectively to stakeholders, policymakers, or relevant audiences. Emphasize the role of mental models in enhancing interdisciplinary understanding and problem-solving.

Interdisciplinarity with Mental Models:

1. **Define the Research Question or Problem:** Articulate a research question or problem that requires an interdisciplinary approach and is amenable to mental model analysis.
2. **Identify Relevant Disciplines and Mental Models:** Identify disciplines and associated mental models that can provide valuable insights into different aspects of the research question. Choose models that offer complementary perspectives and methodologies.
3. **Establish a Collaborative Team:** Form a collaborative team of researchers or experts from the identified disciplines, ensuring diversity in expertise and familiarity with mental models. Facilitate team discussions to introduce and integrate mental models into the research process.
4. **Integrate Mental Models into Data Collection and Analysis:** Incorporate mental models into the data collection and analysis process, using them as frameworks for interpreting and synthesizing interdisciplinary data. Encourage team members to apply their respective mental models to generate insights.
5. **Develop an Integrative Framework with Mental Models:** Develop an integrative framework that incorporates insights from different disciplines and mental models. Use the framework to guide the analysis and interpretation of research findings.
6. **Interpret Findings Using Mental Models:** Interpret the research findings within the context of the integrative framework and associated mental models. Explore how different models illuminate different aspects of the research question and contribute to a comprehensive understanding.
7. **Communicate Results Highlighting Mental Model Integration:** Communicate the interdisciplinary findings and implications to academic audiences, practitioners, or stakeholders, emphasizing the role of mental models in facilitating interdisciplinary collaboration and knowledge integration.

Transdisciplinarity with Mental Models:

1. **Identify a Complex Issue Requiring Transdisciplinary Collaboration:** Select a complex social or environmental issue that transcends disciplinary boundaries and can benefit from a transdisciplinary approach informed by mental models.
2. **Form a Transdisciplinary Team with Mental Model Expertise:** Assemble a transdisciplinary team comprising researchers, practitioners, and stakeholders with expertise in relevant disciplines and mental models. Foster a shared understanding of the issue and the potential contributions of mental models to its analysis.
3. **Define Shared Goals and Objectives Incorporating Mental Models:** Establish shared goals and objectives that reflect the collective vision of the transdisciplinary team, integrating insights from relevant mental models. Use the goals to guide collaborative research and problem-solving efforts.
4. **Engage in Reflexive Dialogue and Knowledge Integration with Mental Models:** Facilitate reflexive dialogue and knowledge integration among team members, incorporating mental models as tools for exploring diverse perspectives, assumptions, and values. Encourage mutual learning and co-production of knowledge.
5. **Co-design and Co-implement Interventions Informed by Mental Models:** Co-design and co-implement interventions or strategies informed by insights from relevant mental models. Involve stakeholders in decision-making and action planning, drawing on interdisciplinary and transdisciplinary expertise.
6. **Monitor and Evaluate Impact Using Mental Models:** Continuously monitor and evaluate the impact of interventions on the complex issue and the broader system, using mental models to guide the assessment of outcomes and feedback mechanisms. Adapt interventions as needed based on insights gained.
7. **Reflect and Adapt the Transdisciplinary Approach with Mental Models:** Reflect on the transdisciplinary process and outcomes, considering the role of mental models in facilitating collaboration and knowledge integration. Adapt the approach and strategies based on feedback and evolving understanding of the issue.

By following these steps and integrating relevant mental models into multidisciplinary, interdisciplinary, and transdisciplinary approaches, researchers and practitioners can enhance their ability to address complex

problems and generate holistic solutions that draw on diverse perspectives and insights.

Certainly! Let's break down each approach and provide comprehensive steps for thinking in a multidisciplinary, interdisciplinary, and transdisciplinary manner:

Multidisciplinary Thinking:

1. **Identify the Problem or Topic:** Clearly define the problem or topic that requires a multidisciplinary approach. Consider its complexity and the potential contributions of various disciplines.
2. **Identify Relevant Disciplines:** Determine which disciplines are relevant to the problem or topic. Consider fields such as psychology, economics, biology, sociology, etc., that may offer valuable insights.
3. **Understand Core Concepts and Perspectives:** Develop a basic understanding of the core concepts, theories, and methodologies used in each relevant discipline. Consider how they approach the problem from different perspectives.
4. **Analyze Insights from Different Disciplines:** Analyze the insights and perspectives offered by each discipline. Look for commonalities, differences, and potential synergies that can inform a comprehensive understanding of the problem.
5. **Integrate Perspectives and Synthesize Findings:** Integrate the perspectives and findings from different disciplines to develop a holistic understanding of the problem. Synthesize the diverse insights into a cohesive framework or analysis.
6. **Evaluate Implications and Generate Solutions:** Consider the implications of the multidisciplinary analysis and generate potential solutions or approaches to address the problem. Evaluate the feasibility, effectiveness, and ethical considerations of each option.
7. **Communicate Across Disciplines:** Effectively communicate the multidisciplinary findings and proposed solutions to stakeholders, policymakers, or relevant audiences. Use clear and accessible language to bridge disciplinary boundaries and foster understanding.

Interdisciplinary Thinking:

1. **Define the Research Question or Problem:** Clearly articulate a research question or problem that requires an interdisciplinary approach. Ensure that it involves aspects that cannot be adequately addressed within a single discipline.
2. **Identify Relevant Disciplines and Perspectives:** Identify the disciplines and perspectives that are necessary to address the research question comprehensively. Consider fields such as psychology, sociology, economics, biology, etc.
3. **Understand Interconnections and Interdependencies:** Explore how concepts, theories, and methodologies from different disciplines intersect and influence each other in relation to the research question. Identify areas of overlap and potential gaps in understanding.
4. **Facilitate Collaboration and Knowledge Exchange:** Foster collaboration and knowledge exchange among experts from different disciplines. Create opportunities for interdisciplinary dialogue, brainstorming, and problem-solving.
5. **Integrate Disciplinary Insights and Synthesize Findings:** Integrate the insights and findings from different disciplines into a cohesive analysis or framework. Synthesize the diverse perspectives to develop a nuanced understanding of the research question.
6. **Generate Innovative Solutions and Approaches:** Draw on the interdisciplinary analysis to generate innovative solutions or approaches to address the research question. Consider how different perspectives can complement each other and lead to novel insights.
7. **Communicate Across Disciplines and Stakeholders:** Communicate the interdisciplinary findings and proposed solutions effectively to academic audiences, practitioners, policymakers, or other stakeholders. Use interdisciplinary language and approaches to foster collaboration and engagement.

Transdisciplinary Thinking:

1. **Identify a Complex Issue Requiring Transdisciplinary Collaboration:** Select a complex social, environmental, or technological issue that transcends disciplinary boundaries and requires collaboration between academia, practitioners, and stakeholders.
2. **Engage Stakeholders and Define Shared Goals:** Engage stakeholders from diverse backgrounds in defining shared goals and objectives for addressing the complex issue. Foster a collaborative and inclusive approach to problem-solving.
3. **Facilitate Reflexive Dialogue and Knowledge Integration:** Facilitate reflexive dialogue and knowledge integration among stakeholders, researchers, and practitioners. Encourage open exchange of ideas, perspectives, and experiences to build mutual understanding and trust.
4. **Co-create and Co-implement Interventions:** Co-create and co-implement interventions or strategies that address the root causes of the complex issue. Involve stakeholders in all stages of the process, from problem definition to evaluation and adaptation.
5. **Monitor and Evaluate Impact:** Continuously monitor and evaluate the impact of interventions on the complex issue and the broader system. Use participatory and adaptive evaluation approaches to engage stakeholders in ongoing learning and improvement.
6. **Reflect and Adapt the Transdisciplinary Approach:** Reflect on the transdisciplinary process and outcomes to identify lessons learned and areas for improvement. Adapt the approach and strategies based on feedback and evolving understanding of the issue and context.
7. **Share Insights and Lessons Learned:** Share insights, best practices, and lessons learned from the transdisciplinary process with other stakeholders, organizations, and communities. Contribute to collective learning and capacity-building efforts to address similar issues in different contexts.

By following these comprehensive steps and embracing multidisciplinary, interdisciplinary, and transdisciplinary thinking, individuals and teams can enhance their ability to tackle complex problems and generate innovative solutions that draw on diverse perspectives, expertise, and approaches.

Certainly! Let's break down each approach and provide comprehensive steps for applying logic in multidisciplinary, interdisciplinarity, and transdisciplinarity:

Multidisciplinary Logic:

1. **Identify the Problem or Topic:** Clearly define the problem or topic that requires a multidisciplinary approach. Consider its complexity and the potential intersections with various disciplines.
2. **Identify Relevant Disciplines:** Determine which disciplines are relevant to the problem or topic. Consider fields such as psychology, economics, biology, sociology, etc., that may offer valuable insights.
3. **Understand Core Concepts and Perspectives:** Develop a basic understanding of the core concepts, theories, and methodologies used in each relevant discipline. Consider how they approach the problem from different perspectives.
4. **Analyze Insights from Different Disciplines:** Apply logical reasoning to analyze the insights and perspectives offered by each discipline. Evaluate the validity and reliability of the information and identify any potential biases or assumptions.
5. **Integrate Perspectives and Synthesize Findings:** Use logical reasoning to integrate the perspectives and findings from different disciplines. Look for commonalities, differences, and potential synergies that can inform a comprehensive understanding of the problem.
6. **Evaluate Implications and Generate Solutions:** Apply logical reasoning to evaluate the implications of the multidisciplinary analysis and generate potential solutions or approaches to address the problem. Consider the feasibility, effectiveness, and ethical considerations of each option.
7. **Communicate Across Disciplines:** Effectively communicate the multidisciplinary findings and proposed solutions to stakeholders, policymakers, or relevant audiences. Use clear and logical arguments to bridge disciplinary boundaries and foster understanding.

Interdisciplinarity Logic:

1. **Define the Research Question or Problem:** Clearly articulate a research question or problem that requires an interdisciplinary approach. Ensure that it involves aspects that cannot be adequately addressed within a single discipline.
2. **Identify Relevant Disciplines and Perspectives:** Identify the disciplines and perspectives that are necessary to address the research question comprehensively. Consider fields such as psychology, sociology, economics, biology, etc.
3. **Understand Interconnections and Interdependencies:** Apply logical reasoning to explore how concepts, theories, and methodologies from different disciplines intersect and influence each other in relation to the research question. Identify areas of overlap and potential gaps in understanding.
4. **Facilitate Collaboration and Knowledge Exchange:** Use logical reasoning to foster collaboration and knowledge exchange among experts from different disciplines. Create opportunities for interdisciplinary dialogue, brainstorming, and problem-solving.
5. **Integrate Disciplinary Insights and Synthesize Findings:** Apply logical reasoning to integrate the insights and findings from different disciplines into a cohesive analysis or framework. Synthesize the diverse perspectives to develop a nuanced understanding of the research question.
6. **Generate Innovative Solutions and Approaches:** Apply logical reasoning to generate innovative solutions or approaches to address the research question. Consider how different perspectives can complement each other and lead to novel insights.
7. **Communicate Across Disciplines and Stakeholders:** Use logical arguments to communicate the interdisciplinary findings and proposed solutions effectively to academic audiences, practitioners, policymakers, or other stakeholders. Foster interdisciplinary understanding and collaboration.

Transdisciplinarity Logic:

1. **Identify a Complex Issue Requiring Transdisciplinary Collaboration:** Select a complex social, environmental, or technological issue that transcends disciplinary boundaries and requires collaboration between academia, practitioners, and stakeholders.
2. **Engage Stakeholders and Define Shared Goals:** Use logical reasoning to engage stakeholders from diverse backgrounds in defining shared goals and objectives for addressing the complex issue. Foster a collaborative and inclusive approach to problem-solving.
3. **Facilitate Reflexive Dialogue and Knowledge Integration:** Apply logical reasoning to facilitate reflexive dialogue and knowledge integration among stakeholders, researchers, and practitioners. Encourage open exchange of ideas, perspectives, and experiences.
4. **Co-create and Co-implement Interventions:** Use logical reasoning to co-create and co-implement interventions or strategies that address the root causes of the complex issue. Involve stakeholders in all stages of the process, from problem definition to evaluation and adaptation.
5. **Monitor and Evaluate Impact:** Apply logical reasoning to continuously monitor and evaluate the impact of interventions on the complex issue and the broader system. Use participatory and adaptive evaluation approaches to engage stakeholders in ongoing learning and improvement.
6. **Reflect and Adapt the Transdisciplinary Approach:** Use logical reasoning to reflect on the transdisciplinary process and outcomes, identifying lessons learned and areas for improvement. Adapt the approach and strategies based on feedback and evolving understanding of the issue and context.
7. **Share Insights and Lessons Learned:** Use logical arguments to share insights, best practices, and lessons learned from the transdisciplinary process with other stakeholders, organizations, and communities. Contribute to collective learning and capacity-building efforts.

By applying logical reasoning in multidisciplinary, interdisciplinarity, and transdisciplinarity, individuals and teams can enhance their ability to tackle complex problems and generate innovative solutions that draw on diverse perspectives, expertise, and approaches.

Step 77 - Understand How the World Really Works

Understanding how the world really works is a complex and multifaceted endeavor, but here are some key aspects to consider:

1. **Power Dynamics:** Much of the world operates based on power structures, whether they are political, economic, or social. Those who hold power often shape the direction of global events and policies.
2. **Economics:** Money and resources play a significant role in shaping the world. Economic systems, such as capitalism and socialism, influence how wealth is distributed and how societies function.
3. **Politics:** Governments, international organizations, and diplomatic relations all impact global affairs. Understanding geopolitics involves analyzing the interactions between different countries and regions.
4. **Technology:** Advancements in technology continually reshape the world, affecting everything from communication and commerce to warfare and healthcare.
5. **Culture:** Cultural beliefs, norms, and values influence individual and collective behavior. Cultural factors shape how societies operate and interact with one another.
6. **Environment:** The natural world has a profound impact on human societies, and human activities, in turn, affect the environment. Climate change, resource depletion, and environmental degradation are significant global challenges.
7. **History:** The past influences the present, and understanding historical events and patterns can provide insights into current affairs and future trends.
8. **Globalization:** The interconnectedness of economies, cultures, and societies across the world has led to increased interdependence and complex interactions.
9. **Human Behavior:** Psychology and sociology offer valuable insights into individual and group behavior, helping to understand why people act in certain ways and how societies function.
10. **Conflict and Cooperation:** Conflicts over resources, ideology, and power are prevalent in global affairs, but cooperation and diplomacy also play crucial roles in addressing common challenges.

These factors interact in intricate ways, shaping the world we live in and influencing the course of events on local, national, and global scales. Understanding how the world really works requires considering these factors holistically and recognizing their interconnectedness.

Certainly! Here's a step-by-step guide on how to understand how the world really works and how to apply mental models to navigate its complexity:

1. **Study Various Disciplines:** Begin by studying different disciplines such as economics, political science, sociology, psychology, history, and environmental science. Each discipline offers unique perspectives and insights into different aspects of the world.
2. **Develop Critical Thinking Skills:** Cultivate critical thinking skills to evaluate information critically, question assumptions, and analyze complex problems. Learn to distinguish between reliable sources and misinformation.
3. **Learn about Mental Models:** Mental models are frameworks for understanding the world. Study different mental models such as Occam's Razor, Bayesian Thinking, Second-Order Thinking, and Inversion. Each model provides a lens through which to view and interpret information.
4. **Apply Mental Models:** Practice applying mental models to real-world situations. When faced with a problem or decision, consider which mental model might be most applicable and use it to guide your thinking.
5. **Seek Diverse Perspectives:** Engage with diverse perspectives and viewpoints to broaden your understanding of the world. Listen to people with different backgrounds, experiences, and beliefs to gain new insights and challenge your own assumptions.
6. **Stay Informed:** Stay informed about current events and global trends. Follow reputable news sources and seek out in-depth analysis to understand the context behind the headlines.
7. **Connect the Dots:** Look for connections between different events, trends, and phenomena. Consider how seemingly unrelated factors might be interconnected and influencing one another.
8. **Think Systematically:** Adopt a systemic approach to understanding the world. Recognize that systems are composed of interconnected parts, and changes in one part can have ripple effects throughout the system.
9. **Practice Scenario Planning:** Anticipate different possible outcomes and scenarios based on your understanding of the world. Consider how different factors might interact to shape future events and prepare accordingly.
10. **Reflect and Iterate:** Continuously reflect on your understanding of the world and refine your mental models based on new information and experiences. Be open to updating your beliefs and adapting your thinking as you learn more.

By following these steps and applying mental models to your understanding of the world, you can develop a more nuanced and informed perspective on global affairs and better navigate its complexity.

Certainly! Here's a step-by-step guide on how to apply mental models to navigate the complexities of the world and integrate your understanding of how the world really works:

1. **Understand Mental Models:** Begin by familiarizing yourself with various mental models that offer frameworks for understanding and analyzing complex situations. Some common mental models include Occam's Razor, Pareto Principle, Second-Order Thinking, and Inversion.
2. **Identify Relevant Mental Models:** Assess the situation or problem you're facing and determine which mental models might be most applicable. Consider factors such as the nature of the problem, the stakeholders involved, and the desired outcomes.
3. **Analyze the Situation:** Break down the situation into its component parts and gather relevant information. Consider the various factors at play, including economic, political, social, and environmental aspects.
4. **Apply Mental Models:** Choose one or more mental models that seem relevant to the situation and apply them to gain insights. For example, if you're analyzing a decision, you might use Second-Order Thinking to consider the potential consequences beyond the immediate effects.
5. **Consider Interconnections:** Recognize that the world is interconnected, and different factors often influence one another. Use mental models to explore the interconnections between various aspects of the situation and identify potential leverage points or areas of intervention.
6. **Evaluate Options:** Use the insights gained from applying mental models to evaluate different options or courses of action. Consider the potential risks, benefits, trade-offs, and unintended consequences associated with each option.
7. **Make Informed Decisions:** Use your analysis and evaluation to make informed decisions that are aligned with your goals and values. Consider how your decisions may impact different stakeholders and anticipate potential reactions or responses.
8. **Monitor and Adapt:** Continuously monitor the situation and be prepared to adapt your approach as new information becomes available. Use mental models to reassess the situation and identify opportunities for improvement or course correction.
9. **Seek Feedback and Learning:** Solicit feedback from others and be open to learning from both successes and failures. Reflect on your experiences and consider how you can refine your application of mental models in future situations.
10. **Integrate Learning with Understanding of the World:** Connect your application of mental models with your broader understanding of how the world really works. Recognize the contextual factors that shape the situation and consider how larger social, economic, political, and environmental dynamics may influence outcomes.
11. **Share Insights and Collaborate:** Share your insights and perspectives with others, and collaborate with individuals who have complementary skills and knowledge. By combining diverse perspectives and expertise, you can generate more robust analyses and solutions. By following these steps, you can effectively apply mental models to navigate the complexities of the world and integrate your understanding of how the world really works into your decision-making and problem-solving processes.

0A. All Models Are Wrong

How is your journey towards understanding Farnam Street's latticework of mental models going? Is it proving useful? Changing your view of the world? If the answer is that it's going well that's good. There's just one tiny hitch.

All models are wrong.

Yep. It's the truth. However, there is another part to that statement:

All models are wrong; some are useful.

Those words come from the British statistician, George Box. In a groundbreaking 1976 paper, Box revealed the fallacy of our desire to categorize and organize the world. We create models (a term with many applications), once to confuse them for reality.

Box also stated:

Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful.

What Exactly Is A Model?

First, we should understand precisely what a model is.

The dictionary definition states a model is 'a representation, generally in miniature, to show the construction or appearance of something' or 'a simplified description, especially a mathematical one, of a system or process, to assist calculations and predictions.'

For our purposes here, we are better served by the second definition. A model is a simplification which fosters understanding.

Think of an architectural model. These are typically a small scale model of a building, made before it's built. Its purpose is to show what the building will look like and to help people working on the project to develop a clear picture of the overall feel. In the iconic scene from Zoolander, Derek (played by Ben Stiller) looks at the architectural model of his proposed 'school for kids who can't read good' and shouts "What is this? A center for ants??"

That scene illustrates the wrong way to understand models: Too literally.

Why We Use Models- And Why They Work

At Farnam Street, we believe in using models for the purpose of building a massive, but finite amount of fundamental, invariant knowledge about how the world really works.

Applying this knowledge is the key to making good decisions and avoiding stupidity.

"Scientists generally agree that no theory is 100 percent correct. Thus, the real test of knowledge is not truth, but utility. Science gives us power. The more useful that power, the better the science."

— Yuval Noah Harari

Time-tested models allow us to understand how things work in the real world. And understanding how things work prepares us to make better decisions without expending too much mental energy in the process.

Instead of relying on fickle and specialized facts, we can learn versatile concepts.

The mental models we cover are intended to be widely applicable.

It's crucial for us to understand as many mental models as possible. As the adage goes, a little knowledge can be dangerous and creates more problems than total ignorance. No single model is universally applicable – we find exceptions for nearly everything. Even hardcore physics has not been totally solved.

"The basic trouble, you see, is that people think that "right" and "wrong" are absolute; that everything that isn't perfectly and completely right is totally and equally wrong."

— Isaac Asimov

Take a look at almost any comment section on the internet and you are guaranteed to find at least one pedant raging about a minor perceived inaccuracy, throwing out the good with

the bad. While ignorance and misinformation are certainly not laudable, neither is an obsession with perfection.

Like heuristics, models work as a consequence of the fact they are usually helpful in most situations, not because they are always helpful in a small number of situations.

Models can assist us in making predictions and forecasting the future. Forecasts are never guaranteed, yet they provide us with a degree of preparedness and comprehension of the future. For example, a weather forecast which claims it will rain today may get that wrong. Still, it's correct often enough to enable us to plan appropriately and bring an umbrella.

Mental Models and Minimum Viable Products

Think of mental models as minimum viable products.

Sure, all of them can be improved. But the only way that can happen is if we try them out, educate ourselves and collectively refine them.

We can apply one of our mental models, Occam's razor, to this. Occam's razor states that the simplest solution is usually correct. In the same way, our simplest mental models tend to be the most useful. This is because there is minimal room for errors and misapplication. *"The world doesn't have the luxury of waiting for complete answers before it takes action."*

— Daniel Gilbert

Your kitchen knives are not as sharp as they could be. Does that matter as long as they still cut vegetables? Your bed is not as comfortable as it could be. Does that matter if you can still get a good night's sleep in it? Your internet is not as fast as it could be. Does that matter as long as you can load this article? Arguably not. Our world runs on the functional, not the perfect. This is what a mental model is – a functional tool. A tool which maybe could be a bit sharper or easier to use, but still does the job.

The statistician David Hand made the following statement in 2014;

In general, when building statistical models, we must not forget that the aim is to understand something about the real world. Or predict, choose an action, make a decision, summarize evidence, and so on, but always about the real world, not an abstract mathematical world: our models are not the reality.

For example, in 1960, Georg Rasch said the following:

When you construct a model you leave out all the details which you, with the knowledge at your disposal, consider inessential.... Models should not be true, but it is important that they are applicable, and whether they are applicable for any given purpose must, of course, be investigated. This also means that a model is never accepted finally, only on trial.

Imagine a world where physics like precision is prized over usefulness.

We would lack medical care because a medicine or procedure can never be perfect. In a world like this, we would possess little scientific knowledge, because research can never be 100% accurate. We would have no art because a work can never be completed. We would have no technology because there are always little flaws which can be ironed out.

"A model is a simplification or approximation of reality and hence will not reflect all of reality ... While a model can never be "truth," a model might be ranked from very useful, to useful, to somewhat useful to, finally, essentially useless."

— Ken Burnham and David Anderson

In short, we would have nothing. Everything around us is imperfect and uncertain. Some things are more imperfect than others, but issues are always there. Over time, incremental improvements happen through unending experimentation and research.

The Map is Not the Territory

As we know, the map is not the territory. A map can be seen as a symbol or index of a place, not an icon.

When we look at a map of Paris, we know it is a representation of the actual city. There are bound to be flaws; streets which have been renamed, demolished buildings, perhaps a new Metro line. Even so, the map will help us find our way. It is far more useful to have a map showing the way from Notre Dame to Gare du Nord (a tool) than to know how many meters they are apart (a piece of trivia.)

Someone who has spent a lot of time studying a map will be able to use it with greater ease, just like a mental model. Someone who lives in Paris will find the map easier to understand than a tourist, just as someone who uses a mental model in their day to day life will apply it better than a novice. As long as there are no major errors, we can consider the map useful, even if it is by no means a reflection of reality. Gregory Bateson writes in Steps to an Ecology of Mind that the purpose of a map is not to be true, but to have a structure which represents truth within the current context.

“A map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness.”

— Alfred Korzybski

Physical maps generally become more accurate as time passes. Not long ago, they often included countries which didn't exist, omitted some which did, portrayed the world as flat or fudged distances. Nowadays, our maps have come a long way.

The same goes for mental models – they are always evolving, being revised – never really achieving perfection. Certainly, over time, the best models are revised only slightly, but we must never consider our knowledge “set”.

Another factor to consider in using models is to take into account what they're used for. Many mental models (e.g. entropy, critical mass and activation energy) are based upon scientific and mathematical concepts. A person who works in those areas will obviously need a deeper understanding of it than someone who want to learn to think better when making investment decisions. They will need a different map and a more detailed one showing elements which the rest of us have no need for.

“A model which took account of all the variation of reality would be of no more use than a map at the scale of one to one.”

— Joan Robinson

In his essay *Partial Enchantments of the Quixote*, Jorge Luis Borges provides an even more interesting analysis of the confusion between models and reality:

Let us imagine that a portion of the soil of England has been leveled off perfectly and that on it a cartographer traces a map of England. The job is perfect; there is no detail of the soil of England, no matter how minute that is not registered on the map; everything has there its correspondence. This map, in such a case, should contain a map of the map, which should contain a map of the map of the map, and so on to infinity. Why does it disturb us that the map be included in the map and the thousand and one nights in the book of the Thousand and One Nights? Why does it disturb us that Don Quixote be a reader of the Quixote and Hamlet a spectator of Hamlet? I believe I have found the reason: these inversions suggest that if the characters of a fictional work can be readers or spectators, we, its readers or spectators, can be fictions.

How Do We Know If A Model Is Useful?

This is a tricky question to answer. When looking at any model, it is helpful to ask some of the following questions:

- How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile.

Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.

- Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
- Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
- How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
- Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
- Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to require extensive knowledge of a particular topic, and have minimal real-world application.

When using any mental model, we must avoid becoming too rigid. There are exceptions to all of them, and situations in which they are not applicable.

Think of the latticework as a toolkit. That's why it pays to do the work up front to put so many of them in your toolbox at a deep, deep level. If you only have one or two, you're likely to attempt to use them in places that don't make sense. If you've absorbed them only lightly, you will not be able to use them when the time is at hand.

If on the other hand, you have a toolbox full of them and they're sunk in deep, you're more likely to pull out the best ones for the job exactly when they are needed.

Too many people are caught up wasting time on physics-like precision in areas of practical life that do not have such precision available. A better approach is to ask "Is it useful?" and, if yes, "To what extent?"

Mental models are a way of thinking about the world that prepares us to make good decisions in the first place.

0B. Mental Models (Use mental models).

1. Three Ways You're Wrong in a Disagreement (Even if You're Right)

Kathryn Schulz, the illuminating author of Being Wrong: Adventures in the Margin of Error, gave an excellent talk at TED talk on being wrong.

There is a moment in her talk when she summarizes what we do when someone disagrees with us that is worth pondering.

... The first thing we usually do when someone disagrees with us is that we just assume they are ignorant. You know, they don't have access to the same information we do and when we generously share that information with them, they are going to see the light and come on over to our team.

When that doesn't work. When it turns out those people have all the same information and they still don't agree with us we move onto a second assumption. They're idiots. They have all the right pieces of the puzzle and they are too moronic to put them together.

And when that doesn't work. When it turns out that people have all the same facts that we do and they are pretty smart we move onto a third assumption. They know the truth and they are deliberately distorting it for their own malevolent purposes.

So this is a catastrophe: our attachment to our own rightness. It prevents us from preventing mistakes when we need to and causes us to treat each other terribly.

And this is what it's like to come face to face with someone that disagrees with us.

That point isn't really whether we're right and they're wrong or they're right and we're wrong — often neither of us are perfectly correct. The point is how our ego subconsciously works to protect itself from anyone and anything that doesn't entirely agree with us.

Rather than open ourselves up to how the world works, we instead put on blinders that tell us we don't need to consider the possibility that the only thing wrong is that we think the other person is wrong and not ourselves.

2. This is a World of Incentives

I thought Warren Buffett said a lot of interesting things in his recent interview with Charlie Rose.

Here are some of the bits that stood out for me.

Fairness:

BUFFETT: ...I also think fairness is important and I think getting rid of promises that you can't keep is important. I don't think we should cut spending dramatically now. I don't think that what I'm talking about on taxes solves the — the deficit gap at all. But I think fairness is important. I think having a sensible long-term plan is important to explain and I think having it be believable is terribly important because people don't believe these out year things generally with Congress. They see too much of what's happened.

The deficit as stimulus

BUFFETT: The deficit is our stimulus. You can — you can say a bridge someplace is part of that act, you can say cutting taxes is part of it as was the case in our stimulus act. But the stimulus is the government pouring more money out than it's taking in. And we have a — a stimulus going on that's 10 percent of GDP which we haven't seen since World War II. So we have a huge stimulus going on. Nobody wants to call it a stimulus because that's gotten to be a dirty word. But we have a big stimulus. So we do — in my view, whether we have a 10 percent of GDP deficit —

ROSE: Right.

BUFFETT: — which is a huge stimulus or a 12 percent or eight percent it doesn't make much difference. I — I think that we pushed monetary policy to a level, we've pushed fiscal policy to the limit but fortunately the most important thing in terms of this country ever coming out of recessions has been the natural workings of capitalism and I think you've seen that for the last couple of years.

Following through

BUFFETT: What our leaders were saying to us then, the key players are saying we'll do whatever it takes. And I believed it. I knew they had the power to do whatever it took and I believed they would do it.

Now, the problem about government now is that if they come out and get on the Sunday talks shows and say "I'll do whatever it takes", you know, people don't believe them. And I mean, they — they — they've got to see action and — and here they see something like the raising the deficit limit used as a hostage for something of vital importance to the United States. And if you — you can use it as a hostage in terms of spending, you can use it as a hostage on funding on education or anything else. I mean, it isn't limited about it; if you've got something that comes up like it.

Incentives

BUFFETT: But I just use it to illustrate that this is a world of incentives and we work on incentives in every way. If we work on education, in business, every other place. And what I try to think of the incentives to get somebody who comes up for re-election in a year to do something where the policy cycle goes out five years or ten years, how do you do it when the policy cycle exceeds the electoral cycle? You've got to make sure the electoral cycle is in the equation.

3. Alignment: The Key to Success Nobody Ever Taught You

I spend a lot of time thinking about this simple idea: The person who aligns themselves with the general principles of the world goes further and faster than the person who doesn't.

What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.

— Joseph Tussman

The way to align yourself with the world is to take simple ideas seriously.

Consider compounding.

We know that spending less than we make, investing the difference in index funds, and waiting for a long time creates financial independence. Yet how many people follow this principle? Not many. Most of us know what works but fail to align ourselves with it.

Compounding applies to relationships too. Not just with your partner, but with your colleagues, friends, and even your customers. For relationships to compound, they must be win-win. But how many people take a consistent win-win approach? Not many. Again, we know what works, but fail to align ourselves with it.

Outcome over Ego

Here's the trick to seeing things differently: put your energy into *being* right, not *feeling* right. While that sounds simple, it's far from easy.

If you want to be right, you have to change your mind. When the evidence indicates the approach isn't working, change the approach. This is easy with something like math, where the answers are black and white, but harder with more subjective things.

Often the hardest things to change our minds about are the things that require us to understand that just because we can't see the results immediately doesn't mean they are not moving us closer or further from the outcome we want. For instance, eating a full pizza once won't make you unhealthy, but repeating that choice daily for years certainly will.

Feeling right, on the other hand, often requires you to believe you are an exception. You know the path to financial independence, but that takes too long. It's boring. Instead, you'd rather try the latest incarnation of a get-rich-quicker scheme that promises the outcome sooner. When it inevitably fails to produce the desired results, rather than tell yourself you made a mistake you chalk it up to the world not working as it should. It's as if that little voice in your head says, "You're not wrong; the world is."

Most of us would rather bargain with how the world works than accept how it does work, cooperate with it, and move forward. This happens in a lot of areas of life. Consider the general concept of health.

A lot of people think they don't have to take care of their health. They get too little sleep. They drink too much. They eat incredible amounts of processed food. They get little to no exercise. While they know health is important, at some level they think they are the exception. Acceptance is knowing you must care for your health because it is the foundation for everything else. Without health, everything else multiplies by zero.

We are tempted to believe we're the exception because it's the easy path.

Aligning with the world often requires you to pre-pay now for a result later. A little bit of pain today for gain tomorrow. And we don't like the sounds of that.

However, if you can align yourself with the world despite what those around you do, you'll quickly discover that it tends to do most of the work for you. It just won't take the first step for you. You have to take that one for yourself.

4. Born, and Evolved, to Run

Daniel Lieberman, author of *The Evolution of the Human Head*, sat down with the NYT for an interesting conversation.

Some years ago, I was doing an experiment where I put pigs on treadmills. The goal was to learn how running stressed the bones in the head. One day, a colleague, Dennis Bramble, walked into the lab, watched what was going on, and declared, "You know, that pig can't hold its head still!"

This was my "eureka!" moment. I'd observed pigs on treadmills for hundreds of hours and had never thought about this. So Dennis and I started talking about how, when these pigs ran, their heads bobbed every which way and how running humans are really adept at stabilizing their heads. We realized that there were special features in the human neck that enable us to keep our heads still. That gives us an evolutionary advantage because it helps us avoid falls and injuries. And this seemed like evidence of natural selection in our ability to run, an important factor in how we became hunters rather than just foragers and got access to richer foods, which fueled the evolution of our big brains.

So I got interested in how we developed these stable heads. I'm a runner myself. It's always interesting to study one's passion. By 2004, we'd found enough evidence to publish a paper in Nature where we declared, "Humans were born to run." We cited the many dozens of adaptations in the human body that had made us into superlative endurance runners, even compared to dogs and horses.

Before bows and arrows and before horses were tamed, we did "persistence hunting" where we ran kudu, wildebeest and zebra into exhaustion. These animals can't pant when they gallop. They overheat. People would find a big animal and chase it till it collapsed. You need no technology to do this, just the ability to run long distances, which all of us have.

You can see proof of this capability every November when 45,000 people run for many hours through the streets of New York.

5. David Quammen on Why Big Populations Survive and Small Ones Go Extinct

*"Big populations don't go extinct. Small populations do.
It's not a surprising finding but it is a significant one."*

Why do small populations go extinct?

While the answer is simple to outline the scientific details are more nuanced. For now, let's stick to the outline version.

"Small populations go extinct because (1) all populations fluctuate in size from time to time, under the influence of two kinds of factors, which ecologists refer to as deterministic and stochastic; and (2) small populations, unlike big ones, stand a good chance of fluctuation to zero, since zero is not far away."

Deterministic factors are those involving straightforward cause-and-effect relations that to some extent can be predicted and controlled: hunting, trapping, destroying habitat, introducing new animals that compete with or prey on existing ones, etc.

Stochastic factors "operate in a realm beyond human prediction and control, either because they are truly random or because they are linked to geophysical or biological causes so obscurely complex that they seem random." We're talking things like weather patterns, epidemic disease, infestation of parasites, forest fires, etc. Each might cause a downward fluctuation in the population of some species.

In Song of the Dodo, David Quammen gives the following illuminating example.

Think of two species that live on the same tiny island. One is a mouse. Total population, ten thousand. The other is an owl. Total population, eighty. The owl is a fierce and proficient mouse eater. The mouse is timorous, fragile, easily victimized. But the mouse population as a collective entity enjoys the security of numbers.

Say that a three-year drought hits the island of owls and mice, followed by a lightning-set fire, accidental events that are hurtful to both species. The mouse population drops to five thousand, the owl population to forty. At the height of the next breeding season a typhoon strikes, raking the treetops and killing an entire generation of unfledged owls. Then a year passes peacefully, during which the owl and the mouse populations both remain steady, with attrition from old age and individual mishaps roughly offset by new births. Next, the mouse suffers an epidemic disease, cutting its population to a thousand, fewer than at any other time within decades. This extreme slump even affects the owl, which begins starving for lack of prey.

Weakened by hunger, the owl suffers its own epidemic, from a murderous virus. Only fourteen birds survive. Just six of those fourteen owls are female, and three of the six are too old to breed. Then a young female owl chokes to death on a mouse. That leaves two fertile females. One of them loses her next clutch of eggs to a snake. The other nests successfully and manages to fledge four young, all four of which happen to be male. The owl population is now depressed to a point of acute vulnerability. Two breeding females, a few older females, a dozen males. Collectively they possess insufficient genetic diversity for adjusting to further troubles, and there is a high chance of inbreeding between mothers and sons. The inbreeding, when it occurs, tends to yield some genetic defects. Meanwhile the mouse population is also depressed far below its original number.

Ten years pass, with the owl population becoming progressively less healthy because of inbreeding. A few further females are hatched, precious additions to the gender balance, though some of them turn out to be congenitally infertile. During that same stretch of time the mouse population rebounds vigorously. Good weather, plenty of food, no epidemics, genetically it's fine—and so the mouse quickly returns to its former abundance.

Then another wildfire scorches the island, killing four adult owls, and, oh, six thousand mice. The four dead owls were all breeding-age females, crucial to the beleaguered population. The six thousand mice were demographically less crucial. Among the owls there now remains only one female who is young and fertile. She develops ovarian cancer,

a problem to which she is susceptible because of the history of inbreeding among her ancestors. She dies without issue. Very bad news for the owl species. Let's give the mouse another plague of woe, just to be fair: a respiratory infection, contagious and lethal, causes eight hundred fatalities. None of this is implausible. These things happen. The owl population—reduced to a dozen mopey males, several dowagers, no fertile females—is doomed to extinction. When the males and the dowagers die off, one by one, leaving not offspring, that's that. The mouse population fluctuates upward in response to the extinction of the owls, a rude signal that life is easier in the absence of predation. Twelve thousand mice. Fifteen thousand. Twenty thousand. But while its numbers are so high it will probably overexploit its own resources and eventually decline again as a consequence of famine. Then rise again. Then decline again. Then ...

The mouse population is a yo-yo on a long string. Despite all the accidental disasters, despite all the ups and downs, the mouse doesn't go extinct because the mouse is not rare. The owl goes extinct. Why? Because life is a gauntlet of uncertainties and the owl's population size, in the best of times, was too small to buffer it against the worst of times.

6. Several Uncomfortable Realities

Something to ponder.

A sobering excerpt from Vaclav Smil's Global Catastrophes and Trends: The Next Fifty Years:

The first is that even the most assiduous deployment of the best available preventive measures (smart policing, clever informants, globe-spanning, electronic intelligence, willingness to undertake necessary military action) will not be able to thwart all planned attacks.

The second reality is that the most dangerous form of terrorist attacks cannot be deterred because the political and ideological motivations for terrorist attacks that characterized Rapoport's (2001) first three waves of terror have blended with religious zealotry and become one with the Muslim concept of martyrdom, providing the perpetrators with an irresistible reward: instant access to paradise. Murder by suicide has deep roots in Muslim history ...

The third sobering consideration is that neither personal instability nor an individuals hopelessness or overt personal defects, factors that come immediately to mind as the most likely drivers, are dependable predictors of candidates for suicidal martyrdom. Nor are such indicators as poverty, level of education, or religious devotion. Institutional manipulation of emotional commitment seems to be a key factor, and one not easily eliminated. Other obvious contributions are rapidly rising youth populations in countries governed by dictatorial regimes with limited economic opportunities, and the disenchantment of second-generation Muslim immigrants with their host societies. But none of these factors can offer any selective guidance to identify the most susceptible individuals and to prevent their murderous suicides.

The fourth consideration is that our understandable fixation on suicidal missions may be misplaced. A dirty bomb containing enough radioactive waste to contaminate several downtown blocks of a major city and cause mass panic (as anything invisible and nuclear is bound to do) can be positioned in a place calculated to have a maximum impact and then remotely detonated. And while Hizbullah's more than 30 days of rocket attacks on Israel in the summer of 2006 were not particularly deadly, they paralyzed a large part of the country and demonstrated how more conventional weapons could be used in the service of terrorism.

7. Kantian Fairness Tendency: The World Isn't Fair

The Kantian Fairness Tendency refers to the pursuit of perfect fairness which causes a lot of terrible problems. Stop expecting the world to be fair and adjust your behavior accordingly.

To learn about this mental model we turn to Charlie Munger, who mentioned it twice. First in this UCCB talk entitled Academic Economics — Strengths and Weaknesses, after Considering Interdisciplinary Needs where he said:

It is not always recognized that, to function best, morality should sometimes appear unfair, like most worldly outcomes. The craving for perfect fairness causes a lot of terrible problems in system function. Some systems should be made deliberately unfair to individuals because they'll be fairer on average for all of us. I frequently cite the example of having your career over, in the Navy, if your ship goes aground, even if it wasn't your fault. I say the lack of justice for the one guy that wasn't at fault is way more than made up by a greater justice for everybody when every captain of a ship always sweats blood to make sure the ship doesn't go aground. Tolerating a little unfairness to some to get a greater fairness for all is a model I recommend to all of you. But again, I wouldn't put it in your assigned college work if you want to be graded well, particularly in a modern law school wherein there is usually an over-love of fairness-seeking process.

The second time was in his essay entitled: The Psychology of Human Misjudgment: Kant was famous for his “categorical imperative,” a sort of a “golden rule” that required humans to follow those behavior patterns that, if followed by all others, would make the surrounding human system work best for everybody. And it is not too much to say that modern acculturated man displays, and expects from others, a lot of fairness as thus defined by Kant.

In a small community having a one-way bridge or tunnel for autos, it is the norm in the United States to see a lot of reciprocal courtesy, despite the absence of signs or signals. And many freeway drivers, including myself, will often let other drivers come in front of them, in lane changes or the like, because that is the courtesy they desire when roles are reversed. Moreover, there is, in modern human culture, a lot of courteous lining up by strangers so that all are served on a “firstcome-first-served” basis.

Also, strangers often voluntarily share equally in unexpected, unearned good and bad fortune. And, as an obverse consequence of such “fair-sharing” conduct, much reactive hostility occurs when fairsharing is expected yet not provided. It is interesting how the world's slavery was pretty well abolished during the last three centuries after being tolerated for a great many previous centuries during which it coexisted with the world's major religions. My guess is that Kantian Fairness Tendency was a major contributor to this result.

* * *

Professor Sanjay Bakshi makes a connection between the Kantian Fairness Tendency and the “law of the higher good” in reference to Machiavelli's famous book The Prince.

Bakshi said this to his students:

Machiavelli's “The Prince” is a great book and should be made compulsory reading for all MBA students.

To many people, The Prince is an evil book. But Joseph L. Badaracco, who teaches a hugely popular course titled “The Moral Leader” at the Harvard Business School uses this book to teach ethics. And he teaches ethics by telling students to follow Machiavelli's advice in The Prince.

In an interview, Badaracco has said that four different takes on The Prince usually emerge in classroom discussions of The Prince at HBS:

Version 1 : “This book is a mess. It was written by a guy who hoped to get to the center of things, was there briefly, offended some of the wrong Medicis, was exiled, was tortured,

and wanted to get back in.” It’s “a scholar’s dream because you can find anything you want in it and play intellectual games. But just put it aside.”

Version 2 : “Now wait a minute. There’s some good common sense in there. Machiavelli is basically saying that if you want to make an omelet you have to break some eggs... To do some right things, you may have to not do some other right things.”

Version 3 : Other students believe the book is still around because it’s so evil. Why is it evil? “If you look closely at *The Prince*,” he said, “it’s quite interesting what isn’t in the book. Nothing about religion. Nothing about the Church. Nothing about God. There’s nothing about spirituality. Almost nothing about the law. Almost nothing about traditions. You’re out there on your own doing what works for you in terms of naked ambition.”

Version 4 : “A fourth Prince that other students uncover is the most interesting one, in Badaracco’s mind. Students find that the book reveals a kind of worldview, he says, and it’s not an evil worldview. This version goes: “If you’re going to make progress in the world you’ve got to have a clear sense, a realistic sense, an unsentimental sense, of how things really work: the mixed motives that compel some people and the high motives that compel some others. And the low motives that unfortunately captivate other people.” Students who claim the fourth Prince, Badaracco said, believe that if they’re going to make a difference, it’s got to be in this world, “and not in some ideal world that you would really like to live in.”

One of my favourite mental models comes from *The Prince*. I call this model, the “law of the higher good”. Before I read *The Prince*, I read an excellent book called, “*The Contrarian Guide to Leadership*” by Steven Sample. In this book, which was recommended by Mr. Munger, Sample’s thoughts on the law of the higher good from *The Prince* resonated very well with what Mr. Munger has been advocating for years.

I reproduce here an excerpt from Sample’s book which deals with the law of the higher good:

“Let me clarify the most fundamental misunderstanding. Machiavelli was not an immoral or even an amoral man; as mentioned earlier, he had a strong set of moral principles. But he was driven by the notion of a higher good: an orderly state in which citizens can move about at will, conduct business, safeguard their families and possessions, and be free of foreign intervention or domination. Anything which could harm this higher good, Machiavelli argued, must be opposed vigorously and ruthlessly. Failure to do so out of either weakness or kindness was condemned by Machiavelli as being contrary to the interests of the state, just as it would be contrary to the interests of a patient for his surgeon to refuse to perform a needed operation out of fear that doing so would inflict pain on the patient.”

The law of the higher good is a terribly useful model for leaders because it forces them to think about things from a totally different perspective.

Here’s a hypothetical situation to ponder about:

You are in charge of running a retail store and one of your cashiers, an elderly woman, is caught committing a minor embezzlement. Fearing that she might be dismissed, she approaches you to plead forgiveness. She tells you that this is the first time she embezzled money from the company and promises that she’ll never do it again. She tells you about her sad situation, namely that her husband is very ill and that she was going to use the money to buy medicines for him. She becomes extremely emotional and your heart is melting. What do you do?

Something similar to the above situation was described by Mr. Munger in a talk given by him. He used two models to produce his answer. The first model was probability. Mr. Munger implores you to reduce the problem to the mathematics of Fermat/Pascal by asking the question: How likely is it that the old woman’s statement, “I’ve never done it before, I’ll never do it again” is true?

Note that this question has nothing whatsoever to do with the circumstances in this particular instance of embezzlement. Rather, Munger is relying on his knowledge of the

theory of probability. He asks: "If you found 10 embezzlements in a year, how many of them are likely to be first offences?"

The possible actions are: (1) She is lying and you fire her (good outcome – because it cures the problem and sends the right signals); (2) She is telling the truth and you fire her (bad outcome for her but good outcome for system integrity); (3) She is lying and you pardon her (bad outcome for system integrity); and (4) She is telling the truth and you pardon her (bad outcome for system integrity because it will send the wrong signal that its ok to embezzle once).

Weighed with probabilities, and after considering signalling effects of your actions on other people's incentives and its effect on system integrity, its clear that the woman should be fired.

Looked this way, this is not a legal problem or an ethical problem. Its an arithmetical problem with a simple solution. This extreme reductionism of practical problems to a fundamental discipline (in this case mathematics), is, of course, the hallmark of the Munger way of thinking and living.

So, from a leader's perspective, it's more important to have the right systems with the right incentives in place, rather than trying to be fair to one person – even if that person is the leader or someone close to the leader.

The logic is that leaders must look at such situations from their civilization's point of view rather than the viewpoint of an individual. If we create systems which encourage embezzlements, or tolerate such systems, we'll ruin our civilization. If we don't punish the woman, the idea that its ok to do minor embezzlement once in a while, will spread because of incentive effects, and social proof (everyone's doing it so its ok). And we cannot let that idea spread because that will ruin our civilization. Its that simple.

6. Two Questions Everyone Asks Themselves When They Meet You

People everywhere differentiate each other by liking (warmth, trustworthiness) and by respecting (competence, efficiency).

Essentially they ask themselves: (1) Is this person warm? and (2) Is this person competent?

The “warmth dimension captures traits that are related to perceived intent, including friendliness, helpfulness, sincerity, trustworthiness and morality, whereas the competence dimension reflects traits that are related to perceived ability, including intelligence, skill, creativity and efficacy.”

“In sum, although both dimensions are fundamental to social perception, warmth judgments seem to be primary, which reflects the importance of assessing other people’s intentions before determining their ability to carry out those intentions.”

Like all perception, social perception reflects evolutionary pressures. In encounters with conspecifics, social animals must determine, immediately, whether the ‘other’ is friend or foe (i.e. intends good or ill) and, then, whether the ‘other’ has the ability to enact those intentions. New data confirm these two universal dimensions of social cognition: warmth and competence. Promoting survival, these dimensions provide fundamental social structural answers about competition and status. People perceived as warm and competent elicit uniformly positive emotions and behavior, whereas those perceived as lacking warmth and competence elicit uniform negativity. People classified as high on one dimension and low on the other elicit predictable, ambivalent affective and behavioral reactions. These universal dimensions explain both interpersonal and intergroup social cognition.

7. Poaching Stars is a Terrible Idea to Improve Performance

In an effort to improve performance we often turn to the simple answer of trying to hire a star from another organization. This sounds like a great idea, is hard to argue with, and offers the promise of an instant performance boost.

In practice, most of the benefits turn out to be illusory.

The question is why?

One reason is that we think of the person as an isolated system when in reality they are not. The surrounding team, culture, and environment can amplify their success.

In his wonderful book, Think Twice: Harnessing the Power of Counterintuition, Michael Mauboussin explains:

A star's performance relied to some degree on the people, structure, and norms around him—the system. Analyzing results requires sorting the relative contributions of the individual versus the system, something we are not particularly good at. When we err, we tend to overstate the role of the individual.

This mistake is consequential because organizations routinely pay big bucks to lure high performers, only to be sorely disappointed. In one study, a trio of professors from Harvard Business School tracked more than one thousand acclaimed equity analysts over a decade and monitored how their performance changes as they switched firms. Their dour conclusion, "When a company hires a star, the star's performance plunges, there is a sharp decline in the functioning of the group or team the person works with, and the company's market value falls." The hiring organization is let down because it failed to consider systems-based advantages that the prior employer supplied, including firm reputation and resources. Employers also underestimate the relationships that supported previous success, the quality of the other employees, and a familiarity with past processes. What's happening is a common mistake — we're focusing on an isolated part of a complex adaptive system without understanding how that part contributes to the overall system dynamics.

For more information read the Harvard Business Review article: *The Risky Business of Hiring Stars*.

8. Learning Effectively From Experience: Distinguishing High from Low Performers

High performers learn from both success and failure making small adjustments.

Conversely, low performers learned more from success.

Learning effectively from experience is a daunting task for any organism. For every good or bad outcome, there are an immense number of potential causes and associations to be considered. For many decisions, it can be nearly impossible to pick out the few relevant factors from the many irrelevant factors, even with extensive experience. A major stumbling block for learning in these multi-dimensional environments is the tendency to form spurious beliefs: i.e., to attribute a causal role to factors that have no actual bearing on the outcome.

The formation of spurious beliefs is universal, from Skinner's observations of superstitious pigeons [1] to an athlete's belief in a lucky hat. In some situations, these beliefs are essentially harmless; by-products of learning mechanisms, but in other settings their impact can be severe. For example, spurious associations can have literal life-or-death consequences when they affect the complex decisions made by physicians. These expert decision-makers must extract and distill relevant features from a myriad of tests, symptoms, and personal histories, and employ these features to make critical medical decisions. Consequently, it is important to understand how spurious associations form and how they can bias subsequent decisions.

Spurious learning and false belief formation happens when the dorsolateral prefrontal cortex fails to distinguish correctly between important and unimportant associations.

The authors conclude:

High performers learned from both successes and failures, and made smaller rule adjustments after feedback. Conversely, low performers learned disproportionately from successes, and made larger rule adjustments ...

Taken together, the behavioral and neuroimaging results suggest that success-chasing and confirmation bias may underlie the relative pervasiveness of premature, asymmetric learning and the resultant poor performance of the majority of physician subjects in the present study. The general human bias towards confirmation over disconfirmation in hypothesis-testing has been extensively documented in a variety of non-medical contexts, such as the Wason Card Task. Conversely, the necessity for disconfirmation learning in empirical investigations is a key principle identified by the philosopher of science, Karl Popper [28]. Conceivably, providing medical professionals with formal training in disconfirmation learning could improve their ability to learn effectively from clinical experience in real-world settings. Exploring this possibility would be an important area for future research.

In conclusion, the results of this study show distinct patterns of learning, both behaviorally and neurally, between effective and ineffective learners among physicians making decisions in a medically framed learning task. The tendency to chase successes and ignore failures provides a simple computational model of how spurious beliefs might be formed, and how different individuals seeing similar data might learn very different sets of associations. The neural differences observed could conceivably be developed into useful biomarkers for essential differences in individual learning styles. These may in turn prove useful in identifying those individuals who can resist the impulse to chase successes, and hence learn most effectively from experience. Finally, we note that although this study focused upon the specific case of medical decision-making, the findings may be also be relevant to many other fields in which experts must make high-stakes decisions by drawing upon personal experience.

Abstract:

Accurate associative learning is often hindered by confirmation bias and success-chasing, which together can conspire to produce or solidify false beliefs in the decision-maker. We performed functional magnetic resonance imaging in 35 experienced physicians, while

they learned to choose between two treatments in a series of virtual patient encounters. We estimated a learning model for each subject based on their observed behavior and this model divided clearly into high performers and low performers. The high performers showed small, but equal learning rates for both successes (positive outcomes) and failures (no response to the drug). In contrast, low performers showed very large and asymmetric learning rates, learning significantly more from successes than failures; a tendency that led to sub-optimal treatment choices. Consistently with these behavioral findings, high performers showed larger, more sustained BOLD responses to failed vs. successful outcomes in the dorsolateral prefrontal cortex and inferior parietal lobule while low performers displayed the opposite response profile. Furthermore, participants' learning asymmetry correlated with anticipatory activation in the nucleus accumbens at trial onset, well before outcome presentation. Subjects with anticipatory activation in the nucleus accumbens showed more success-chasing during learning. These results suggest that high performers' brains achieve better outcomes by attending to informative failures during training, rather than chasing the reward value of successes. The differential brain activations between high and low performers could potentially be developed into biomarkers to identify efficient learners on novel decision tasks, in medical or other contexts.

9. Situations Matter

*"We're easily seduced by the notion of stable character.
So much of who we are, how we think, and what we do is
driven by the situations we're in, yet we remain blissfully unaware of it."*
— Sam Sommers

Situations Matter is an excellent book that should give you a leg up in life.

One of the lessons of modern psychological research is that 'the situation' we find ourselves in influences us. If you've ever wondered about why you are not as independent-minded as you think or about the difference between men and women this is a great book.

A summary paragraph:

So much of how we see and interact with the social universe around is shaped by our immediate context. ... seemingly trivial aspects of daily situations determine whether we keep to ourselves or get involved in the affairs of others, whether we follow a group or stake out on an independent path, why we're drawn to certain people and away from others.

As Sam Sommers points out, "once you start paying attention to situations there's no going back." Sommers argues, "People are easy to see. They're tangible. Context is harder: it's an abstract, nebulous concept, a backdrop that can be downright invisible. Precisely because situations are difficult to see, effort is required to recognize their influence."

The context in which we make decisions matters. Stress might mean we don't consider all the options or we become paralyzed. Focusing on an outcome means we miss what's possible. When we're rushed, we're not paying attention to obvious signals and warnings. It's hard to make good decisions when you have blind spots.

If you want to understand why someone made a particular decision or is behaving in a certain way, put yourself in their shoes. If you see what they see, suddenly the behaviour or decision becomes rational.

Not only are others blind to the larger context but we are often blind to their context. Only by zooming out and looking at the situations through the eyes of multiple people, can you begin to acquire perspective. And perspective is the key to removing blind-spots.

10. Richard Feynman on Why Questions

In this beautiful video, [Richard Feynman](#) on the nature of why questions and how they help us understand the world.

Interviewer: If you get hold of two magnets, and you push them, you can feel this pushing between them. Turn them around the other way, and they slam together. Now, what is it, the feeling between those two magnets?

Feynman: What do you mean, "What's the feeling between the two magnets?"

There's something there, isn't there? The sensation is that there's something there when you push these two magnets together.

Listen to my question. What is the meaning when you say that there's a feeling? Of course, you feel it. Now, what do you want to know?

What I want to know is what's going on between these two bits of metal?

They repel each other.

What does that mean, or why are they doing that, or how are they doing that? I think that's a perfectly reasonable question.

Of course, it's an excellent question. But the problem, you see, when you ask why something happens, how does a person answer why something happens? For example, Aunt Minnie is in the hospital. Why? Because she went out, slipped on the ice, and broke her hip. That satisfies people. It satisfies, but it wouldn't satisfy someone who came from another planet and knew nothing about why when you break your hip do you go to the hospital. How do you get to the hospital when the hip is broken? Well, because her husband, seeing that her hip was broken, called the hospital up and sent somebody to get her. All that is understood by people. And when you explain a why, you have to be in some framework that you allow something to be true. Otherwise, you're perpetually asking why. Why did the husband call up the hospital? Because the husband is interested in his wife's welfare. Not always, some husbands aren't interested in their wives' welfare when they're drunk, and they're angry.

"But the problem, you see, when you ask why something happens, how does a person answer why something happens?"

— Richard Feynman

And you begin to get a very interesting understanding of the world and all its complications. If you try to follow anything up, you go deeper and deeper in various directions. For example, if you go, "Why did she slip on the ice?" Well, ice is slippery. Everybody knows that, no problem. But you ask why is ice slippery? That's kinda curious. Ice is extremely slippery. It's very interesting. You say, how does it work? You could either say, "I'm satisfied that you've answered me. Ice is slippery; that explains it," or you could go on and say, "Why is ice slippery?" and then you're involved with something, because there aren't many things as slippery as ice. It's not very hard to get greasy stuff, but that's sort of wet and slimy. But a solid that's so slippery? Because it is, in the case of ice, when you stand on it (they say) momentarily the pressure melts the ice a little bit so you get a sort of instantaneous water surface on which you're slipping. Why on ice and not on other things? Because water expands when it freezes, so the pressure tries to undo the expansion and melts it. It's capable of melting, but other substances get cracked when they're freezing, and when you push them they're satisfied to be solid.

Why does water expand when it freezes and other substances don't? I'm not answering your question, but I'm telling you how difficult the why question is. You have to know what it is that you're permitted to understand and allow to be understood and known, and what it is you're not. You'll notice, in this example, that the more I ask why, the deeper a thing is, the more interesting it gets. We could even go further and say, "Why did she fall down when she slipped?" It has to do with gravity, involves all the planets and everything else. Nevermind! It goes on and on. And when you're asked, for example, why two magnets

repel, there are many different levels. It depends on whether you're a student of physics or an ordinary person who doesn't know anything. If you're somebody who doesn't know anything at all about it, all I can say is the magnetic force makes them repel, and that you're feeling that force.

You say, "That's very strange, because I don't feel a kind of force like that in other circumstances." When you turn them the other way, they attract. There's a very analogous force, electrical force, which is the same kind of a question, that's also very weird. But you're not at all disturbed by the fact that when you put your hand on a chair, it pushes you back. But we found out by looking at it that that's the same force, as a matter of fact (an electrical force, not magnetic exactly, in that case). But it's the same electric repulsions that are involved in keeping your finger away from the chair because it's electrical forces in minor and microscopic details. There are other forces involved, connected to electrical forces. It turns out that the magnetic and electrical force with which I wish to explain this repulsion in the first place is what ultimately is the deeper thing that we have to start with to explain many other things that everybody would just accept. You know you can't put your hand through the chair; that's taken for granted. But that you can't put your hand through the chair, when looked at more closely, why, involves the same repulsive forces that appear in magnets. The situation you then have to explain is why, in magnets, it goes over a bigger distance than ordinarily. There it has to do with the fact that in iron all the electrons are spinning in the same direction, they all get lined up, and they magnify the effect of the force 'til it's large enough, at a distance, that you can feel it. But it's a force which is present all the time and very common and is a basic force of almost – I mean, I could go a little further back if I went more technical – but on an early level I've just got to tell you that's going to be one of the things you'll just have to take as an element of the world: the existence of magnetic repulsion, or electrical attraction, magnetic attraction. I can't explain that attraction in terms of anything else that's familiar to you. For example, if we said the magnets attract like rubber bands, I would be cheating you. Because they're not connected by rubber bands. I'd soon be in trouble. And secondly, if you were curious enough, you'd ask me why rubber bands tend to pull back together again, and I would end up explaining that in terms of electrical forces, which are the very things that I'm trying to use the rubber bands to explain. So I have cheated very badly, you see. So I am not going to be able to give you an answer to why magnets attract each other except to tell you that they do. And to tell you that that's one of the elements in the world – there are electrical forces, magnetic forces, gravitational forces, and others, and those are some of the parts. If you were a student, I could go further. I could tell you that the magnetic forces are related to the electrical forces very intimately, that the relationship between the gravity forces and electrical forces remains unknown, and so on. But I really can't do a good job, any job, of explaining magnetic force in terms of something else you're more familiar with, because I don't understand it in terms of anything else that you're more familiar with.

11. Mindless Eating: Why We Eat More Than We Think

Mindless Eating: Why We Eat More Than We Think will change the way you think about your next meal.

According to eating behavior expert Brian Wansink the mind makes food-related decisions, more than 200 a day, and many of them without pause for actual thought. In *Mindless Eating*, Wansink argues that we don't have to change what we eat as much as how we eat. Make no mistake, this isn't a diet book.

Wansink says "This book is not about dietary extremism—just the opposite. It's about reengineering your environment so that you can eat what you want without guilt and without gaining weight. It's about reengineering your food life so that it is enjoyable."

The research summaries are entertaining. Take the study of how much people ate when their plates were literally bottomless. "It seems," Wansink writes, "that when estimating almost anything—such as weight, height, brightness, loudness, sweetness, and so on—we consistently under-estimate things as they get larger."

"While most Americans stop eating when they're full, those in leaner cultures stop eating when they're no longer hungry." Not only that, unlike our (leaner) European friends, we tend to have bigger package sizes (and bigger kitchens), which means we end up eating (or pouring) more — "Because big packages (like big portions) suggest a consumption norm—what is appropriate or normal to use or eat."

The problem is we're all tricked by our environment. We think others could be fooled by something as simple as a bigger plate, but we never think we are fooled. That is what gives mindless eating so much power over us—we're not aware it's happening. Wansink's approach is to change the environment.

Wansink believes that warehouse clubs are bad for our health. He also explains why you should leave empty wine glasses on the table, why Cinnabon stores are positioned beside stores that don't sell food, how Subway is bad for your health, and why you should be the last person to start eating.

"Regardless of how well we think we are tuned into our eating decisions, we will serve 25% to 35% more on a larger plate than a smaller plate." Don't think it makes a difference? 150 extra-calories a day is up to 15 pounds a year.

11. Owning up to Your Ignorance by Saying “I Don’t Know”

When was the last time you admitted you didn’t know something?

Saying ‘I don’t know’ is hard. We can be so resistant to it that we end up not even knowing what we don’t know. This is dangerous. When you don’t know what you don’t know you’re clueless as to how to minimize those gaps in your knowledge. This could hinder your ability to succeed in business and life.

Furthermore, if you’re in a position to mentor or teach others, they probably expect you to know your blind spots. People look to you for knowledge and ideas. But you might be disseminating ignorance instead. And who needs more of that in a world full of it?

Justin Landis wrote an interesting blog [post](#) in response to a Freakonomics podcast “Why Is ‘I Don’t Know’ So Hard to Say?”

The highlight:

[T]hose of us who live in the business world are certainly incentivized to focus on what we know over what we don’t know. And whether we’re talking about closing a deal with an important client or simply competing with peers for a limited number of positions in a given field, this holds true. By highlighting what we know and tactfully hiding what we don’t, we present the illusion of mastery, and this is thought to (and generally does) inspire confidence in our ability to execute. The incentive here is clear, and the results are pretty clear as well, at least in my experience. The unintended consequence is that while we’re all focusing on what we know and making sure others are aware of those things, there is still a lot that we don’t know. In some cases, we may not even really know what we don’t know. And this is the most dangerous place to be in.

Not knowing what you don’t know is dangerous indeed. In this position, you are clueless as to how to minimize gaps in your knowledge, which could hinder your ability to excel in business and in life. Furthermore, if you are in a position to teach, mentor, and/or coach others, then people are looking to you for knowledge and ideas. But instead of spreading knowledge and idea, you’d be disseminating false information and ignorance. And who needs more ignorance in a world that’s already full of it?

If I asked you if you knew how your cellphone works, you’d probably say yes, right? But if I asked you why your screen reacts to the touch of your fingertips or how the power button turns on your phone, what would you say? The [illusion of explanatory depth](#) (IOED) is a term that was first coined by Leonid Rozenblit and Frank Keil in their 2002 research paper, [The misunderstood limits of folk science: an illusion of explanatory depth](#). From the abstract:

[People feel they understand complex phenomena with far greater precision, coherence, and depth than they really do; they are subject to an illusion—an illusion of explanatory depth. The illusion is far stronger for explanatory knowledge than many other kinds of knowledge, such as that for facts, procedures or narratives. The illusion for explanatory knowledge is most robust where the environment supports real-time explanations with visible mechanisms.

But consider this: “[Fake it ‘til you make it](#)” can be seen as the internal battle cry of people who feel out of their depth. However, despite their insecurities, they still pursue what they desire. This imaginary mask of confidence that hides their shortcomings becomes the buoy that keeps them afloat. Oftentimes, they end up doing what they set out to do and exceed expectations. Sometimes that individual can morph into the person they were pretending to be in the first place. It’s an idealistic outcome, but it does happen.

Needless to say, we must not forget the potentially disastrous outcomes that occur when this transformation doesn’t happen and they go on fooling others and themselves instead. If we acknowledge our ignorance, an empty space in our knowledge that needs to be filled, we need to carefully consider how we say “I don’t know”. Right now, I don’t have the answer but I will find out for you. I don’t know but I know someone that does. Or simply, I’m

sorry, but as much as I wish I could help you, I'm just not the right person to solve this problem. I don't want to put your project in jeopardy.
Depending on who you are, facing this reality can either be uncomfortable, terrifying or liberating.

12. The Filter Bubble — What the Internet is Hiding From You

In case you're interested, we have another article on The Filter Bubble [here](#).

Just “googling it” might not be such a great idea after all

The Filter Bubble, by Eli Pariser, puts forth an argument that we're increasingly trapped inside an algorithm that filters our news based on what it thinks is best for us. In this case, IT is an algorithm.

Computers and the algorithms they run are increasingly aware of the things we seem to like. They learn from what we click on and tailor results so we get more of what we like and less of what we don't like. The equivalent would be parents giving their kids only sugar because that's what they seem to like. Only parents know better, so they feed their kids what they need first with a sprinkling of what they want. Algorithms don't. This means that two people googling the same thing are likely to see different results.

The problem with this, Pariser argues, is that you're not making a conscious choice to have your results filtered — it happens without your knowledge or consent. And that causes a whole host of issues, of which Pariser is primarily concerned with the social and political implications.

When technology's job is to show you the world, it ends up sitting between you and reality, like a camera lens.

“If we want to know what the world really looks like,” Pariser writes, “we have to understand how filters shape and skew our view of it.” It's useful to borrow from nutrition to illustrate this point:

Our bodies are programmed to consume fat and sugars because they're rare in nature. Thus, when they come around, we should grab them. In the same way, we're biologically programmed to be attentive to things that stimulate: content that is gross, violent, or sexual and that gossip which is humiliating, embarrassing, or offensive. If we're not careful, we're going to develop the psychological equivalent of obesity. We'll find ourselves consuming content that is least beneficial for ourselves or society as a whole.

Consider for a moment where we are headed. If Google knows that I'm a democrat or republican they *could* now add a filter to my news to show me only the stories I'm predisposed to agree with. Based on their guess as to my education level, they may then tailor the article's words and language to maximize its impact on me. In this world, I only see things I agree with and writing that I easily comprehend and that's a problem. Google might know that I don't read anything about Republican tax cuts or democratic spending so they might just filter those articles out. Reality, as I see it, becomes what the lens shows me.

“If you're not paying for something, you're not the customer; you're the product being sold.”

— Andrew Lewis

When asked about the prospects for important but unpopular news, Media Lab's Nicholas Negroponte smiled. On one end of the spectrum, he said is sycophantic personalization — “you're so great and wonderful, and I'm going to tell you exactly what you want to hear.”

On the other end is the parental approach: “I'm going to tell you this whether you want to hear this or not, because you need to know.” Currently, he argues, we're headed in sycophantic direction.

Whether you believe the book's conclusions are wholly convincing or not, it is worth thinking about. If nothing else, it is thought-provoking.

(If you want a search engine that won't “track you” try [DuckDuckGo.com](#))

13. Does Experience Make You an Expert?

In Experience and validity of clinical judgment: The illusory correlation, Robyn Dawes explores the relationship between experience and accuracy.

There is research about the relationship between experience and diagnostic and predictive accuracy, and about the validity of interviewing people to find out what they are like. Garb has recently summarized the research on experience and accuracy. There is no relationship between years of clinical experience and accuracy of judgment. A report of a task force of the American Psychological Association convened in the early 1980s noted that there was no evidence that professional competence is related to years of professional experience.

And yet we seek experienced people to be our teachers, executives, and political leaders. Ben Franklin is oft quoted as saying “experience is the best teacher,” the second clause reads “and fools will learn from no other.” Only Franklin didn’t say “the best teacher” he said “dear teacher,” which was clearly intended to mean expensive.

The 10,000-hour rule, popularized by Malcolm Gladwell and based on Anders Ericsson’s study, *The Role of Deliberate Practice in the Acquisition of Expert Performance*, states that in order to become an expert, one must have 10,000 hours of deliberate practice under their belts. This has been highly disputed by many, including Ericsson himself. There’s no question that practice is necessary for improvement, but 10,000 hours isn’t a magic number that wields the power of universal application.

Something else to ponder: why is it that we often forget to account for the length of time that an expert has been out of practice in their field?

So does experience really make you an expert? What does it actually mean to be one? It turns out, we don’t learn from experience in many contexts.

The analysis of what we learn and why we learn it, however, quickly yields sobriety about embracing generalizations about the effect of experience on learning across all contexts. For example, learning to sit in a chair, become a chess grandmaster, make a correct medical diagnosis, or avoid a war are quite different processes. The word “learning” is, of course, common to all, but close examination reveals that it means little more than that someone with no experience whatsoever could not accomplish any of these tasks.

Dawes illuminates this highly contrarian idea through quite unremarkable human behaviours like sitting in a chair and driving.

What then are the differences? First, consider sitting in a chair. It is a motor skill. It is done automatically. It does not involve any conscious hypotheses. It is clearly learned through early experience that provides immediate feedback about failure. Finally, it is not taught in the sense that one person conveys a verbal or mathematical description to another about how to do it. (In fact an amusing exercise is to attempt to write such a description, convince somebody else to follow your instructions explicitly—and then watch the person fail.) Driving a car has many similar characteristics. For example, steering it in a straight line is accomplished by very tiny discrete adjustments of the steering wheel that are not accomplished consciously (Ehrlich, 1966). (The “weaving” behavior of drunk drivers is often due to the impairment of these movements, rather than to any visual problem.) The skills needed to perform these slight movements are attained only through experience driving; in fact, most complete novices on the first driving lesson alternate between going toward the ditch and almost crossing the center line—much to the surprise and consternation of their novice teachers, who themselves may be unaware of their own “tremorous” movements of the steering wheel. As with sitting in a chair, explicit verbal instructions to someone else about exactly how to drive a car could result in disaster for the person who follows them rigidly.

Consider the curious thing that happened during the Paris Wine Tasting of 1976, alternatively known as the Judgement of Paris (its name was inspired by a story in Greek

mythology). During this blind taste competition, French wine experts judged ten different reds and ten different whites. Contrary to the strongly held belief that France produced the finest wines, it was the California wines that received the highest scores. Not only did the shocking results of the competition call into question the supposed superiority of French wine, but it served as a reason for people to wonder what authority an expert had over a casual wine drinker.

Abstract of Experience and validity of clinical judgment: The illusory correlation
Mental health experts often justify diagnostic and predictive judgments on the basis of "years of experience" with a particular type of person. Justification by experience is common in legal settings, and can have profound consequences for the person about whom such judgments are made. However, research shows that the validity of clinical judgment and amount of clinical experience are unrelated. The role of experience in learning varies as a function of what is to be learned. Experiments show that learning conceptual categories depends upon: (1) the learner's having clear hypotheses about the possible rule for category membership prior to receiving feedback about which instances belong to the category, and, (2) the systematic nature of such feedback, especially about erroneous categorizations. Since neither of these conditions is satisfied in clinical contexts in psychology, the subsequent failure of experience per se to enhance diagnostic or predictive validity is unsurprising. Claims that "I can tell on the basis of my experience with people of a particular type (e.g., child abusers) that this person is of that type (e.g., a child abuser)" are simply invalid.

14. Become A Learning Machine

When successful people from different fields offer the same advice, I listen. Often they have different vocabulary around an idea, but when you break it down you realize they're talking about the same thing.

Below is an example of Charlie Munger, Carol Dweck, and Susan Cain, offering the same core advice: Become a Learning Machine.

If you want to go to bed smarter than you woke up, you need to learn something new each day. It doesn't matter how smart you are today; what matters it that you learn something new and useful. If you can simply repeat that day after day, you will find that you outperform others.

It can be hard to grasp this concept because the differences at first are small. Only as the days turn into weeks, the weeks into months, the months into years, and the years into decades will you look back and wonder how it happened.

Charlie Munger:

I constantly see people rise in life who are not the smartest, sometimes not even the most diligent, but they are learning machines. They go to bed every night a little wiser than they were when they got up and boy does that help, particularly when you have a long run ahead of you.

Carol Dweck says:

You have to apply yourself each day to becoming a little better. By applying yourself to the task of becoming a little better each and every day over a period of time, you will become a lot better.

And this tidbit from Susan Cain, also fits:

...identify the tasks or knowledge that are just out of your reach, strive to upgrade your performance, monitor your progress, and revise accordingly.

15. Why Nations Fail

An interesting opinion piece by Thomas Friedman in the New York Times on the new book Why Nations Fail, co-authored by the M.I.T. economist Daron Acemoglu and the Harvard political scientist James A. Robinson.

The more you read it, the more you appreciate what a fool's errand we're on in Afghanistan and how much we need to totally revamp our whole foreign aid strategy. But most intriguing are the warning flares the authors put up about both America and China.

Why Nations Fail argues the key differentiator between countries is their institutions. Nations fail when institutions concentrate power in the hands of only a few.

From Why Nations Fail:

Inclusive economic institutions that enforce property rights, create a level playing field, and encourage investments in new technologies and skills are more conducive to economic growth than extractive economic institutions that are structured to extract resources from the many by the few.

"Inclusive economic institutions, are in turn supported by, and support, inclusive political institutions," which "distribute political power widely in a pluralistic manner and are able to achieve some amount of political centralization so as to establish law and order, the foundations of secure property rights, and an inclusive market economy."

Back to Friedman in the Times

The lesson of history, the authors argue, is that you can't get your economics right if you don't get your politics right, which is why they don't buy the notion that China has found the magic formula for combining political control and economic growth.

"Our analysis," says Acemoglu, "is that China is experiencing growth under extractive institutions — under the authoritarian grip of the Communist Party, which has been able to monopolize power and mobilize resources at a scale that has allowed for a burst of economic growth starting from a very low base," but it's not sustainable because it doesn't foster the degree of "creative destruction" that is so vital for innovation and higher incomes.

"Sustained economic growth requires innovation," the authors write, "and innovation cannot be decoupled from creative destruction, which replaces the old with the new in the economic realm and also destabilizes established power relations in politics."

"Unless China makes the transition to an economy based on creative destruction, its growth will not last," argues Acemoglu. But can you imagine a 20-year-old college dropout in China being allowed to start a company that challenges a whole sector of state-owned Chinese companies funded by state-owned banks? he asks.

Afghanistan was a fool's errand

The post-9/11 view that what ailed the Arab world and Afghanistan was a lack of democracy was not wrong, said Acemoglu. What was wrong was thinking that we could easily export it. Democratic change, to be sustainable, has to emerge from grassroots movements, "but that does not mean there is nothing we can do," he adds.

As for America

Acemoglu worries that our huge growth in economic inequality is undermining the inclusiveness of America's institutions, too. "The real problem is that economic inequality, when it becomes this large, translates into political inequality."

16. A Primer on Strategy

There are many good reasons to read Good Strategy Bad Strategy by Richard Rumelt. You may be frustrated by the state of your organization's strategy. You may be interested in identifying the characteristics of good strategy. Or you may want to learn how to identify the elements of a bad strategy.

A leader's most important responsibility is identifying the biggest challenges to forward progress and devising a coherent approach to overcoming them. In contexts ranging from corporate direction to national security, strategy matters. Yet we have become so accustomed to strategy as exhortation that we hardly blink an eye when a leader spouts slogans and announces high-sounding goals, calling the mixture a "strategy."

Complexity

"A hallmark of mediocrity and bad strategy," Rumelt writes, "is unnecessary complexity—a flurry of fluff masking an absence of substance." Most bad strategies are nothing more than statements of desire. And if you read them closely, the goals often contradict one another.

This book should be required reading for managers and executives alike.

The Strategy Retreat

I'm sure this excerpt sounds familiar to many of you:

The event was a "strategy retreat." The CEO had modeled it on a similar event at British Airways he had attended several years before. About two hundred upper-level managers from around the world gathered in a hotel ballroom where top management presented a vision for the future: to be the most respected and successful company in their field. There was a specially produced motion picture featuring the firm's products and services being used in colorful settings around the world. There was an address by the CEO accompanied by dramatic music to highlight the company's "strategic" goals: global leadership, growth, and high shareholder return. There were breakouts into smaller groups to allow discussion and buy-in. There was a colorful release of balloons. There was everything but strategy.

Good strategy is the exception not the rule. Rumelt argues that the bad strategy problem is only growing. Even worse, more and more leaders think they have a strategy when they do not—they have a bad strategy. Bad strategy, "ignores the power of choice and focus, trying instead to accommodate a multitude of conflicting demands and interests." Sounds familiar?

What is a bad strategy?

Bad strategy is long on goals and short on policy or action. It assumes that goals are all you need. It puts forward strategic objectives that are incoherent and, sometimes, totally impracticable. It uses high-sounding words and phrases to hide these failings.

Underperformance

When a leader characterizes the challenge as underperformance, it sets the stage for bad strategy. Underperformance is a result. The true challenges are the reasons for the underperformance.

Good Strategy

Good strategy is not just "what" you are trying to do. It is also "why" and "how" you are doing it. ... Good strategy requires leaders who are willing and able to say no to a wide variety of actions and interests. Strategy is at least as much about what an organization does not do as it is about what it does.

Strategy is not vision or ambition

Despite the roar of voices wanting to equate strategy with ambition, leadership, "vision," planning, or the economic logic of competition, strategy is none of these. The core of strategy work is always the same: discovering the critical factors in a situation and designing a way of coordinating and focusing actions to deal with those factors. A leader's most important responsibility is identifying the biggest challenges to forward progress and

devising a coherent approach to overcoming them. In contexts ranging from corporate direction to national security, strategy matters.

The Three Elements of Strategy

The kernel of a strategy contains three elements: a diagnosis, a guiding policy, and coherent action. The guiding policy specifies the approach to dealing with the obstacles called out in the diagnosis. It is like a signpost, marking the direction forward but not defining the details of the trip. Coherent actions are feasible coordinated policies, resource commitments, and actions designed to carry out the guiding policy.

Coherence of design

A good strategy doesn't just draw on existing strength; it creates strength through the coherence of its design. Most organizations of any size don't do this. Rather, they pursue multiple objectives that are unconnected with one another or, worse, that conflict with one another.

Coordination is costly and hard

Coordination is costly, because it fights against the gains to specialization, the most basic economies in organized activity. To specialize in something is, roughly speaking, to be left alone to do just that thing and not be bothered with other tasks, interruptions, and other agents' agendas. As is clear to anyone who has belonged to a coordinating committee, coordination interrupts and de-specializes people.

Good strategy is surprising

Most complex organizations spread rather than concentrate resources, acting to placate and pay off internal and external interests. Thus, we are surprised when a complex organization, such as Apple or the U.S. Army, actually focuses its actions. Not because of secrecy, but because good strategy itself is unexpected.

Focus, however, is hard. It means saying no to individuals, groups, and even entire lines of business.

The inside view describes the fact that people tend to see themselves, their group, their project, their company, or their nation as special and different.

Increasing value ...

In particular, increasing value requires a strategy for progress on at least one of four different fronts: deepening advantages, broadening the extent of advantages, creating higher demand for advantaged products or services, or strengthening the isolating mechanisms that block easy replication and imitation by competitors.

Unfinished Thought

As I was reading this book I kept wondering why organizations were so reluctant to employ a strategy. All of this thinking reminded me of another book I had read a few years back on strategy called The Strategy Paradox.

What is the paradox?

The most profitable strategies are "extreme" strategies that commit companies to positions of either product differentiation or cost leadership. These extreme positions expose firms to a greater likelihood of bankruptcy by increasing the strategic risk they face.

Consequently, the strategies likeliest to succeed are also likeliest to fail. That is the strategy paradox.

At first I thought that maybe organizations avoided good strategy simply because it was complicated and involved hard choices. The more I thought about it, however, the more I settled on the fact that people avoid good strategies because they don't want to be wrong. When Steve Jobs took over Apple, he did the unexpected.

What he did was both obvious and, at the same time, unexpected. He shrunk Apple to a scale and scope suitable to the reality of its being a niche producer in the highly competitive personal computer business. He cut Apple back to a core that could survive. Steve Jobs talked Microsoft into investing \$150 million in Apple, exploiting Bill Gates's concerns about what a failed Apple would mean to Microsoft's struggle with the

Department of Justice. Jobs cut all of the desktop models—there were fifteen—back to one. He cut all portable and handheld models back to one laptop. He completely cut out all the printers and other peripherals. He cut development engineers. He cut software development. He cut distributors and cut out five of the company's six national retailers. He cut out virtually all manufacturing, moving it offshore to Taiwan. With a simpler product line manufactured in Asia, he cut inventory by more than 80 percent. A new Web store sold Apple's products directly to consumers, cutting out distributors and dealers.

What is remarkable about Jobs's turnaround strategy for Apple was how much it was "Business 101" and yet how much of it was unanticipated.

In May 1998, shortly after taking over Apple, Jobs explained the substance and coherence of his actions:

The product lineup was too complicated and the company was bleeding cash. A friend of the family asked me which Apple computer she should buy. She couldn't figure out the differences among them and I couldn't give her clear guidance, either. I was appalled that there was no Apple consumer computer priced under \$2,000. We are replacing all of those desktop computers with one, the Power Mac G3. We are dropping five of six national retailers—meeting their demand has meant too many models at too many price points and too much markup.

Jobs's actions were both focused and decisive and, in hindsight, correct. Everyone at the time was surprised because they expected the fluffy goals and vacuous promises typical of most executives. But Jobs's back-to-business 101 approach was correct. Jobs had a sick business and he needed to fix it.

While Jobs's turnaround at Apple was impressive it wouldn't enable Apple to become more than a niche player in an industry dominated by network effects. In 1998 Rumelt had a chance to ask Jobs "What is the strategy?" Jobs responded simply "I am going to wait for the next big thing."

This encounter struck Rumelt as different. Everywhere he went and everyone he talked to just spewed the same clichés about their strategy — network relationships, adopt best practices, etc.

Rumelt writes:

Jobs did not enunciate some simple-minded growth or market share goal. He did not pretend that pushing on various levers would somehow magically restore Apple to market leadership in personal computers. Instead, he was actually focused on the sources of and barriers to success in his industry—recognizing the next window of opportunity, the next set of forces he could harness to his advantage, and then having the quickness and cleverness to pounce on it quickly like a perfect predator. There was no pretense that such windows opened every year or that one could force them open with incentives or management tricks. He knew how it worked. He had done it before with the Apple II and the Macintosh and then with Pixar. He had tried to force it with NeXT, and that had not gone well. It would be two years before he would make that leap again with the iPod and then online music. And, after that, with the iPhone.

Steve Jobs's answer that day—"to wait for the next big thing"—is not a general formula for success. But it was a wise approach to Apple's situation at that moment, in that industry, with so many new technologies seemingly just around the corner.

In hindsight we know Jobs's strategy worked but it could have just as easily backfired. The turnaround might have failed and landed Apple, now the world's largest company, in bankruptcy. Apple's strategy at the time wasn't easy to like — in fact, many people thought he was wrong. I imagine that Jobs would have been ok with being wrong — he was more worried about being mediocre.

We equate strategy with success but they are different things.

Real strategies—*good strategies*—can be wrong. And we don't want to be wrong. We're playing not to lose rather than playing to win. We all know how it feels to make a mistake

— we'd rather watch other people make mistakes than make them ourselves. So we seek consensus because it's safe.

Yet consensus, when you think about it, is almost assured to fail. It's making everyone happy and alienating no one.

Consensus is the opposite of marshalling your resources towards a coordinated approach. And consensus, by definition, almost certainly assures a bad strategy because it doesn't make any choices. It's a sprinkle of this and a dash of that — it's something for everyone. Rather than risk being wrong, we hide behind puff that makes everyone happy. That's bad strategy.

The beauty of Good Strategy Bad Strategy is that it calls out the vast majority of public and private organizations that have horrible strategies. The bad news is that things are unlikely to change. After all, no one ever got fired for having a strategy to "increase the percentage of high school graduates." It's hard to argue with that as a goal but let's stop calling it a strategy.

There are plenty of good strategies out there. Lou Gestner developed one when he took over IBM in 1993 (for details see Gestner's book — Who Says Elephants Can't Dance?: Leading a Great Enterprise through Dramatic Change). He understood the problem and devised an approach that marshalled the organization towards dealing with the problem.

17. Do You Know What You Don't Know?

You probably don't know as much as you think you do. When put to the test, most people find they can't explain the workings of everyday things they think they understand. Don't believe me? Find an object you use daily (a zipper, a toilet, a stereo speaker) and try to describe the particulars of how it works. You're likely to discover unexpected gaps in your knowledge. In psychology, we call this cognitive barrier the illusion of explanatory depth. It means you think you fully understand something that you actually don't. We witness this all the time with the use of buzz words (think "strategic," "streamline," etc.).

While often used, the meaning of these words is usually unclear and masks gaps in our knowledge, "serving as placeholders that gloss concepts we don't fully understand."

These words are similar to Aphorisms in the sense that they stifle informed debate — you're expected to get the gist of what people mean and move on.

For example, several years ago, I attended a corporate meeting where the vice president spoke about streamlining business practices in the coming year. During the talk, executives around the room nodded in agreement. Afterward, though, many of them discussed what streamlining actually meant. None of the people who had nodded in agreement could exactly define the mechanics of how to streamline a business practice.

One tip:

Explain concepts to yourself as you learn them. Get in the habit of self-teaching. Your explanations will reveal your own knowledge gaps and identify words and concepts whose meanings aren't clear.

18. The Copernican Principle: How To Predict Everything

An old (1999) New Yorker article introduces us to J. Richard Gott III, a Princeton astrophysicist and some of his ideas on prediction. The core idea is that — despite what we'd like — we are not that special. So when we encounter something, we are unlikely to be doing so at a special time in its life. This is the Copernican Principle.

"On May 27, 1993, I looked up all the plays that were listed in The New Yorker—Broadway and Off Broadway plays and musicals—and called up each of the theatres and asked when each play had opened," Gott recalls. "I predicted how long each would run, based solely on how long it had been running already. Forty-four shows were playing at the time. So far, thirty-six of them have closed, all in agreement with my predictions of how long they would last. And the others, which are still running, are also within the range I'd predicted." *It must be said that Gott's predictions are, well, broad. He predicted, for instance, that "Marisol," which had been open for a week when he called the theatres, would close in less than thirty-nine weeks; it lasted 10 more days. To "Cats," which had then been running for three thousand eight hundred and eighty-five days, Gott assigned a longevity of not less than a hundred days and not more than four hundred and fourteen years.*

The significance of Gott's approach rests in its competence in addressing issues previously inaccessible to scientific inquiry, such as, say, trying to predict how long the human species will endure.

"As time goes on, you'll understand. What lasts, lasts; what doesn't, doesn't. Time solves most things. And what time can't solve, you have to solve yourself."

— Haruki Murakami

"My approach is based on the Copernican principle, which has been one of the most famous and successful scientific hypotheses in the history of science," Gott said. "It's named after Nicolaus Copernicus, who proved that the earth is not the center of the universe; and it's simply the idea that your location is not special. The more we've learned about the universe, the more non-special our location has looked. The earth is orbiting an ordinary star in an ordinary galaxy. The reason the Copernican principle works is that, of all the places for intelligent observers to be, there are, by definition, only a few special places and many non-special places. So you're simply more likely to be in one of the many non-special places."

The predictions that I make are based on applying this principle to time. I first thought of it in 1969. I'd just graduated from Harvard and was traveling around Europe, and I visited the Berlin Wall. People at the time wondered how long the Wall might last. Was it a temporary aberration, or a permanent fixture of modern Europe? Standing at the Wall in 1969, I made the following argument, using the Copernican principle. I said, Well, there's nothing special about the timing of my visit. I'm just travelling—you know, Europe on five dollars a day—and I'm observing the Wall because it happens to be here. My visit is random in time. So if I divide the Wall's total history, from the beginning to the end, into four quarters, and I'm located randomly somewhere in there, there's a fifty-percent chance that I'm in the middle two quarters—that means, not in the first quarter and not in the fourth quarter.

Let's suppose that I'm at the beginning of that middle fifty percent. In that case, one-quarter of the Wall's ultimate history has passed, and there are three-quarters left in the future. In that case, the future's three times as long as the past. On the other hand, if I'm at the other end, then three-quarters have happened already, and there's one-quarter left in the future. In that case, the future is one-third as long as the past.

The Wall was 8 years old at the time. "So I said to a friend, 'There's a fifty-percent chance that the Wall's future duration will be between two-thirds of a year (I believe this should be two and two-thirds of a year — i.e. $1/3$ of 8) and twenty-four years.' Twenty years later, in 1989, the Wall came down, within those two limits that I had predicted. I thought, maybe I should write this up."

Recently, it's come to be understood that systems may behave chaotically and therefore be unpredictable. You know, a butterfly in the Amazon can affect the weather thousands of miles away, that sort of thing. This has led some people to say that predicting the future of complex systems is impossible. Which is true if you are concerned with the precise specifics. To predict the name of the President of the United States in the year 2085, for instance, is impossible. But if you ask the right question maybe you can get an interesting answer.

As for the question of how long the human species will last Gott offers some wise words. When the author of the New Yorker article, Timothy Ferris, asked his friends how long humans would last, "most people predicted either that humans beings will last less than two hundred years or that we're good for more than ten million years." To which Gott responded, "That's because people like to think they're living in special times. We like to think of ourselves as near the beginning of things, or in an apocalyptic situation near the end. It's more dramatic that way. A lot of people might say, 'Oh, but we are in a special epoch. We're in the epoch when men first went to the moon, when we discovered genetic engineering, nuclear energy, and so forth.' My answer to this is that the Copernican principle predicts that you will be living in a high-population century—most people do, just as most people come from cities with higher than average populations, in larger than average nations. It's people who make discoveries, so if you live when there are more people around, you should expect to live in an age when a lot of interesting discoveries are being made."

19. Nassim Taleb: The Winner-Take-All Effect In Longevity

Nassim Taleb elaborates on the Copernican Principle, a concept first introduced on Farnham Street in How To Predict Everything.

For the perishable, every additional day in its life translates into a shorter additional life expectancy. For the nonperishable, every additional day implies a longer life expectancy. So the longer a technology lives, the longer it is expected to live. Let me illustrate the point. Say I have for sole information about a gentleman that he is 40 years old and I want to predict how long he will live. I can look at actuarial tables and find his age-adjusted life expectancy as used by insurance companies. The table will predict that he has an extra 44 to go. Next year, when he turns 41 (or, equivalently, if apply the reasoning today to another person currently 41), he will have a little more than 43 years to go. So every year that lapses reduces his life expectancy by about a year (actually, a little less than a year, so if his life expectancy at birth is 80, his life expectancy at 80 will not be zero, but another decade or so).

The opposite applies to nonperishable items. I am simplifying numbers here for clarity. If a book has been in print for forty years, I can expect it to be in print for another forty years. But, and that is the main difference, if it survives another decade, then it will be expected to be in print another fifty years. This, simply, as a rule, tells you why things that have been around for a long time are not “aging” like persons, but “aging” in reverse. Every year that passes without extinction doubles the additional life expectancy. This is an indicator of some robustness. The robustness of an item is proportional to its life!

This is the “winner-take-all” effect in longevity.

The main argument against this idea is the counterexample — newspapers and traditional telephone lines come to mind. These technologies, widely considered inefficient and dying, have been around for a long time. Yet the Copernican Principle would suggest they will continue to live on for a long time.

These arguments miss the point of probability. The argument is not about a specific example, but rather about the life expectancy, which is, Taleb writes “simply a probabilistically derived average.”

Perhaps an example, from Taleb, will help illustrate. If I were to ask you to guess the life expectancy of the average 40 year old man, you would probably guess around 80 (at least that's what the actuarial tables likely reveal). However, if I now add that the man is suffering from cancer, we would revisit our decision and most likely revise our estimate downward. “It would,” Taleb writes, “be a mistake to think that he has forty four more years to live, like others in his age group who are cancer-free.”

20. Economists Are Overconfident. So Are You.

The point of regression analysis is to make predictions based on past relationships. “My concern,” one of the authors of the paper said, “is that when reading economics journal articles you get the impression that the world is much more predictable than it is.”

What Soyer and Hogarth did was get 257 economists to read about a regression analysis that related independent variable X to dependent variable Y, then answer questions about the probabilities of various outcomes (example: if X is 1, what’s the probability of Y being greater than 0.936?).

When the results were presented in the way empirical results usually are presented in economics journals — as the average outcomes of the regression followed by a few error terms — the economists did a really bad job of answering the questions. They paid too much attention to the averages, and too little to the uncertainties inherent in them, thereby displaying too much confidence.

When the economists were shown the numerical results plus scatter graphs of the same data, they did slightly better. The economists who were shown only the graphs and none of the numerical results, meanwhile, actually got most of the answers right, or close to right. The bigger point here, which Soyer and Hogarth have elaborated in other research, is that we tend to understand probabilistic information much better when it’s presented in visual form than if we’re just shown the numbers. (This was also a key argument of Sam Savage’s edifying and entertaining 2009 book The Flaw of Averages.) What’s so interesting is to learn that statistically literate experts are just as likely to glom onto the point estimate and discount the uncertainty as, say, innumerate journalists reporting the results of political polls.

21. Daniel Kahneman — What I Know

Nobel prize-winning psychologist Daniel Kahneman talks with the Guardian about his pessimistic mother, the delusion of investment bankers and the need for irony.

Human beings cannot comprehend very large or very small numbers. It would be useful for us to acknowledge that fact.

My main work has concerned judgment and decision-making. But I never felt I was studying the stupidity of mankind in the third person. I always felt I was studying my own mistakes.

Happiness is complicated. There are two components. One is strongly genetic; the second is a question of how you feel at any moment. I am pretty content, but I had a very pessimistic mother, and I've always been known as a pessimist.

It was always assumed I would be a professor. I grew up thinking it.

There is a powerful idea that we should want to be richer. I went to a financial advisor in the States and said: "I don't really want to get richer, but I would like to continue to live like I do." She said: "I can't work with you."

Collaboration is not only more creative, it is more fun. Amos Tversky, my research partner, and I were better together than on our own. We sort of knew that. Mostly it was extremely pleasant not trying to work everything out yourself.

A sense of irony is essential. When we wrote our first paper, "The Law of Small Numbers", we were laughing all the time we wrote it. A colleague we showed it to said: "This is going to change things." I didn't take him seriously.

Many people now say they knew a financial crisis was coming, but they didn't really. After a crisis we tell ourselves we understand why it happened and maintain the illusion that the world is understandable. In fact, we should accept the world is incomprehensible much of the time.

Motives are rarely straightforward. When the war started my father was chief of research for a company that was part of L'Oréal in Paris. The owner of L'Oréal was also a main funder of the fascist party in France, and antisemitic. But he protected my [Jewish] father during the war when he was taken by the Nazis.

People who wouldn't even come to your funeral seem to take simple pleasure in the fact that you have won the Nobel prize [for economic sciences], and it makes them feel good about themselves to feel that way. For a while you are spreading joy.

Investment bankers believe in what they do. They don't want to hear that their decisions are no better than chance. The rest of us pay for their delusions.

Despite 45 years of work in the field, I am still inclined to make over-confident predictions.

Economists have a mystique among social scientists because they know mathematics. They are quite good at explaining what has happened after it has happened, but rarely before. I don't think of myself as an economist at all.

I enjoy being active but I look forward to the day when I can retire to the internet.

22. Simplicity's Best Friend: Small Groups of Smart People

More brains don't necessarily lead to better ideas. When it came to leading meetings, Steve Jobs had no qualms about tossing the least necessary person out of the room.

An excerpt from Insanely Simple: The Obsession That Drives Apple's Success:

One particular day, there appeared in our midst a woman from Apple with whom I was unfamiliar. I don't recall her name, as she never appeared in our world again, so for the purposes of this tale, I'll call her Lorrie. She took her seat with the rest of us as Steve breezed into the boardroom, right on time. Steve was in a sociable mood, so we chatted it up for a few minutes, and then the meeting began. "Before we start, let me just update you on a few things," said Steve, his eyes surveying the room. "First off, let's talk about iMac—" He stopped cold. His eyes locked on to the one thing in the room that didn't look right. Pointing to Lorrie, he said, "Who are you?"

Lorrie was a bit stunned to be called out like that, but she calmly explained that she'd been asked to attend because she was involved with some of the marketing projects we'd be discussing. Steve heard it. Processed it. Then he hit her with the Simple Stick. "I don't think we need you in this meeting, Lorrie. Thanks," he said. Then, as if that diversion had never occurred—and as if Lorrie never existed—he continued with his update. So, just as the meeting started, in front of eight or so people whom Steve did want to see at the table, poor Lorrie had to pack up her belongings, rise from her chair, and take the long walk across the room toward the door. Her crime: She had nothing to add.

Simplicity's Best Friend: Small Groups of Smart People

Start with small groups of smart people—and keep them small. Every time the body count goes higher, you're simply inviting complexity to take a seat at the table. The small-group principle is deeply woven into the religion of Simplicity. It's key to Apple's ongoing success and key to any organization that wants to nurture quality thinking. The idea is pretty basic: Everyone in the room should be there for a reason. There's no such thing as a "mercy invitation." Either you're critical to the meeting or you're not. It's nothing personal, just business.

Steve Jobs actively resisted any behavior he believed representative of the way big companies think—even though Apple had been a big company for many years. He knew that small groups composed of the smartest and most creative people had propelled Apple to its amazing success, and he had no intention of ever changing that. When he called a meeting or reported to a meeting, his expectation was that everyone in the room would be an essential participant. Spectators were not welcome.

This was based on the somewhat obvious idea that a smaller group would be more focused and motivated than a large group, and smarter people will do higher quality work. For a principle that would seem to be common sense, it's surprising how many organizations fail to observe it. How many overpopulated meetings do you sit through during the course of a year? How many of those meetings get sidetracked or lose focus in a way that would never occur if the group were half the size? The small-group rule requires enforcement, but it's worth the cost.

Remember, complexity normally offers the easy way out. It's easier to remain silent and let the Lorries of the world take their seats at the table, and most of us are too mannerly to perform a public ejection. But if you don't act to keep the group small, you're creating an exception to the rule—and Simplicity is never achieved through exceptions. Truthfully, you can do the brutal thing without being brutal. Just explain your reasons. Keep the group small.

Prior to working with Steve Jobs, I worked with a number of more traditional big companies. So it was a shock to my system (in a good way) when I entered Steve's world of Simplicity. In Apple's culture, progress was much easier to attain. It was also a shock to my system (in a bad way) when I left Steve's world and found myself suffering through the same old issues with more traditional organizations again.

And

Out in the real world, when I talk about small groups of smart people, I rarely get any pushback. That's because common sense tells us it's the right way to go. Most people know from experience that the fastest way to lose focus, squander valuable time, and water down great ideas is to entrust them to a larger group. Just as we know that there is equal danger in putting ideas at the mercy of a large group of approvers.

One reason why large, unwieldy groups tend to be created in many companies is that the culture of a company is bigger than any one person. It's hard to change "the way we do things here." This is where the zealots of Simplicity need to step in and overcome the inertia. One must be judicious and realistic about applying the small-group principle.

Simply making groups smaller will obviously not solve all problems, and "small" is a relative term. Only you know your business and the nature of your projects, so only you can draw the line between too few people and too many. You need to be the enforcer and be prepared to hit the process with the Simple Stick when the group is threatened with unnecessary expansion.

23. The Oracle, a Manual of the Art of Discretion

In The Art of Worldly Wisdom, Christopher Maurer translates this gem from Baltasar Gracián y Morales:

Know how to sell your wares, intrinsic quality isn't enough. Not everyone bites at substance or looks for inner value. People like to follow the crowd; they go someplace because they see other people do so. It takes much skill to explain something's value. You can use praise, for praise arouses desire. At other times you can give things a good name (but be sure to flee from affectation). Another trick is to offer something only to those in the know, for everyone believes himself an expert, and the person who isn't will want to be one. Never praise things for being easy or common: you'll make them seem vulgar and facile. Everybody goes for something unique. Uniqueness appeals both to the taste and to the intellect.

24. David Foster Wallace: The Paradox of Plagiarism

David Foster Wallace (1962–2008) remains one of the most revered authors of our time. His timeless collection of wisdom includes everything from his famous commencement speech This is Water to his profound thoughts on the relationship between ambition and perfectionism and writing in the age of information.

In The Pale King, published posthumously, Foster Wallace describes the paradox of plagiarism.

It was all pretty incredible. In many respects, this college was my introduction to the stark realities of class, economic stratification, and the very different financial realities that different sorts of Americans inhabited.

Some of these upper-class students were indeed spoiled, cretinous, and/or untroubled by questions of ethics. Others were under great family pressure and failing, for whatever reasons, to work up to what their parents considered their true grade potential. Some just didn't manage their time and responsibilities well, and found themselves up against the wall on an assignment. I'm sure you get the basic picture. Let's just say that, as a way of positioning myself to pay off some of my loans at an accelerated rate, I provided a certain service. This service was not cheap, but I was quite good at it, and careful. E.g., I always demanded a large enough sample of a client's prior writing to determine how he tended to think and sound, and I never made the mistake of delivering something that was unrealistically superior to someone's own previous work. You can probably also see why these sorts of exercises would be good apprentice training for someone interested in so-called 'creative writing.'

... To anticipate a likely question, let me concede that the ethics here were gray at best. This is why I chose to be honest, just above, about not being impoverished or needing the extra income in order to eat anything. I was not desperate. I was, though, trying to accumulate some savings against what I anticipated to be debilitating post-grad debt. I am aware that this is not an excuse in the strict sense, but I do believe it serves as at least an explanation; and there were also other, more general factors and contexts that might be seen as mitigating. For one, the college itself turned out to have a lot of moral hypocrisy about it, e.g., congratulating itself on its diversity and the leftist piety of its politics while in reality going about the business of preparing elite kids to enter elite professions and make a great deal of money, thus increasing the pool of prosperous alumni donors.

... The basic view I held was that, whereas there may have been elements of my enterprise that might technically qualify as aiding or abetting a client's decision to violate the college's Code of Academic Honesty; that decision, as well as the practical and moral responsibility for it rested with the client. I was undertaking certain freelance writing assignments for pay; why certain students wanted certain papers of a certain length on certain topics, and why they chose to do them with them after delivery, were not my business.

Suffice it to say that this view was not shared by the college's Judicial Board in late 1984. Here the story gets complex and a bit lurid, and a SOP memoir would probably linger on the details and the rank unfairness of hypocrisies involved.

The paradox of plagiarism

The paradox of plagiarism is that it actually requires a lot of care and hard work to pull off successfully, since the original text's style, substance, and logical sequences have to be modified enough so that the plagiarism isn't totally, insultingly obvious to the professor who's grading it.

Update: D.T. Max questions whether David Foster Wallace ever did the stuff he says he did in the Pale King.

Practically speaking, one of the great struggles was to figure out what really happened or at least get close to it. David was writing his autobiography even as he was living it and the life and the narrative coincided but were not identical. Take an example. David used to tell people he sold thesis help for pot or money at Amherst. He even has his doppel do it in

The Pale King and Stonecipher LaVache Beadsman, something of a stand-in for David, does it in The Broom of the System. David was one of the smartest people anyone ever met in their lives—everyone agrees on that—so it's obvious that in philosophy or English, and probably history or French or economics, all subjects he got A-pluses in—he could have done it. Anyone would have been smart to make that trade with him. But did it ever happen? His college roommate and confidante Mark Costello, the one who knew him best in those years, thinks not. He thinks it's David's self-mythologizing. I never found anyone on the receiving end of such a transaction or had direct knowledge of one, so it's not in the book. If I were writing a novel with David as the protagonist, it would certainly be something the character did. It's something he should have done if he didn't.

25. Insanely Simple

I learned quite a lot about organizational culture while reading Ken Segall's Insanely Simple: The Obsession That Drives Apple's Success.

Segall worked closely with Steve Jobs as an ad agency creative director for NeXT and Apple and was a member of the team that created the legendary 'Think Different' campaign. Oh, and he's also the guy responsible for the "i" that found itself in Apple product names like the iPad and iPhone.

Segall compares the difference between working *with* Apple and working with *other companies* like Dell and Intel and the contrast is shocking. Apple might be the biggest corporation in the world but it's certainly not the most bureaucratic.

Here are some of my highlights from the book.

Why is it that only a small handful of companies are able to produce truly great marketing campaigns?

One major reason is that most big organizations are simply awful at thinking small. They're unable to streamline complicated processes. Even when they successfully identify their challenges, develop strategies, and create great work that brings them to life, their processes choke the life out of that work. They inflict endless meetings and multiple approvals upon what should be a simpler way of working.

What you ask for and what you allow ...

Companies that don't have a leader with Steve's passion tend to see marketing in more clinical terms. For them, marketing is just another spoke in the wheel, an organization within the organization. Chief marketers in these companies typically demand brilliant creativity but support processes that make it difficult. They seem to think that if they demand greatness, it will somehow land on their desk.

If process is king ...

When process is king, ideas will never be. It takes only Common Sense to recognize that the more layers you add to a process, the more watered down the final work will become.

Most companies have an inability to focus ...

Many companies can't stop themselves from responding to every opportunity, trying to please every customer and close every sale — when in fact they would be better served by making their product lineup logical and easier to navigate. They seem to forget that trying to please everyone is a good way to please no one.

Powerpoint is a poor method of communication ...

It drove Steve batty to see in twenty slides what could be spoken in three sentences. He valued his time way too much for that. He preferred straight talk and raw content to a slick presentation. In fact, a slick presentation would only make him suspect that you were fluffing up the few facts you really had. It meant that you'd devoted valuable time to the wrapping of your idea rather than thinking through the content itself. ... Few people who attend an overblown, hard-to-digest presentation return to their offices eager to set the world on fire. Most prefer to head for the nearest bar. This is not the way to inspire people to greatness. This is simply checking off boxes to make sure every last fact is on the table. It serves the purpose of the presenters, but not the attendees.

Did Jobs listen to the experts?

This is not to say that Steve's skepticism led him to ignore his experts' advice. It just means that he would consider their advice in context of other evidence, his larger goals for the company, and common sense.

26. The Checklist Manifesto: How to Get Things Right

It's no secret that I'm a huge fan of Atul Gawande. A reader recently pointed out that I hadn't covered his most recent book, *The Checklist Manifesto: How to Get Things Right*. I had only covered an interesting subset of the book—why we fail.

The Checklist Manifesto

To put us in the proper context, we're smart. Not scary smart but smart enough. We have skills, and we generally put them in the most highly trained and hardworking people we can find. We have the most educated society in history. And we've accomplished a lot. Nevertheless, sometimes, success escapes us for avoidable reasons. Not only are these failures common—across everything from medicine to finance—but they are also frustrating. We should know better, but we don't. The reason we don't learn, Gawande argues, is evident:

the volume and complexity of what we know has exceeded our individual ability to deliver its benefits correctly, safely, or reliably. Knowledge has both saved us and burdened us.

To overcome this, we need a strategy. Something that “builds on experience and takes advantage of the knowledge people have but somehow also makes up for our inevitable human inadequacies.” We need a checklist.

In response to increasing complexity, we've become more specialized. We divide the problem up. It's not just the growing breadth and quantity of knowledge that makes things more complicated, although they certainly are significant contributors. It is also execution. In every field from medicine to construction, there are a slew of practical procedures, policies, and best practices. Gawande breaks this down for the modern medical case: *[Y]ou have a desperately sick patient and in order to have a chance of saving him you have to get the knowledge right and then you have to make sure that the 178 daily tasks that follow are done correctly—despite some monitor's alarm going off for God knows what reason, despite the patient in the next bed crashing, despite a nurse poking his head around the curtain to ask whether someone could help “get this lady's chest open.” There is complexity upon complexity. And even specialization has begun to seem inadequate. So what do you do?*

The response of the medical profession, like most others, is to move from specialization to super-specialization. Gawande argues that these super-specialists have two advantages over ordinary specialists: greater knowledge of the things that matter and “a learned ability to handle the complexities of that particular job.” But even for these super specialists, avoiding mistakes is proving impossible.

Modern professions, like medicine, with their dazzling successes and spectacular failures, pose a significant challenge: “What do you do when expertise is not enough? What do you do when even the super-specialists fail?”

The origins of the checklist.

On October 30, 1935, at Wright Air Field in Dayton, Ohio, the U.S. Army Air Corps held a competition for airplane manufacturers vying to build the next-generation of the long-range bomber. Only it wasn't supposed to be much of a competition at all. The Boeing Corporation's gleaming aluminum-alloy Model 299 was expected to steal the show, its design far superior to those of the competition. In other words, it was just a formality. As the Model 299 test plane taxied onto the runway, a small group of army brass and manufacturing executives watched. The plane took off without a hitch. Then suddenly, at about 300 feet, it stalled, turned on one wing, and crashed killing two of the five crew members, including the pilot Major Hill.

Of course, everyone wanted to know what had happened. An investigation revealed that there was nothing to indicate any problems mechanically with the plane. It was a “pilot error.” The problem with the new plane, if there was one, was that it was substantially more complex than the previous aircraft. Among other things, there were 4 engines, each with its own fuel-mix, wing flaps, trim that needed constant adjustment, and propellers

requiring pitch adjustment. While trying to keep up with the increased complexity, Hill had forgotten to release a new locking mechanism on the rudder controls. The new plane was too much for anyone to fly. The unexpected winner was the smaller designed Douglas. Here is where it really gets interesting. The army, convinced of the technical superiority of the plane, ordered a few anyway. If you're thinking they'd just put the pilots through more training to fly the plane, you'd be wrong. Major Hill, the chief of flight testing, was an experienced pilot, so longer training was unlikely to result in improvement. Instead, they created a pilot's checklist.

The pilots made the list simple and short. It fit on an index card with step-by-step instructions for takeoff, flying, landing, and taxiing. It was as if someone all of a sudden gave an experienced automobile driver a checklist of things that would be obvious to them. There was nothing on the checklist they didn't know. Stuff like, check that the instruments are set, the door closed. Basics. That checklist changed the course of history and quite possibly the war. The pilots went on to fly the Model 299 a "total of 1.8 million miles" without a single accident and as a result the army ordered over 13,000 of them. In *The Checklist Manifesto*, Gawande argues that most of today's work has entered a checklist phase.

Substantial parts of what software designers, financial managers, firefighters, police officers, lawyers, and most certainly clinicians do are now too complex for them to carry out reliably from memory alone.

Yet, no one wants to use a checklist. We believe "our jobs are too complicated to reduce to a checklist." After all, we don't work at McDonald's, right?

In a complex environment, experts are up against two main difficulties. The first is the fallibility of human memory and attention, especially when it comes to mundane, routine matters that are easily overlooked under the strain of more pressing events. (When you've got a patient throwing up and an upset family member asking you what's going on, it can be easy to forget that you have not checked her pulse.) Faulty memory and distraction are a particular danger in what engineers call all-or-none processes: whether running to the store to buy ingredients for a cake, preparing an airplane for takeoff, or evaluating a sick person in the hospital, if you miss just one key thing, you might as well not have made the effort at all.

A further difficulty, just as insidious, is that people can lull themselves into skipping steps even when they remember them. In complex processes, after all, certain steps don't always matter. ... "This has never been a problem before," people say. Until one day it is. Checklists seem to provide protection against such failures. They remind us of the minimum necessary steps and make them explicit. They not only offer the possibility of verification but also instill a kind of discipline of higher performance.

In news that would shock bureaucracies and governments alike, the strategy a lot of industries use to get things right in complex environments is to give employees power. Most authorities, in response to risk, tend to centralize power and decision making. Sometimes that's even the point of a checklist—to make sure the people below you are doing things in the manner in which you want. These checklists, the McDonald's type checklists, spell out the tiniest detail of every critical step. These serve their purpose, but they also create a group of employees no longer able to adapt. When things change, as they always do, you're now faced with a non-routine problem. "The philosophy," writes Gawande, "is that you push the power of decision making out to the periphery and away from the center. You give people the room to adapt, based on their experience and expertise. All you ask is that they talk to one another and take responsibility. That is what works."

...the real lesson is that under conditions of true complexity—where the knowledge required exceeds that of any individual and unpredictability reigns—efforts to dictate every step from the center will fail. People need room to act and adapt. Yet they cannot succeed

as isolated individuals, either—that is anarchy. Instead, they require a seemingly contradictory mix of freedom and expectation—expectation to coordinate, for example, and also to measure progress toward common goals.

This was the understanding people in the skyscraper-building industry had grasped. More remarkably, they had learned to codify that understanding into simple checklists. They had made the reliable management of complexity a routine.

That routine requires balancing a number of virtues: freedom and discipline, craft and protocol, specialized ability and group collaboration. And for checklists to help achieve that balance, they have to take two almost opposing forms. They supply a set of checks to ensure the stupid but critical stuff is not overlooked, and they supply another set of checks to ensure people talk and coordinate and accept responsibility while nonetheless being left the power to manage the nuances and unpredictabilities the best they know how.

I came away from Katrina and the builders with a kind of theory: under conditions of complexity, not only are checklists a help, they are required for success. There must always be room for judgment, but judgment aided—and even enhanced—by procedure.

27. Alignment: The Key to Success Nobody Ever Taught You

I spend a lot of time thinking about this simple idea: The person who aligns themselves with the general principles of the world goes further and faster than the person who doesn't.

What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.

— Joseph Tussman

The way to align yourself with the world is to take simple ideas seriously.

Consider compounding.

We know that spending less than we make, investing the difference in index funds, and waiting for a long time creates financial independence. Yet how many people follow this principle? Not many. Most of us know what works but fail to align ourselves with it.

Compounding applies to relationships too. Not just with your partner, but with your colleagues, friends, and even your customers. For relationships to compound, they must be win-win. But how many people take a consistent win-win approach? Not many. Again, we know what works, but fail to align ourselves with it.

Outcome over Ego

Here's the trick to seeing things differently: put your energy into *being* right, not *feeling* right. While that sounds simple, it's far from easy.

If you want to be right, you have to change your mind. When the evidence indicates the approach isn't working, change the approach. This is easy with something like math, where the answers are black and white, but harder with more subjective things.

Often the hardest things to change our minds about are the things that require us to understand that just because we can't see the results immediately doesn't mean they are not moving us closer or further from the outcome we want. For instance, eating a full pizza once won't make you unhealthy, but repeating that choice daily for years certainly will.

Feeling right, on the other hand, often requires you to believe you are an exception. You know the path to financial independence, but that takes too long. It's boring. Instead, you'd rather try the latest incarnation of a get-rich-quicker scheme that promises the outcome sooner. When it inevitably fails to produce the desired results, rather than tell yourself you made a mistake you chalk it up to the world not working as it should. It's as if that little voice in your head says, "You're not wrong; the world is."

Most of us would rather bargain with how the world works than accept how it does work, cooperate with it, and move forward. This happens in a lot of areas of life. Consider the general concept of health.

A lot of people think they don't have to take care of their health. They get too little sleep. They drink too much. They eat incredible amounts of processed food. They get little to no exercise. While they know health is important, at some level they think they are the exception. Acceptance is knowing you must care for your health because it is the foundation for everything else. Without health, everything else multiplies by zero.

We are tempted to believe we're the exception because it's the easy path.

Aligning with the world often requires you to pre-pay now for a result later. A little bit of pain today for gain tomorrow. And we don't like the sounds of that.

However, if you can align yourself with the world despite what those around you do, you'll quickly discover that it tends to do most of the work for you. It just won't take the first step for you. You have to take that one for yourself.

28. They Work Long Hours, but What About Results?

Robert Pozen writes an interesting piece in the New York Times on what happens when you value busyness over achievement.

It's 5 p.m. at the office. Working fast, you've finished your tasks for the day and want to go home. But none of your colleagues have left yet, so you stay another hour or two, surfing the Web and reading your e-mails again, so you don't come off as a slacker.

We've all been there right? He continues:

a measurement system based on hours makes no sense for knowledge workers. Their contribution should be measured by the value they create through applying their ideas and skills.

By applying an industrial-age mind-set to 21st-century professionals, many organizations are undermining incentives for workers to be efficient. If employees need to stay late in order to curry favor with the boss, what motivation do they have to get work done during normal business hours? After all, they can put in the requisite "face time" whether they are surfing the Internet or analyzing customer data. It's no surprise, then, that so many professionals find it easy to procrastinate and hard to stay on a task.

Busyness, however, is no substitute for achievement. When you work in an organization that values "busyness" things will only get busier. Before you know it you're coming earlier and staying later but you're not actually doing more work — you're doing less.

29. None of us really likes honesty

None of us really likes honesty. We prefer deception—but only when it is unabashedly flattering or artfully camouflaged. Groups seem to need to believe that they are superior to others and that they have a purpose greater than just passing along their genes to the next generation. Individuals seem to need similar delusions—about who they are and why they do what they do. They need heroes, however fraudulent. People ask actors who play doctors on television what they should do for their ailments, although they know perfectly well that the actors are just playing a role. Studies show that people are more likely to accept the opinion of a confident con man than the cautious view of someone who actually knows what he is talking about. And professionals who form overconfident opinions on the basis of incorrect readings of the facts are more likely to succeed than their more competent peers who display greater doubt.

What's more, deception works best, according to studies by psychologists, when the person doing the deceiving is fool enough to be deceived, too; that is, when he believes his own lies. That is why incompetent leaders—who are naive enough to fall for their own guff—are such a danger to civilized life. If they are modern leaders, they must delude themselves into thinking they know how to make the world a better place.

— Mobs, Messiahs, and Markets: Surviving the Public Spectacle in Finance and Politics

Further in the book, Bonner writes:

Like all world improvers, Che (Guevara) claimed a remarkable ability to look into the future and then improve it before it happened. Of course, we all try to peek ahead and try to avoid traffic collisions and bad restaurants, but only a chump thinks he knows best how to improve the entire planet.

30. The Human Mind has a Shut-Off Device

Once you've formed a belief, adding exceptions and justifications becomes easier than updating it.

Ryan Holiday writes about this in *Trust Me, I'm Lying*:

Once the mind has accepted a plausible explanation for something, it becomes a framework for all the information that is perceived after it. We're drawn, subconsciously, to fit and contort all the subsequent knowledge we receive into our framework, whether it fits or not. Psychologists call this "cognitive rigidity". The facts that built an original premise are gone, but the conclusion remains—the general feeling of our opinion floats over the collapsed foundation that established it.

Information overload, "busyness," speed, and emotion all exacerbate this phenomenon. They make it even harder to update our beliefs or remain open-minded.

Charlie Munger said something similar:

[W]hat I'm saying here is that the human mind is a lot like the human egg, and the human egg has a shut-off device. When one sperm gets in, it shuts down so the next one can't get in. The human mind has a big tendency of the same sort. And here again, it doesn't just catch ordinary mortals; it catches the deans of physics. According to Max Planck, the really innovative, important new physics was never really accepted by the old guard. Instead a new guard came along that was less brain-blocked by its previous conclusions. And if Max Planck's crowd had this consistency and commitment tendency that kept their old inclusions intact in spite of disconfirming evidence, you can imagine what the crowd that you and I are part of behaves like.

Once a belief is formed, the mind tends to stick to it, making it difficult to accept new ideas. Even the most intelligent people can be trapped by their previous conclusions, so it's important to stay open-minded and avoid being influenced solely by popular opinion. The trick, if there is one, is to form working beliefs, not permanent beliefs.

31. Trust Me, I'm Lying: Why Sites Like Gawker Manipulate You

"A newspaper is a business out to make money through advertising revenue. That is predicated on its circulation and you know what the circulation depends on. ..."
— *The Long Goodbye*, Raymond Chandler

Ryan Holiday's book Trust Me, I'm Lying: Confessions of a Media Manipulator, offers a penetrating look at the incentives of media.

Holiday, himself, is a practitioner of the dark arts of media manipulation and uses these techniques to make a living.

"Usually, it is a simple hustle," Holiday writes. "Someone pays me, I manufacture a story for them, and we trade it up the chain — from a tiny blog to Gawker to a website of a local news network to the Huffington Post to the major newspapers to cable news and back again, until the unreal becomes real. Sometimes I start by planting a story. Sometimes I put out a press release or ask a friend to break a story on their blog. Sometimes I 'leak' a document. Sometimes I fabricate a document and leak that. Really, it can be anything, from vandalizing a Wikipedia page to producing an expensive viral video. However the play starts, the end is the same: The economics of the Internet are exploited to change public perception — and sell product."

For me, the most interesting part of the book was the history of the press, which begins with the Party Press, moves on to the Yellow Press and ends with the Modern Press (aka Subscription Press). Holiday gives us this history lesson to explain how news outlets sold their product over the years.

The Party Press

The earliest forms of newspapers were a function of political parties. These were media outlets for party leaders to speak to party members, to give them the information they needed and wanted. ... These papers were not some early version of Fox News. They usually were one-man shops. The editor-publisher-writer-printer was the dedicated steward of a very valuable service to that party in his town. The service was the ability to communicate ideas and information about important issues. ...

This first stage of journalism was limited in its scope and impact. Because of the size and nature of its audience, the party press was not in the news business. They were in the editorial business. It was a different time and style, one that would be eclipsed by changes in technology and distribution.

The Yellow Press

Newspapers changed the moment that Benjamin Day launched the New York Sun in 1833. It was not so much his paper that changed everything but his way of selling it: on the street, one copy at a time. He hired the unemployed to hawk his papers and immediately solved a major problem that had plagued the party presses: unpaid subscriptions. Day's "cash and carry" method offered no credit. You bought and walked. The Sun, with this simple innovation in distribution, invented the news and the newspaper. A thousand imitators followed.

These papers weren't delivered to your doorstep. They had to be exciting and loud enough to fight for their sales on street corners, in barrooms, and at train stations. Because of the change in distribution methods and the increased speed of the printing press, newspapers truly became newspapers. Their sole aim was to get new information, get it to print faster, get it more exclusively than their competition. It meant the decline of the editorial. These papers relied on gossip. ...

... He (James Gordon Bennett) knew that the newspaper's role was "not to instruct but to startle." His paper was anti-black, anti-immigrant, and anti-subtlety. These causes sold papers—to both people who loved them for it and people who hated them for it. And they bought and they bought.

... The need to sell every issue anew each day creates a challenge I call the “One-Off Problem.” Bennett’s papers solved it by getting attention however they could.

The first issue of Bennett’s Herald looked like this: First page—eye-catching but quickly digestible miscellany; Second page—the heart of the paper, editorial and news; Third page—local; Fourth page—advertising and filler. There was something for everyone. It was short, zesty. He later tried to emphasize quality editorial instead of disposable news by swapping the first two pages. The results were disastrous. He couldn’t sell papers on the street that way.

The One-Off Problem shaped more than just the design and layout of the newspaper. When news is sold on a one-off basis, publishers can’t sit back and let the news come to them. There isn’t enough of it, and what comes naturally isn’t exciting enough. So they must create the news that will sell their papers. When reporters were sent out to cover spectacles and events, they knew that their job was to cover the news when it was there and to make it up when it was not.

Speaking of the markers of “yellow journalism” (the One-Off problem), author of Yellow Journalism and media historian W.J. Campbell wrote:

As practiced more than 100 years ago, yellow journalism was a robust, enterprising genre characterized by these practices and features:

- the frequent use of multicolumn headlines that sometimes stretched across the front page.*
- a variety of topics reported on the front page, including news of politics, war, international diplomacy, sports, and society.*
- the generous and imaginative use of illustrations, including photographs and other graphic representations such as locator maps.*
- bold and experimental layouts, including those in which one report and illustration would dominate the front page. Such layouts sometimes were enhanced by the use of color.*
- a tendency to rely on anonymous sources, particularly in dispatches of leading correspondents.*
- a penchant for self-promotion, to call attention eagerly to the paper’s accomplishments. This tendency was notably evident in crusades against monopolies and municipal corruption.*

As defined above and as practiced more than a century ago, yellow journalism could not be called predictable, boring, or uninspired — complaints of the sort that are not infrequently raised about U.S. newspapers in the early twenty-first century.

Does any of that sound familiar? It should. Just take a look at Gawker and The Huffington Post. It’s the modern version of the One-Off problem. Instead of trying to sell you a copy of the newspaper by shouting on the street corner, today’s media want page views. In yellow journalism, headlines and promotions were more important than content.

So what happened after the yellow press? Holiday continues:

The Modern Stable Press

... Adolph S. Ochs, publisher of the New York Times, ushered in the next iteration of news. Ochs, like most great businessmen, understood that doing things differently was the way to great wealth. In the case of his newly acquired newspaper and the dirty, broken world of yellow journalism, he made the pronouncement that “decency meant dollars.”

He immediately set out to change the conditions that allowed the Bennett, Hearst, Pulitzer, and their imitators to flourish. He was the first publisher to solicit subscriptions via

telephone. He offered contests to his salesman. He gave them quotas and goals for the number of subscribers they were expected to bring in.

He understood that people bought the yellow papers because they were cheap—and they didn't have any other options. He felt that if they had a choice, they'd pick something better. He intended to be that option. First, he would match his competitors' prices, and then he would deliver a paper that far surpassed the value implied by the low price.

It worked. When he dropped the price of the *Times* to one cent, circulation tripled in the first year. He would compete on content. He came up with the phrase "All the News That's Fit to Print" as a mission statement for the editorial staff, two months after taking over the paper. The less known runner-up says almost as much: "All the World's News, But Not a School for Scandal."

Of course, the transition to the modern press wasn't immediate. The subscription model, however, better aligned the incentives of the reader and newspaperman. Subscriptions change everything because readers who are misled unsubscribe. Content, not headlines, ruled the day.

"With Ochs's move," Holiday writes, "reputation began to matter more than notoriety. This was the era of the professionalization of journalism. For the first time, it created a sense of obligation, not just to the paper and circulation, but also to the audience."

While subscription journalism meant you didn't have to peddle papers on the street, that didn't make it a perfect system.

As the character Philip Marlowe observed in Raymond Chandler's novel The Long Goodbye:

Newspapers are owned and published by rich men. Rich men all belong to the same club. Sure, there's competition—hard tough competition for circulation, for newsbeats, for exclusive stories. Just so long as it doesn't damage the prestige and privilege and position of the owners.

We've had a good run. For a long time journalism was primarily sold via subscriptions (the stable press model) but now we're moving quickly towards online à la Carte offerings.

Journalism is no longer selling a package. Now each story is like a mini paper on the side of the street corner in the 1840's trying to be heard over all of the other stories.

Eli Pariser wrote in The Filter Bubble:

Our bodies are programmed to consume fat and sugars because they're rare in nature. Thus, when they come around, we should grab them. In the same way, we're biologically programmed to be attentive to things that stimulate: content that is gross, violent, or sexual and that gossip which is humiliating, embarrassing, or offensive. If we're not careful, we're going to develop the psychological equivalent of obesity. We'll find ourselves consuming content that is least beneficial for ourselves or society as a whole.

... Each article ascends the most-forwarded lists or dies an ignominious death on its own.... The attention economy is ripping the binding, and the pages that get read are the pages that are frequently the most topical, scandalous, and viral.

Think about how you consume media today. You don't read one newspaper or blog. You read an assortment of many newspapers and blogs. And you don't pay for any of it. The trust relationship is fractured. Competition centers around who can create the most read story. That means journalism becomes about what spreads – not what's good.

MIT Media Studies Professor Henry Jenkins gives publishers and companies the following advice: "if it doesn't spread, it's dead." Spreading is traffic. Traffic is money.

So what spreads?

Joseph Campbell and Katherine Milkman, of the Wharton School looked into over 7,000 articles that made it on to the New York Times Most Emailed List. They conclude:

Virality is partially driven by physiological arousal. Content that evokes high-arousal positive (awe) or negative (anger or anxiety) emotions is more viral. Content that evokes low-arousal, or deactivating, emotions (e.g., sadness) is less viral.

Basically, virality is determined by how much anger the article causes. Not all extreme emotions spread. Sadness doesn't spread. Anger spreads. If anger spreads and financial incentives are somehow aligned to 'page views' more of our journalism will move towards what spreads.

Something analogous to Gresham's Law can be found in the One-Off problem. If each story has to find its own audience (i.e., it's no longer sold as a bundle) and compensation is derived from page views, we can expect incentives to favor a lot of low-cost articles with catchy headlines. In the end, we're likely to get the stories we want to read — not the ones we should read. If not part of subscription, we'll likely lose the in-depth reporting we've come to expect from some of the old media guards.

(side-note: I found the first part of Holiday's book — where he explains how page view media works and how he manipulated the system — pretty good. The book is not without it's "controversy" though. Overall it's a great read for anyone interested in the economics of new media.)

(update: a previous version of this post (ironically) sourced a site that accused Holiday of mis-quoting a study. Holiday contacted me and it appears that he used an older version of the study, which did, in fact, contain the quote he referenced in his book. The other site was wrong and my verification process was lax. My bad.)

*"If you're not paying for something,
you're not the customer; you're the product being sold."*

— Andrew Lewis

32. Jeff Bezos on Why People that Are Often Right Change Their Minds Often

Jeff Bezos recently stopped by the office of 37 Signals. After talking product strategy he answered some questions.

In his answer to one question he shared some thoughts on people who were "right a lot." *He said people who were right a lot of the time were people who often changed their minds. He doesn't think consistency of thought is a particularly positive trait. It's perfectly healthy — encouraged, even — to have an idea tomorrow that contradicted your idea today.*

He's observed that the smartest people are constantly revising their understanding, reconsidering a problem they thought they'd already solved. They're open to new points of view, new information, new ideas, contradictions, and challenges to their own way of thinking.

This doesn't mean you shouldn't have a well formed point of view, but it means you should consider your point of view as temporary.

What trait signified someone who was wrong a lot of the time? Someone obsessed with details that only support one point of view. If someone can't climb out of the details, and see the bigger picture from multiple angles, they're often wrong most of the time.

Bezos isn't alone. Warren Buffett's long time business partner Charlie Munger captures this:

If Berkshire has made modest progress, a good deal of it is because Warren and I are very good at destroying our own best-loved ideas. Any year that you don't destroy one of your best-loved ideas is probably a wasted year.

John Kenneth Galbraith put it this way:

Faced with the choice between changing one's mind and proving there is no need to do so, almost everyone gets busy on the proof.

33. Charlie Munger: Bad Morals Drive Out The Good

Charlie Munger on applying Gresham's Law to lending.

The idiotic ideas are all from the social science department and I would put economics in the social sciences department although it has some tinges of reality that remind you of arts and science.

In economics textbooks they teach you Gresham's Law: Bad money drives out good. But we don't have any bad money that amounts to anything. We don't have any coins that are worth a lot, that have precious metals that you can melt down. Nobody cares what the melt-down value of the quarter is in relationship to the dime, so Gresham's Law is a non-starter in the modern world. Bad money drives out good. But the new form of Gresham's Law is ungodly important.

The new form of Gresham's Law is brought into play – in economic thought, anyway – in the savings and loans crisis, when it was perfectly obvious that bad lending drives out good. Think of how powerful that model is. Think of the disaster that it creates for everybody.

You sit there in your little institution. All of the builders [are not good credits anymore], and you are in the business of lending money to builders. Unless you do the same idiotic thing [as] Joe Blow is doing down the street. Pete Johnson up the street wants to do something a little dumber and the thing just goes to a mighty tide. You've got to shrink the business that you love and maybe lay off the employees who have trusted you their careers and so forth or [make] a lot of dumb loans. At Berkshire Hathaway we try and let the place shrink. We never fire anybody, we tell them to go out and play golf. We sure as hell don't want to make any dumb loans. But that is very hard to do if you sit in a leadership position in society with people you helped recruit, you meet their wives and children and so forth. The bad loans drive out the good.

It isn't just bad loans. Bad morals drive out the good. If you want to run a check-cashing agency in [a] downtown big city, more than 100 percent of all the profit you could possibly earn can only be earned by flim-flamming people on the finance contracts. So if you aren't willing to cheat people – basically minorities – more than 100 percent of the profit can't be earned. Well, if you inherited the business or your idiot son-in-law is in it, you don't know what else to do. This is what I would call an adult problem and most people solve it in the adult fashion: They learn to tolerate the cheating. But that is not the right answer to people who want to live a larger and better life. But it is a form of Gresham's Law, the new Gresham's Law. One that is not taught in economics courses and should be. It is a really serious problem and, of course, it relates deeply to what happened to create the economic crisis. All kinds of people who you would be glad to have marry into your family compared to what you are otherwise going to get did things that were very regrettable under these pressures from the new Gresham's Law.

34. Ignorance Increases the Further Away you Are

While I'm not sure of the math, I enjoyed this quote from Mobs, Messiahs, and Markets: Surviving the Public Spectacle in Finance and Politics:

Ignorance increases the square of the distance from a given event, so the odds that things won't work out the way you expect must be multiplied by the squares of all the intervening events.

It reminded me of what Peter Bevelin Wrote in Seeking Wisdom:

The more independent steps that are involved in achieving a scenarios, the more opportunities for failure and the less likely it is that the scenario will happen. We often underestimate the number of steps, people, and decisions involved.

Add to this that we often forget that the reliability of a system is a function of the whole system. The weakest link sets the upper limit for the whole chain.

35. The Principle of Incomplete Knowledge

"All models are wrong, but some are useful"

— George Box

If you think of the complicated world we live in you quickly realize that we need to sort the inessential from the essential and then reduce complexity into something simpler. In the same way the map is not the territory, knowledge is only but a subset of what it represents. In why knowledge is incomplete, the authors elaborate on these ideas:

This principle can be deduced from a lot of other, more specific principles: Heisenberg's uncertainty principle, implying that the information a control system can get is necessarily incomplete; the relativistic principle of the finiteness of the speed of light, implying that the moment information arrives, it is already obsolete to some extent; the principle of bounded rationality, stating that a decision-maker in a real-world situation will never have all information necessary for making an optimal decision; the principle of the partiality of self-reference, a generalization of Gödel's incompleteness theorem, implying that a system cannot represent itself completely, and hence cannot have complete knowledge of how its own actions may feed back into the perturbations. As a more general argument, one might note that models must be simpler than the phenomena they are supposed to model. Otherwise, variation and selection processes would take as much time in the model as in the real world, and no anticipation would be possible, precluding any control. Finally, models are constructed by blind variation processes, and, hence, cannot be expected to reach any form of complete representation of an infinitely complex environment.

36. The Peter Principle

Laurence J. Peter and James Hull defined The Peter Principle: “In a hierarchically structured administration, people tend to be promoted up to their level of incompetence.” I think that’s fairly well understood, but what does it look like if we frame it in an evolutionary perspective?

The evolutionary generalization of the principle is less pessimistic in its implications, since evolution lacks the bureaucratic inertia that pushes and maintains people in an unfit position. But what will certainly remain is that systems confronted by evolutionary problems will quickly tackle the easy ones, but tend to get stuck in the difficult ones. The better (more fit, smarter, more competent, more adaptive) a system is, the more quickly it will solve all the easy problems, but the more difficult the problem will be it finally gets stuck in. Getting stuck here does not mean “being unfit”, it just means having reached the limit of one’s competence, and thus having great difficulty advancing further. This explains why even the most complex and adaptive species (such as ourselves, humans) are always still “struggling for survival” in their niches as energetically as are the most primitive organisms such as bacteria. If ever a species would get control over all its evolutionary problems, then the “Red Queen Principle” would make sure that new, more complex problems would arise, so that the species would continue to balance on the border of its domain of incompetence. In conclusion, the generalized Peter principle states that in evolution systems tend to develop up to the limit of their adaptive competence.

37. The Future Is Not Like The Past

From Everything Is Obvious: How Common Sense Fails Us:

The ubiquity of complex systems in the social world is important because it severely restricts the kinds of predictions we can make. In simple systems, that is, it is possible to predict with high probability what will actually happen—for example when Halley’s Comet will next return or what orbit a particular satellite will enter. For complex systems, by contrast, the best that we can hope for is to correctly predict the probability that something will happen. At first glance, these two exercises sound similar, but they’re fundamentally different. To see how, imagine that you’re calling the toss of a coin. Because it’s a random event, the best you can do is predict that it will come up heads, on average, half of the time. A rule that says “over the long run, 50% of coin tosses will be heads, and 50% will be tails” is, in fact, perfectly accurate in the sense that heads and tails do, on average, show up exactly half the time. But even knowing this rule, we still can’t predict the outcome of a single coin toss any more than 50% of the time, no matter what strategy we adopt. Complex systems are not really random in the same way that a coin toss is random, but in practice it’s extremely difficult to tell the difference.

38. Why Catastrophes Happen

From Ubiquity: Why Catastrophes Happen

There are many subtleties and twists in the story ... but the basic message, roughly speaking, is simple: The peculiar and exceptionally unstable organization of the critical state does indeed seem to be ubiquitous in our world. Researchers in the past few years have found its mathematical fingerprints in the workings of all the upheavals I've mentioned so far [earthquakes, eco-disasters, market crashes], as well as in the spreading of epidemics, the flaring of traffic jams, the patterns by which instructions trickle down from managers to workers in the office, and in many other things. At the heart of our story, then, lies the discovery that networks of things of all kinds – atoms, molecules, species, people, and even ideas – have a marked tendency to organize themselves along similar lines. On the basis of this insight, scientists are finally beginning to fathom what lies behind tumultuous events of all sorts, and to see patterns at work where they have never seen them before.

And

In this simplified setting of the sandpile, the power law also points to something else: the surprising conclusion that even the greatest of events have no special or exceptional causes. After all, every avalanche large or small starts out the same way, when a single grain falls and makes the pile just slightly too steep at one point. What makes one avalanche much larger than another has nothing to do with its original cause, and nothing to do with some special situation in the pile just before it starts. Rather, it has to do with the perpetually unstable organization of the critical state, which makes it always possible for the next grain to trigger an avalanche of any size.

To this, John Mauldin adds:

Now, let's couple this idea with a few other concepts. First, Hyman Minsky (who should have been a Nobel laureate) points out that stability leads to instability. The more comfortable we get with a given condition or trend, the longer it will persist and then when the trend fails, the more dramatic the correction. The problem with long term macroeconomic stability is that it tends to produce unstable financial arrangements. If we believe that tomorrow and next year will be the same as last week and last year, we are more willing to add debt or postpone savings in favor of current consumption. Thus, says Minsky, the longer the period of stability, the higher the potential risk for even greater instability when market participants must change their behavior.

Relating this to our sandpile, the longer that a critical state builds up in an economy, or in other words, the more "fingers of instability" that are allowed to develop a connection to other fingers of instability, the greater the potential for a serious "avalanche."

Couple this with Didier Sornette, in Why Stock Markets Crash (incidentally, this is a book Nassim Taleb recommends — "I learned more from this book than any other on disequilibrium.")

[T]he specific manner by which prices collapsed is not the most important problem: a crash occurs because the market has entered an unstable phase and any small disturbance or process may have triggered the instability. Think of a ruler held up vertically on your finger: this very unstable position will lead eventually to its collapse, as a result of a small (or an absence of adequate) motion of your hand or due to any tiny whiff of air. The collapse is fundamentally due to the unstable position; the instantaneous cause of the collapse is secondary.

Mauldin continues:

When things are unstable, it isn't the last grain of sand that causes the pile to collapse or the slight breeze that causes the ruler on your fingertip to fall. Those are the "proximate" causes. They're the closest reasons at hand for the collapse. The real reason, though, is the "remote" cause, the farthest reason. The farthest reason is the underlying instability of the system itself.

A fundamentally unstable system is exactly what we saw in the recent credit crisis. Consumers all through the world's largest economies borrowed money for all sorts of things, because times were good. Home prices would always go up and the stock market was back to its old trick of making 15% a year. And borrowing money was relatively cheap. You could get 2% short-term loans on homes, which seemingly rose in value 15% a year, so why not buy now and sell a few years down the road? Greed took over. Those risky loans were sold to investors by the tens and hundreds of billions of dollars, all over the world. And as with all debt sandpiles, the fault lines started to appear. Maybe it was that one loan in Las Vegas that was the critical piece of sand; we don't know, but the avalanche was triggered.

39. The Problem With Information

Nassim Taleb in Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets:

The argument in favor of “new things” and even more “new new things” goes as follows: Look at the dramatic changes that have been brought about by the arrival of new technologies, such as the automobile, the airplane, the telephone, and the personal computer. Middlebrow inference (inference stripped of probabilistic thinking) would lead one to believe that all new technologies and inventions would likewise revolutionize our lives. But the answer is not so obvious: Here we only see and count the winners, to the exclusion of the losers (it is like saying that actors and writers are rich, ignoring the fact that actors are largely waiters — and lucky to be ones, for the less comely writers usually serve French fries at McDonald’s). Losers? The Saturday newspaper lists dozens of new patents of such items that can revolutionize our lives. People tend to infer that because some inventions have revolutionized our lives that inventions are good to endorse and we should favor the new over the old. I hold the opposite view. The opportunity cost of missing a “new new thing” like the airplane and the automobile is minuscule compared to the toxicity of all the garbage one has to go through to get to these jewels (assuming these have brought some improvement to our lives, which I frequently doubt).

Now the exact same argument applies to information. The problem with information is not that it is diverting and generally useless, but that it is toxic. We will examine the dubious value of the highly frequent news with a more technical discussion of signal filtering and observation frequency farther down. I will say here that such respect for the time-honored provides arguments to rule out any commerce with the babbling modern journalist and implies a minimal exposure to the media as a guiding principle for someone involved in decision making under uncertainty. If there is anything better than noise in the mass of “urgent” news pounding us, it would be like a needle in a haystack. People do not realize that the media is paid to get your attention. (For a detailed explanation on this see Trust Me, I’m Lying) For a journalist, silence rarely surpassed any word.

On the rare occasions when I boarded the 6:42 train to New York I observed with amazement the hordes of depressed business commuters (who seemed to prefer to be elsewhere) studiously buried in The Wall Street Journal, apprised of the minutiae of companies that, at the time of writing now, are probably out of business. Indeed it is difficult to ascertain whether they seem depressed because they are reading the newspaper, or if depressive people tend to read the newspaper, or if people who are living outside their genetic habitat both read the newspaper and look sleepy and depressed. But while early on in my career such focus on noise would have offended me intellectually, as I would have deemed such information as too statistically insignificant for the derivation of any meaningful conclusion, I currently look at it with delight. I am happy to see such mass-scale idiotic decision making, prone to overreaction in their post-perusal investment orders — in other words I currently see in the fact that people read such material an insurance for my continuing in the entertaining business of option trading against the fools of randomness. (It takes a huge investment in introspection to learn that the thirty or more hours spent “studying” the news last month neither had any predictive ability during your activities of that month nor did it impact your current knowledge of the world. This problem is similar to the weaknesses in our ability to correct for past errors: like a health club membership taken out to satisfy a New Year’s resolution, people often think that it will surely be the next match of news that will really make a difference to their understanding of things.)

40. The Worst Mistake of All: Outshining the Master

“Being defeated is hateful, and besting one’s boss is either foolish or fatal. Most people do not mind being surpassed in good fortune, character, or temperament, but no one, especially not a sovereign, likes to be surpassed in intelligence.”

— Baltasar Gracián

In *The 48 Laws of Power*, Robert Greene echoes the sentiments of Gracián’s quote above in the first law: Never Outshine the Master.

Greene writes:

Always make those above you feel comfortably superior. In your desire to please or impress them, do not go too far in displaying your talents or you might accomplish the opposite – inspire fear and insecurity. Make your masters appear more brilliant than they are and you will attain the heights of power.

Outshining the master is the worst mistake of all ...

Everyone has insecurities. When you show yourself in the world and display your talents, you naturally stir up all kinds of resentment, envy, and other manifestations of insecurity. This is to be expected. You cannot spend your life worrying about the petty feelings of others. With those above you, however, you must take a different approach: When it comes to power, outshining the master is perhaps the worst mistake of all.

Almost everyone, including you, wants to seem more brilliant than we rightly deserve. And we don’t like people to remind us of our fallibility.

Those who attain high standing in life are like kings and queens: They want to feel secure in their positions, and superior to those around them in intelligence, wit, and charm. It is a deadly but common misperception to believe that by displaying and vaunting your gifts and talents, you are winning the master’s affection. He may feign appreciation, but at his first opportunity he will replace you with someone less intelligent, less attractive, less threatening ...

There are two important points to consider.

1. You can outshine the master without trying;
2. Just because you’re loved, doesn’t mean you can do what you want.

Let’s explore these quickly, shall we?

Even if you are not trying, you can outshine the master just by being you. This happens easily. If your boss is particularly insecure, natural wit and charm will be enough to draw unwanted attention. If they are incompetent than obvious competence will do the trick. Either find a way to mute the side of you most likely to draw ire, or avoid people where being you is likely to naturally outshine them.

Second, never imagine that being valued or loved affords you the freedom to do what you want. Your status is only secure to the point your master is secure that they are better than you. Always leave them with this feeling. No matter what.

41. Five Rules to help you Learn to Love Volatility

Nassim Taleb's book Antifragile: Things That Gain from Disorder is having a profound impact on how I see the world.

In this adapted piece from Antifragile, which appeared in the Wall Street Journal, Taleb offers five policy rules that can help us establish antifragility as a principle of our socioeconomic life.

Rule 1: Think of the economy as being more like a cat than a washing machine.

We are victims of the post-Enlightenment view that the world functions like a sophisticated machine, to be understood like a textbook engineering problem and run by wonks. In other words, like a home appliance, not like the human body. If this were so, our institutions would have no self-healing properties and would need someone to run and micromanage them, to protect their safety, because they cannot survive on their own.

By contrast, natural or organic systems are antifragile: They need some dose of disorder in order to develop. Deprive your bones of stress and they become brittle. This denial of the antifragility of living or complex systems is the costliest mistake that we have made in modern times. Stifling natural fluctuations masks real problems, causing the explosions to be both delayed and more intense when they do take place. As with the flammable material accumulating on the forest floor in the absence of forest fires, problems hide in the absence of stressors, and the resulting cumulative harm can take on tragic proportions.

And yet our economic policy makers have often aimed for maximum stability, even for eradicating the business cycle. "No more boom and bust," as voiced by the U.K. Labor leader Gordon Brown, was the policy pursued by Alan Greenspan in order to "smooth" things out, thus micromanaging us into the current chaos. Mr. Greenspan kept trying to iron out economic fluctuations by injecting cheap money into the system, which eventually led to monstrous hidden leverage and real-estate bubbles. On this front there is now at least a glimmer of hope, in the U.K. rather than the U.S., alas: Mervyn King, governor of the Bank of England, has advocated the idea that central banks should intervene only when an economy is truly sick and should otherwise defer action.

Promoting antifragility doesn't mean that government institutions should avoid intervention altogether. In fact, a key problem with overzealous intervention is that, by depleting resources, it often results in a failure to intervene in more urgent situations, like natural disasters. So in complex systems, we should limit government (and other) interventions to important matters: The state should be there for emergency-room surgery, not nanny-style maintenance and overmedication of the patient—and it should get better at the former.

In social policy, when we provide a safety net, it should be designed to help people take more entrepreneurial risks, not to turn them into dependents. This doesn't mean that we should be callous to the underprivileged. In the long run, bailing out people is less harmful to the system than bailing out firms; we should have policies now that minimize the possibility of being forced to bail out firms in the future, with the moral hazard this entails.

Rule 2: Favor businesses that benefit from their own mistakes, not those whose mistakes percolate into the system.

Some businesses and political systems respond to stress better than others. The airline industry is set up in such a way as to make travel safer after every plane crash. A tragedy leads to the thorough examination and elimination of the cause of the problem. The same thing happens in the restaurant industry, where the quality of your next meal depends on the failure rate in the business—what kills some makes others stronger. Without the high failure rate in the restaurant business, you would be eating Soviet-style cafeteria food for your next meal out.

These industries are antifragile: The collective enterprise benefits from the fragility of the individual components, so nothing fails in vain. These businesses have properties similar

to evolution in the natural world, with a well-functioning mechanism to benefit from evolutionary pressures, one error at a time.

By contrast, every bank failure weakens the financial system, which in its current form is irremediably fragile: Errors end up becoming large and threatening. A reformed financial system would eliminate this domino effect, allowing no systemic risk from individual failures. A good starting point would be reducing the amount of debt and leverage in the economy and turning to equity financing. A firm with highly leveraged debt has no room for error; it has to be extremely good at predicting future revenues (and black swans). And when one leveraged firm fails to meet its obligations, other borrowers who need to renew their loans suffer as the chastened lenders lose their appetite to extend credit. So debt tends to make failures spread through the system.

A firm with equity financing can survive drops in income, however. Consider the abrupt deflation of the technology bubble during 2000. Because technology firms were relying on equity rather than debt, their failures didn't ripple out into the wider economy. Indeed, their failures helped to strengthen the technology sector.

Rule 3: Small is beautiful, but it is also efficient.

Experts in business and government are always talking about economies of scale. They say that increasing the size of projects and institutions brings costs savings. But the "efficient," when too large, isn't so efficient. Size produces visible benefits but also hidden risks; it increases exposure to the probability of large losses. Projects of \$100 million seem rational, but they tend to have much higher percentage overruns than projects of, say, \$10 million. Great size in itself, when it exceeds a certain threshold, produces fragility and can eradicate all the gains from economies of scale. To see how large things can be fragile, consider the difference between an elephant and a mouse: The former breaks a leg at the slightest fall, while the latter is unharmed by a drop several multiples of its height. This explains why we have so many more mice than elephants.

So we need to distribute decisions and projects across as many units as possible, which reinforces the system by spreading errors across a wider range of sources. In fact, I have argued that government decentralization would help to lower public deficits. A large part of these deficits comes from underestimating the costs of projects, and such underestimates are more severe in large, top-down governments. Compare the success of the bottom-up mechanism of canton-based decision making in Switzerland to the failures of authoritarian regimes in Soviet Russia and Baathist Iraq and Syria.

Rule 4: Trial and error beats academic knowledge.

Things that are antifragile love randomness and uncertainty, which also means—crucially—that they can learn from errors. Tinkering by trial and error has traditionally played a larger role than directed science in Western invention and innovation. Indeed, advances in theoretical science have most often emerged from technological development, which is closely tied to entrepreneurship. Just think of the number of famous college dropouts in the computer industry.

But I don't mean just any version of trial and error. There is a crucial requirement to achieve antifragility: The potential cost of errors needs to remain small; the potential gain should be large. It is the asymmetry between upside and downside that allows antifragile tinkering to benefit from disorder and uncertainty.

Perhaps because of the success of the Manhattan Project and the space program, we greatly overestimate the influence and importance of researchers and academics in technological advancement. These people write books and papers; tinkerers and engineers don't, and are thus less visible. Consider Britain, whose historic rise during the Industrial Revolution came from tinkerers who gave us innovations like iron making, the steam engine and textile manufacturing. The great names of the golden years of English science were hobbyists, not academics: Charles Darwin, Henry Cavendish, William

Parsons, the Rev. Thomas Bayes. Britain saw its decline when it switched to the model of bureaucracy-driven science.

America has emulated this earlier model, in the invention of everything from cybernetics to the pricing formulas for derivatives. They were developed by practitioners in trial-and-error mode, drawing continuous feedback from reality. To promote antifragility, we must recognize that there is an inverse relationship between the amount of formal education that a culture supports and its volume of trial-and-error by tinkering. Innovation doesn't require theoretical instruction, what I like to compare to "lecturing birds on how to fly."

Rule 5: Decision makers must have skin in the game.

At no time in the history of humankind have more positions of power been assigned to people who don't take personal risks. But the idea of incentive in capitalism demands some comparable form of disincentive. In the business world, the solution is simple: Bonuses that go to managers whose firms subsequently fail should be clawed back, and there should be additional financial penalties for those who hide risks under the rug. This has an excellent precedent in the practices of the ancients. The Romans forced engineers to sleep under a bridge once it was completed.

Because our current system is so complex, it lacks elementary clarity: No regulator will know more about the hidden risks of an enterprise than the engineer who can hide exposures to rare events and be unharmed by their consequences. This rule would have saved us from the banking crisis, when bankers who loaded their balance sheets with exposures to small probability events collected bonuses during the quiet years and then transferred the harm to the taxpayer, keeping their own compensation.

In these five rules, I have sketched out only a few of the more obvious policy conclusions that we might draw from a proper appreciation of antifragility. But the significance of antifragility runs deeper. It is not just a useful heuristic for socioeconomic matters but a crucial property of life in general. Things that are antifragile only grow and improve under adversity. This dynamic can be seen not just in economic life but in the evolution of all things, from cuisine, urbanization and legal systems to our own existence as a species on this planet.

We all know that the stressors of exercise are necessary for good health, but people don't translate this insight into other domains of physical and mental well-being. We also benefit, it turns out, from occasional and intermittent hunger, short-term protein deprivation, physical discomfort and exposure to extreme cold or heat. Newspapers discuss post-traumatic stress disorder, but nobody seems to account for post-traumatic growth. Walking on smooth surfaces with "comfortable" shoes injures our feet and back musculature: We need variations in terrain.

Modernity has been obsessed with comfort and cosmetic stability, but by making ourselves too comfortable and eliminating all volatility from our lives, we do to our bodies and souls what Mr. Greenspan did to the U.S. economy: We make them fragile. We must instead learn to gain from disorder.

42. “Everyone has filters to select information that receives attention.”

These excerpts were taken from Roger Fisher’s excellent book Getting It Done: How to Lead When You’re Not in Charge.

Everyone has filters to select information that receives attention. If we don’t consciously choose them we fall back on unconscious ones. Typically these default rules for selecting data limit the useful information we receive. Like a magician’s sleight of hand, they direct attention away from true action.

Do you think that what you know is more important than what you don’t?

We often equate the information we have with the information that should guide a decision. This creates two difficulties. First, we assume that what we don’t already know isn’t worth knowing. We stop looking for information when there may still be important things to learn. Secondly, we think that because we have a certain piece of information, it should figure into the decision: “If it is true, it is relevant.” Years are spent fighting over what happened yesterday for every day that is spent figuring out what out to be done tomorrow.

Are you biased toward vivid data?

We all pay undue attention to a good story. Information that has an emotional impact gobbles up attention. Dry information is ignored. As you try to accomplish something you may find that the bankruptcy of one competitor holds your attention more than an improved product being marketed by another. At work no one has packaged important information to make it easy to take in.

Are you trapped in your own point of view?

Russians have a saying that “everyone looks at the world from the bell tower of his own village.” We all know that we tend to judge ourselves more charitably than we judge others. You notice your own contributions to a success more than those of others. You tend to minimize, even to yourself, the role you played in a failure. Because we focus on data that favor us or cast others in a bad light, we neglect large amounts of relevant information.

43. The Half-life of Facts

Facts change all the time. Smoking has gone from doctor recommended to deadly. We used to think the Earth was the center of the universe and that Pluto was a planet. For decades we were convinced that the brontosaurus was a real dinosaur.

Knowledge, like milk, has an expiry date. That's the key message behind Samuel Arbesman's excellent new book The Half-life of Facts: Why Everything We Know Has an Expiration Date.

We're bombarded with studies that seemingly prove this or that. Caffeine is good for you one day and bad for you the next. What we think we know and understand about the world is constantly changing. Nothing is immune. While big ideas are overturned infrequently, little ideas churn regularly.

As scientific knowledge grows, we end up rethinking old knowledge. Abresman calls this "a churning of knowledge." But understanding that facts change (and how they change) helps us cope in a world of constant uncertainty. We can never be too sure of what we know. In introducing this idea, Abresam writes:

Knowledge is like radioactivity. If you look at a single atom of uranium, whether it's going to decay — breaking down and unleashing its energy — is highly unpredictable. It might decay in the next second, or you might have to sit and stare at it for thousands, or perhaps even millions, of years before it breaks apart.

But when you take a chunk of uranium, itself made up of trillions upon trillions of atoms, suddenly the unpredictable becomes predictable. We know how uranium atoms work in the aggregate. As a group of atoms, uranium is highly regular. When we combine particles together, a rule of probability known as the law of large numbers takes over, and even the behavior of a tiny piece of uranium becomes understandable. If we are patient enough, half of a chunk of uranium will break down in 704 million years, like clock-work. This number — 704 million years — is a measurable amount of time, and it is known as the half-life of uranium.

It turns out that facts, when viewed as a large body of knowledge, are just as predictable. Facts, in the aggregate, have half-lives: We can measure the amount of time for half of a subject's knowledge to be overturned. There is science that explores the rates at which new facts are created, new technologies developed, and even how facts spread. How knowledge changes can be understood scientifically.

This is a powerful idea. We don't have to be at sea in a world of changing knowledge. Instead, we can understand how facts grow and change in the aggregate, just like radioactive materials. This book is a guide to the startling notion that our knowledge — even what each of us has in our head — changes in understandable and systematic ways. Why does this happen? Why does knowledge churn? In Zen and the Art of Motorcycle Maintenance, Robert Pirsig writes:

If all hypotheses cannot be tested, then the result of any experiment are inconclusive and the entire scientific method falls short of its goal of establishing proven knowledge.

About this Einstein had said, "Evolution has shown that at any given moment out of all conceivable constructions a single one has always proved itself absolutely superior to the rest," and let it go at that.

... But there it was, the whole history of science, a clear story of continuously new and changing explanations of old facts. The time spans of permanence seemed completely random, he could see no order in them. Some scientific truths seemed to last for centuries, others for less than a year. Scientific truth was not dogma, good for eternity, but a temporal quantitative entity that could be studied like anything else.

A few pages later, Pirsig continues:

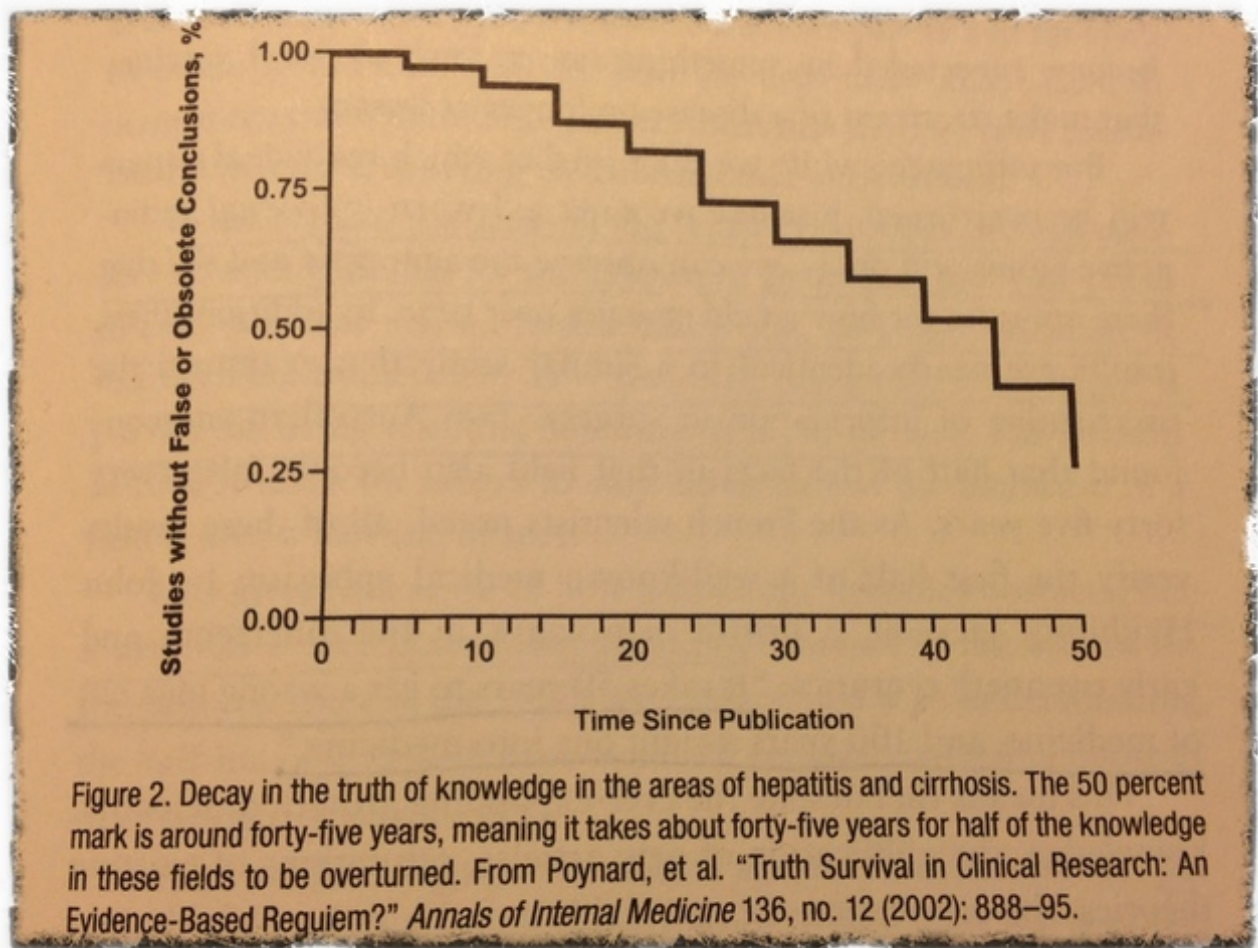
The purpose of scientific method is to select a single truth from among many hypothetical truths. That, more than anything else, is what science is all about. But historically science has done exactly the opposite. Through multiplication upon multiplication of facts,

information, theories and hypotheses, it is science itself that is leading mankind from single absolute truths to multiple, indeterminate, relative ones.

With that, let's dig into how this looks. Arbesman offers an example:

A few years ago a team of scientists at a hospital in Paris decided to actually measure this (churning of knowledge). They decided to look at fields that they specialized in: cirrhosis and hepatitis, two areas that focus on liver diseases. They took nearly five hundred articles in these fields from more than fifty years and gave them to a battery of experts to examine. Each expert was charged with saying whether the paper was factual, out-of-date, or disproven, according to more recent findings. Through doing this they were able to create a simple chart (see below) that showed the amount of factual content that had persisted over the previous decades. They found something striking: a clear decay in the number of papers that were still valid.

Furthermore, they got a clear measurement of the half-life of facts in these fields by looking at where the curve crosses 50 percent on this chart: 45 years. Essentially, information is like radioactive material: Medical knowledge about cirrhosis or hepatitis takes about forty-five years for half of it to be disproven or become out-of-date.



Old knowledge, however, isn't a waste. It's not like we have to start from scratch. "Rather," writes Arbesman, "the accumulation of knowledge can then lead us to a fuller and more accurate picture of the world around us."

Isaac Asimov, in a wonderful [essay](#), uses the Earth's curvature to help explain this:

When people thought the earth was flat, they were wrong. When people thought the earth was spherical, they were wrong. But if you think that that thinking the earth is spherical is just as wrong as thinking the earth is flat, then your view is wronger than both of them put together.

When our knowledge in a field is immature, discoveries come easily and often explain the main ideas. “But there are uncountably more discoveries, although far rarer, in the tail of this distribution of discovery. As we delve deeper, whether it’s into discovering the diversity of life in the oceans or the shape of the earth, we begin to truly understand the world around us.”

So what we’re really dealing with the long tail of discovery. Our search for what’s way out at the end of that tail, while it might not be as important or as Earth-shattering as the blockbuster discoveries, can be just as exciting and surprising. Each new little piece can teach us something about what we thought was possible in the world and help us to asymptotically approach a more complete understanding of our surroundings.

In an interview with the Economist, Arbesman was asked which scientific fields decay the slowest-and fastest-and what causes that difference.

Well it depends, because these rates tend to change over time. For example, when medicine transitioned from an art to a science, its half-life was much more rapid than it is now. That said, medicine still has a very short half-life; in fact it is one of the areas where knowledge changes the fastest. One of the slowest is mathematics, because when you prove something in mathematics it is pretty much a settled matter unless someone finds an error in one of your proofs.

One thing we have seen is that the social sciences have a much faster rate of decay than the physical sciences, because in the social sciences there is a lot more “noise” at the experimental level. For instance, in physics, if you want to understand the arc of a parabola, you shoot a cannon 100 times and see where the cannonballs land. And when you do that, you are likely to find a really nice cluster around a single location. But if you are making measurements that have to do with people, things are a lot messier, because people respond to a lot of different things, and that means the effect sizes are going to be smaller.

Arbesman concludes his economist interview:

I want to show people how knowledge changes. But at the same time I want to say, now that you know how knowledge changes, you have to be on guard, so you are not shocked when your children (are) coming home to tell you that dinosaurs have feathers. You have to look things up more often and recognise that most of the stuff you learned when you were younger is not at the cutting edge. We are coming a lot closer to a true understanding of the world; we know a lot more about the universe than we did even just a few decades ago. It is not the case that just because knowledge is constantly being overturned we do not know anything. But too often, we fail to acknowledge change. Some fields are starting to recognise this. Medicine, for example, has got really good at encouraging its practitioners to stay current. A lot of medical students are taught that everything they learn is going to be obsolete soon after they graduate. There is even a website called “up to date” that constantly updates medical textbooks. In that sense we could all stand to learn from medicine; we constantly have to make an effort to explore the world anew—even if that means just looking at Wikipedia more often. And I am not just talking about dinosaurs and outer space. You see this same phenomenon with knowledge about nutrition or childcare—the stuff that has to do with how we live our lives.

Even when we find new information that contradicts what we thought we knew, we’re likely to be slow to change our minds. “A prevailing theory or paradigm is not overthrown by the accumulation of contrary evidence,” writes Richard Zeckhauser, “but rather by a new paradigm that, for whatever reasons, begins to be accepted by scientists.”

In this view, scientific scholars are subject to status quo persistence. Far from being objective decoders of the empirical evidence, scientists have decided preferences about the scientific beliefs they hold. From a psychological perspective, this preference for beliefs can be seen as a reaction to the tensions caused by cognitive dissonance.

A lot of scientific advancement happens only when the old guard dies off. Many years ago Max Planck offered this insight: “A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.”

While we have the best intentions and our minds change slowly, a lot of what we think we know is actually just a temporary knowledge to be updated in the future by more complete knowledge. I think this is why Nassim Taleb argues that we should read Seneca and not worry about someone like Jonah Lehrer bringing us sexy narratives of the latest discoveries. It turns out most of these discoveries are based on very little data and, while they may add to our cumulative knowledge, they are not likely to be around in 10 years. The Half-life of Facts is a good read that help puts what we think we understand about the world into perspective.

Follow your curiosity and read my interview with the author. Knowing that knowledge has a half-life isn't enough, we can use this to help us determine what to read.

44. Can History Tell the Truth?

"I know it is the fashion to say," George Orwell once wrote, "that most of recorded history is lies anyway. I am willing to believe that history is for the most part inaccurate and biased, but what is peculiar to our own age is the abandonment of the idea that history could be truthfully written."

Charles Frankel in The Case For the Modern Man

An exciting Japanese movie of a few years ago, Rashomon, offers a peculiarly apt illustration of (Karl) Mannheim's central thesis (that all social thinking is inevitably determined by unconscious assumptions and unacknowledged commitments – that is, everyone views events through a limited point of view.) The movie is in the form of a story told by a woodsman, who is in despair at what he has seen and heard, and has lost all of his faith in man. He reports that a Japanese lady and her husband have been set upon in the woods by a highwayman. The lady has been raped, the husband killed. And then he repeats in turn the accounts he has overheard at the police station, where the highway man, the lady, and the dead husband, speaking through a medium, have had to tell the events that transpired. Each participant tells a different story, each subtly arranges the events in a pattern that will put his own position in the best light. As each of these stories is re-enacted before our eyes, our tension mounts. We are not sure whether what really happened was murder and rape, whether the lady was treacherous or loyal, the husband cowardly or heroic, the highwayman an aggressor or a victim. Each time we move to the next story we hope to get closer to the truth, and each time we are put off. But suddenly we seem to see an opening. For it turns out that the woodsman, who has claimed to be merely repeating the stories he overheard at the police station, has been an eyewitness to the actual scene in the forest. So the woodsman tells his story. But, once more, we hear a story which has something subtly off-center about it. A dagger is unaccounted for. And then it turns out that the woodsman has stolen it. He has not been a neutral bystander; he too is a participant.

This notation that we are all participants in what happens in human history, and that there can therefore be no such thing as objectivity about history, is the central theme, and the central problem, in Mannheim's philosophy of history. We never see what "really" happens, and in fact it makes no sense even to ask. The affairs of men take place in a hall of mirrors, each with its own angle of distortion; and all we can report is what we see in the mirrors, for there is nothing else to see. All social thinking is inevitably the thinking of men who have a role in events, feelings about them, and a limited perspective upon them. Every belief comes labeled with the date, place, and social pedigree of the man who holds it. And the idea that there is an objective truth about human affairs, independently of who asserts it, is only one element in the special perspective of liberalism.

Frankel continues

There can be no disengaged intelligence seeking a universal truth. Intelligence is inevitably earth-bound, practical and biased. The questions men ask about social affairs are always selected questions that are suggested by some particular point of view and serve some special interest. The answers men accept as satisfactory are always partial answers with an inescapable element of arbitrariness in them. And even the standards of truth that men employ are limited by the social perspectives in which they are framed. Mannheim's argument that we cannot objectively observe social affairs is based on two main lines of argument. "The first of these rests on a sharp distinction between the study of nature and the study of human affairs. The second rests on an assumption about the meaning of terms like "partiality" and "bias." Frankel goes on to look at each of those.

...

We are putting the cart before the horse when we think that a science of politics must be different from other sciences because political behavior is random and haphazard. It is not because political behavior is random and haphazard that we do not have much objective

knowledge about it. It is because we do not have much objective knowledge about it that it is random and haphazard.

Ultimately Frankel comes to doubt Mannheim.

There are obvious differences between the behavior of human beings and the behavior of physical things; but they do not justify setting these two in separate worlds, or suggesting that the ideals of truth and reason we apply to the physical sciences do not apply to the study of human history. The natural sciences after all, have also had social origins and social consequences.

45. Why Privacy Matters Even if You Have ‘Nothing to Hide’

Daniel Solove, author of Nothing to Hide: The False Tradeoff between Privacy and Security, argues that privacy matters even if you have nothing to hide.

The nothing-to-hide argument pervades discussions about privacy. The data-security expert Bruce Schneier calls it the “most common retort against privacy advocates.” The legal scholar Geoffrey Stone refers to it as an “all-too-common refrain.” In its most compelling form, it is an argument that the privacy interest is generally minimal, thus making the contest with security concerns a foreordained victory for security.

“If you’ve got nothing to hide, you’ve got nothing to fear.” While flawed, that argument is not new. It appears in Henry James’s 1888 novel, The Reverberator:

If these people had done bad things they ought to be ashamed of themselves and he couldn’t pity them, and if they hadn’t done them there was no need of making such a rumpus about other people knowing.

In the end, the nothing-to-hide argument has nothing to say.

When the nothing-to-hide argument is unpacked, and its underlying assumptions examined and challenged, we can see how it shifts the debate to its terms, then draws power from its unfair advantage. The nothing-to-hide argument speaks to some problems but not to others. It represents a singular and narrow way of conceiving of privacy, and it wins by excluding consideration of the other problems often raised with government security measures. When engaged directly, the nothing-to-hide argument can ensnare, for it forces the debate to focus on its narrow understanding of privacy. But when confronted with the plurality of privacy problems implicated by government data collection and use beyond surveillance and disclosure, the nothing-to-hide argument, in the end, has nothing to say.

46. Oliver Burkeman: The Power of Negative Thinking

“Think Positive.”

That’s what magazines and friends advise us to do in order to cope with the stress of the holiday season.

That’s the same advice that Norman Vincent Peale, author of The Power of Positive Thinking, was dispensing six decades ago. It turns out that thinking positive might not be the best way to cope with our stress.

In The Antidote: Happiness for People Who Can’t Stand Positive Thinking, Oliver Burkeman argues that we should explore an alternative to the “think positive” mantra: a counterintuitive approach that might be termed “the negative path to happiness.” The heart of this approach is to embrace uncertainty.

Burkeman writes in the WSJ:

This approach helps to explain some puzzles, such as the fact that citizens of more economically insecure countries often report greater happiness than citizens of wealthier ones. Or that many successful businesspeople reject the idea of setting firm goals.

Albert Ellis, who died in 2007, rediscovered a key insight of the Stoic philosophers: sometimes the best way to address the future is to focus on the worst-case scenario, not on the best.

Seneca the Stoic was a radical on this matter. If you feared losing your wealth, he once advised, “set aside a certain number of days, during which you shall be content with the scantiest and cheapest fare, with coarse and rough dress, saying to yourself the while: ‘Is this the condition that I feared?’”

To overcome a fear of embarrassment, Ellis told me, he advised his clients to travel on the New York subway, speaking the names of stations out loud as they passed. I’m an easily embarrassed person, so in the interest of journalistic research, I took his advice, on the Central Line of the London Underground. It was agonizing. But my overblown fears were cut down to size: I wasn’t verbally harangued or physically attacked. A few people looked at me strangely.

Just thinking in sober detail about worst-case scenarios—a technique the Stoics called “the premeditation of evils”—can help to sap the future of its anxiety-producing power. The psychologist Julie Norem estimates that about one-third of Americans instinctively use this strategy, which she terms “defensive pessimism.” Positive thinking, by contrast, is the effort to convince yourself that things will turn out fine, which can reinforce the belief that it would be absolutely terrible if they didn’t.

The Antidote is a series of journeys among people who share a single, surprising way of thinking about life. What they have in common is a hunch about human psychology: that it’s our constant effort to eliminate the negative that causes us to feel so anxious, insecure, and unhappy.

47. “We get to think the world is progressing when it is only repeating itself.”

If we pay no attention to words whatever, we may become like the isolated gentleman who invents a new perpetual-motion machine on old lines in ignorance of all previous plans, and then is surprised that it doesn't work. If we confine our attention entirely to the slang of the day, that is to say, if we devote ourselves exclusively to modern literature, we get to think the world is progressing when it is only repeating itself. In both cases we are likely to be deceived, and what is more important, to deceive others. Therefore, it is advisable for us in our own interests, quite apart from considerations of personal amusement, to concern ourselves occasionally with a certain amount of our national literature drawn from all ages. I say from all ages, because it is only when one reads what men wrote long ago that one realises how absolutely modern the best of the old things are.

48. How feeling powerless directs the narratives of our mind

In his new book Mastery, Robert Greene writes discusses how feeling powerless directs the narratives of our mind.

We live in a world that seems increasingly beyond our control. Our livelihoods are at the whim of globalized forces. The problems that we face—economic, environmental, and so on—cannot be solved by our individual actions. Our politicians are distant and unresponsive to our desires. A natural response when people feel overwhelmed is to retreat into various forms of passivity. If we don't try too much in life, if we limit our circle of action, we can give ourselves the illusion of control. The less we attempt, the less chances of failure. If we can make it look like we are not really responsible for our fate, for what happens to us in life, then our apparent powerlessness is more palatable. For this reason we become attracted to certain narratives: it is genetics that determines much of what we do; we are just products of our times; the individual is just a myth; human behavior can be reduced to statistical trends.

Many take this change in value a step further, giving their passivity a positive veneer. They romanticize the self-destructive artist who loses control of him- or herself. Anything that smacks of discipline or effort seems fussy and passé: what matters is the feeling behind the artwork, and any hint of craftsmanship or work violates this principle. They come to accept things that are made cheaply and quickly. The idea that they might have to expend much effort to get what they want has been eroded by the proliferation of devices that do so much of the work for them, fostering the idea that they deserve all of this—that it is their inherent right to have and to consume what they want. “Why bother working for years to attain mastery when we can have so much power with very little effort? Technology will solve everything.” This passivity has even assumed a moral stance: “mastery and power are evil; they are the domain of patriarchal elites who oppress us; power is inherently bad; better to opt out of the system altogether,” or at least make it look that way.

49. Wittgenstein: Reality is Shaped by the Words we Use

"Philosophy is a battle against the bewitchment of our intelligence by means of our language."

— Wittgenstein

Philosopher Bertrand Russell described Ludwig Josef Johann Wittgenstein as "the most perfect example I have ever known of genius as traditionally conceived, passionate, profound, intense, and dominating."

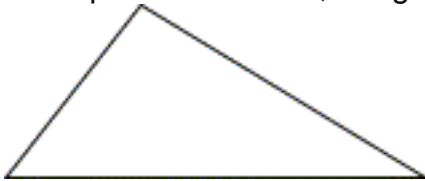
Wittgenstein, an Austrian philosopher, worked primarily in logic, mathematics, and the philosophy of language. He published one very short book: Tractatus Logico-Philosophicus.

The book's aim was to identify the relationship between language and reality. Interestingly, he spent the last twenty-two years of his life disputing the conclusions he wrote in *Tractatus*. "I have been forced," he wrote, "to recognize the grave mistakes in what I wrote in that first book." He started over but his life was cut short before he could publish his new conclusions.

After his death these works were assembled in a book titled Philosophical Investigations, which many people consider one of the most important books of the twentieth century.

"Wittgenstein came to believe," writes Robert Hagstrom in The Last Liberal Art, "that the meaning of words is constituted by the very function they perform within any language-game. Instead of believing there was some kind of omnipotent and separate logic to the world independent of what we observe, Wittgenstein took a step back and argued instead that the world we see is defined and given meaning by the words we choose. In short, the world is what we make of it."

To help us understand, Wittgenstein drew a very simple three-sided figure.



Wittgenstein then writes:

Take as an example the aspects of a triangle. This triangle can be seen as a triangular hole, as a solid, as a geometrical drawing, as standing on its base, as hanging from its apex; as a mountain, as a wedge, as an arrow or pointer, as an overturned object, which is meant to stand on the shorter side of the right angle, as a half parallelogram, and as various other things ... You can think now of this now of this as you look at it, can regard it now as this now as this, and then you will see it now this way, now this.

In essence, reality is shaped by the words we use.

"The words we choose," Hagstrom continues, "give meaning (description) to what we observe."

In order to further explain and/or defend our description, we in turn develop a story about what we believe is true. There is nothing wrong with storytelling. In fact, it is a very effective way of transferring ideas. If you stop and think, the way we communicate with each other is basically through a series of stories. Stories are open-ended and metaphorical rather than determinate.

We all use narratives but we must be careful doing so because they shape the way we see a problem.

50. Worldly-Wisdom from Charlie Munger

I'm a huge fan of Charlie Munger — Warren Buffett's right-hand man at Berkshire Hathaway.

For those of you unfamiliar with him, listening to his famous talk, The Psychology of Human Misjudgment will have you instantly hooked.

If that doesn't get you going, check out his two-step process for making effective decisions.

Recently Munger took to the stage at the shareholder meeting for the Daily Journal Corporation — a small company based in California that few people have heard of — where he is Chairman.

While generally, managers at shareholder meetings offer very little wisdom, Munger and Buffett are exceptions.

Here's a lengthy sampling of his comments.

Incentives of managers in tough businesses

I should tell you people a story, because you are groupies for stories. I talked recently to a man who shall go nameless. But his company was one of the great growth stocks of America.

And they had armies of PhD's in there who had mastered very difficult disciplines. And they had patents, and technology, and know how, what have you and hard to replace plants. What they make is difficult to make in a lot of different categories.

And the profits in the business are very mediocre, to put it mildly. And it isn't that it has been that badly run. It's just that everybody's learned how to make these difficult things, and there are too many of them trying to make them. It just gets terrible. And what happens then is, you're now the CEO of the place and you see it's getting tough. You view yourself as a guy that knows how to fix things. You never have a category in your mind of, "It's too tough to fix," which is a really stupid idea. You can recognize all kinds of things that are too tough to fix.

But if you don't, then you are a sucker for some narrative to say, maybe there's some company in your industry that makes something really complicated that other people can't match. And you say, "Well, I'll buy that. That solves my problem." But your friendly investment banker and your friendly management consultant want you to buy it at 30 times' earnings and 12 times' book. Of course, at that price, it won't solve your problems. And you do it anyway. After all, you've got consultants, and it gives you hope.

On thinking everyone will be successful with investments

I think the idea that everybody is going to have wonderful results from investing is inherently crazy. Nobody thinks everybody is going to have wonderful results from playing poker.

In the end, the wealth of the country is based on the productivity of the country, which only advances so fast. Of course, if you pay more and more people for not working, it's hard to see how that grows the productivity of the country.

On Making Bad Decisions

You know what Rudyard Kipling said? Treat those two imposters just the same success and failure. Of course, there's going to be some failure in making the correct decisions. Nobody bats a thousand. I think it's important to review your past stupidities so you are less likely to repeat them, but I'm not gnashing my teeth over it or suffering or enduring it. I regard it as perfectly normal to fail and make bad decisions. I think the tragedy in life is to be so timid that you don't play hard enough so you have some reverses.

The failure of General Motors

General Motors, out of the profits of their good years, they could have bought, every year, for many years, a big company. They could have bought Eli Lilly one year and Merck the next, and United Technologies. General Motors could own the world. Instead, what they declared to their shareholders was a goose egg. They took the common equity to zero.

And they would say it was all somebody else's fault. The climate was bad, the unions got powerful. Those damn Asians and Europeans were too competitive.

The truth of the matter is, their very prosperity made them weak. The dealerships got in the hands of inheritors, and the executives on the sales field go around and drink martinis with inheritors, and didn't pay enough attention to defects in their vehicles. And one thing led to another, and when they were all done the shareholders' equity went to zero.

And that was in a company that at its peak was one of the most admirable companies in the world. Take the stuff that Boss Kettering (Charles Kettering – head of research at General Motors from 1920 to 1947) had invented in the early days. Kettering was one of the most useful citizens that ever lived in America.

A self starter on a car is a wonderful thing. Under the old system, you frequently broke your arm. You would give it a crank and it would answer back by spinning backwards and breaking your arm. I would much rather push a button than have my arm broken. Nor do I have the opportunity to go and crank in the sleet and snow.

51. Competitive Strategy

An organization's core capabilities are those activities that, when performed at the highest level, enable the organization to bring its where-to-play and how-to-win choices to life. They are best understood as operating as a system of reinforcing activities— a concept first articulated by Harvard Business School's Michael Porter. Porter noted that powerful and sustainable competitive advantage is unlikely to arise from any one capability (e.g., having the best sales force in the industry or the best technology in the industry), but rather from a set of capabilities that both fit with one another (i.e., that don't conflict with one another) and actually reinforce one another (i.e., that make each other stronger than they would be alone).

For Porter, a company's "strategic position is contained in a set of tailored activities designed to deliver it." He calls the visual depiction of this set of activities an activity system. Since "competitive strategy is about being different ... [and] means deliberately choosing a different set of activities to deliver unique value," an activity system must also be distinctive from the activity systems of competitors. In his landmark 1996 article "What Is Strategy?," Porter illustrated his theory with examples from Southwest Airlines, Progressive Insurance, and The Vanguard Group, articulating the way in which each organization made distinctive choices and tailored an activity system to deliver on those choices. The activity system is a visual representation of the firm's competitive advantage, capturing on a single page the core capabilities of the firm. Articulating a firm's core capabilities is a vital step in the strategy process. Identifying the capabilities required to deliver on the where-to-play and how-to-win choices crystallizes the area of focus and investment for the company. It enables a firm to continue to invest in its current capabilities, to build up others, and to reduce the investment in capabilities that are not essential to the strategy.

53. Temperament Matters: In Life and Business

I love this excerpt from *Quiet: The Power of Introverts in a World That Can't Stop Talking* on Warren Buffett and temperament.

Buffett is known for thinking carefully when those around him are losing their heads. "Success in investing doesn't correlate with IQ," he has said. "Once you have ordinary intelligence, what you need is the temperament to control the urges that get other people into trouble in investing."

*Every summer since 1983, the boutique investment bank Allen & Co. has hosted a weeklong conference in Sun Valley, Idaho. This isn't just any conference. It's an extravaganza, with lavish parties, river-rafting trips, ice-skating, mountain biking, fly fishing, horseback riding, and a fleet of babysitters to care for guests' children. The hosts service the media industry, and past guest lists have included newspaper moguls, Hollywood celebrities, and Silicon Valley stars, with marquee names such as Tom Hanks, Candice Bergen, Barry Diller, Rupert Murdoch, Steve Jobs, Diane Sawyer, and Tom Brokaw. In July 1999, according to Alice Schroeder's excellent biography of Buffett, *The Snowball*, he was one of those guests. He had attended year after year with his entire family in tow, arriving by Gulfstream jet and staying with the other VIP attendees in a select group of condos overlooking the golf course. Buffett loved his annual vacation at Sun Valley, regarding it as a great place for his family to gather and for him to catch up with old friends.*

But this year the mood was different. It was the height of the technology boom, and there were new faces at the table—the heads of technology companies that had grown rich and powerful almost overnight, and the venture capitalists who had fed them cash. These people were riding high. When the celebrity photographer Annie Leibovitz showed up to shoot "the Media All-Star Team" for Vanity Fair, some of them lobbied to get in the photo. They were the future, they believed.

Buffett was decidedly not a part of this group. He was an old-school investor who didn't get caught up in speculative frenzy around companies with unclear earnings prospects. Some dismissed him as a relic of the past. But Buffett was still powerful enough to give the keynote address on the final day of the conference.

He thought long and hard about that speech and spent weeks preparing for it. After warming up the crowd with a charmingly self-deprecating story—Buffett used to dread public speaking until he took a Dale Carnegie course—he told the crowd, in painstaking, brilliantly analyzed detail, why the tech-fueled bull market wouldn't last. Buffett had studied the data, noted the danger signals, and then paused and reflected on what they meant. It was the first public forecast he had made in thirty years.

The audience wasn't thrilled, according to Schroeder. Buffett was raining on their parade. They gave him a standing ovation, but in private, many dismissed his ideas. "Good old Warren," they said. "Smart man, but this time he missed the boat."

Later that evening, the conference wrapped up with a glorious display of fireworks. As always, it had been a blazing success. But the most important aspect of the gathering—Warren Buffett alerting the crowd to the market's warning signs—wouldn't be revealed until the following year, when the dot-com bubble burst, just as he said it would.

Buffett takes pride not only in his track record, but also in following his own "inner scorecard." He divides the world into people who focus on their own instincts and those who follow the herd. "I feel like I'm on my back," says Buffett about his life as an investor, "and there's the Sistine Chapel, and I'm painting away. I like it when people say, 'Gee, that's a pretty good-looking painting.' But it's my painting, and when somebody says, 'Why don't you use more red instead of blue?' Good-bye. It's my painting. And I don't care what they sell it for. The painting itself will never be finished. That's one of the great things about it."

Temperament is what caused Buffett to go into insurance. In *The Snowball*, Schroeder writes:

He loved the handicapping aspect, the tough negotiating in which temperament mattered and huge sums of money were won or lost based on pure intellect and will. This business in which psychology gave the right person an edge drew together all of Buffett's skills.

Unfinished thought

It's Buffett's comment that really sticks with me because, like a lot of his wisdom, it transcends investing and remains true in many aspects of life.

Success in investing doesn't correlate with IQ. Once you have ordinary intelligence, what you need is the temperament to control the urges that get other people into trouble in investing

Warren Buffett

Temperament matters.

You need a temperament that controls the urges that get other people into trouble. And there is a long list of things that get people into trouble ... Buffett offers a great example:

You need a temperament that neither derives great pleasure from being with the crowd or against the crowd.

You also need a temperament that allows you to take action, whereas many just sit and watch. In his 1993 shareholder letter, Buffett writes:

a director who sees something he doesn't like should attempt to persuade the other directors of his views. If he is successful, the board will have the muscle to make the appropriate change. Suppose, though, that the unhappy director can't get other directors to agree with him. He should then feel free to make his views known to the absentee owners. Directors seldom do that, of course. The temperament of many directors would in fact be incompatible with critical behavior of that sort. But I see nothing improper in such actions, assuming the issues are serious. Naturally, the complaining director can expect a vigorous rebuttal from the unpersuaded directors, a prospect that should discourage the dissenter from pursuing trivial or non-rational causes.

The temperament of many people is incompatible with critical behavior. Most people go with the path of least resistance.

Take the high road, you'll find it's less crowded.

charlie munger

Temperament affects so much, and yet we rarely give it thought.

54. Opinions and Organizational Theory

When I think about the world in which we live and the organizations in which we work, I can't help but think that few people have the intellectual honesty, time, and discipline required to hold a view. Considered opinions are a lot of work, that's why there are so few of them.

We have a bias for action and, equally important, a bias for the appearance of knowledge. Think about it. When's the last time you heard someone say *I don't know*? If my experience was any indication, it seems the higher up the corporate ladder you go, the more unlikely you are to say or hear those three words.

Too Busy to Think

No one wants to tell the boss they don't know. The boss certainly doesn't want to let on that they might know either. We have too much of our self-worth wrapped up in our profession and others opinions of us.

Because we don't know, we talk in abstractions and fog. The appearance of knowledge becomes our currency.

Who has time to do the work required to hold an opinion? There is always an email to respond to, an urgent request from your boss, paper to move from one side of your desk to the other, etc. So we don't do the work. But so few others do the work either.

Perhaps an example will help.

At 4:45 pm you receive a 4 page proposal in your inbox. The proposal is to be decided on the next day at a meeting with 12 people.

To reflect on the proposal seriously, you'd have to stay at work late. You'd need to turn off the email and all of your other tasks to read a document from start to finish. And, after-all, who has time to read four pages these days? (So we skim.)

If we really wanted to do the work necessary to hold an opinion we'd have to: read the document from start to finish; talk to anyone you can find about the proposal; listen to arguments from others for and against it; verify the facts; consider our assumptions; talk to someone who has been through something similar before; verify the framing of the problem is not too narrow or wide; make sure the solution solves the problem; etc.

So we don't do the work. Yet we need an opinion for the meeting, or, perhaps more accurately, a sound bite. So we skim the document again looking for something we can support; something that signals we've thought about it, despite the fact we haven't.

We spend the time we should be learning and understanding something running around trying to make it look like we know everything. We're doing work alright: busywork.

We turn up at the meeting the next day to discuss the proposal but our only real goal is to find a brief pause in the conversation so we can insert our pre-scripted, fact-deficient, obfuscating generality into the conversation. We do, after-all, have to maintain appearances.

The proposal ultimately reaches consensus, but this was never really in doubt. If you flip this around for a second, it must be the easiest decision in the world. Think about it, here you have a room full of smart people all in agreement on the best way to proceed. How often does that happen? A true no-brainer is hardly worth a memo or even a meeting.

It's easy to agree when no one is thinking.

And organizational incentives encourage this behavior.

If the group makes the right decision you can take take credit. And, if by chance things go wrong, you don't get the blame. Group decisions, especially ones with consensus, allow for all of the participants to have the upside and few if any to have the downside.

When groups make decisions based on consensus, no one is really accountable if things go bad. Everyone can weasel out of responsibility (diffusion of responsibility).

When you're talking to someone familiar with the situation you might say something like, 'we were all wrong' or 'we all thought the same thing.'

When you're talking to someone unfamiliar with the situation you'd offer something more clever like 'I thought that decision was wrong but no one would listen to me,' knowing full well they can't prove you wrong.

And just like that, one-by-one, everyone in attendance at the meeting is absolved.

The alternative is uncomfortable.

Say, rather than jetting off to pick up the kids at 5 you stay and do the work required to have an opinion. While you get home around 11, exhausted, you are now comfortable with a well thought out opinion on the proposal. Maybe two things happen at this point. If you've done the work and you reached the same conclusion at the proposal, you feel like you just wasted 6 hours. If, however, you do the work and you reach a different conclusion, things get more interesting.

You show up at the meeting and mention that you thought about this and reached a different conclusion — In fact, you determine this proposal doesn't solve the problem. It's nothing more than lipstick.

So you speak up. And in the process, you risk being labelled as a dissenting troublemaker. Why, because no one else has done the work.

You might even offer some logical flow for everyone to follow along with your thinking. So you say something along the lines of: "I think a little differently on this. Here is how I see the problem and here are what I think are the governing variables. And here is how I weighed them. And here is how I'd address the main arguments I see against this. ... What I'd miss?"

In short you'd expose your thinking and open yourself up. You'd be vulnerable to people who haven't really done the work.

If you expect them to say OK, that sounds good, you'd be wrong. After all, if they're so easily swayed by your rational thinking, it looks like they haven't done the work.

Instead, they need to show they've already thought about your reasoning and arguments and formed a different opinion.

Rather than stick to facts, they might respond with hard to pin down jargon or corporate speak — facts will rarely surface in a rebuttal.

You'll hear something like "that doesn't account for the synergies" or "that doesn't line up with the strategic plan (you haven't seen)." Or maybe they point the finger at their boss who is not in the room: "That's what I thought too but Doug, oh no, he wants it done this way."

If you push too far you won't be at the next meeting because everyone knows you'll do the work and that means they know that by inviting you they'll be forced to think about things a little more, to anticipate arguments, etc. In short, inviting you means more work for them. It's nothing personal.

55. Intelligent Preparation: The World Is Multidisciplinary

We live in a society that demands specialization. Being the best means being an expert in something. Letters after your name and decades in the trenches of experience are required before you can claim to know anything. In one sense there is nothing wrong with this — specialized knowledge is required to solve problems and advance our global potential. But a byproduct of this niche focus is that it narrows the ways we think we can apply our knowledge without being called a fraud.

So we think physicists can't teach us about love; mathematicians can't instruct us on how to run a business; poets don't know squat about "my life." And bloggers can't contribute to philosophy.

I don't believe this is true.

Knowledge is hard to come by.

It takes work and commitment, and I think we owe it to ourselves to take it out of the box it comes in and experiment with it. We should blow past conformity and apply all the knowledge at our disposal to the problems and challenges we face every day.

Think about it. Over time you've picked up a lot of fundamentals about how the world works. You may have read a book about the Manhattan Project and the building of the nuclear bomb that was launched at Hiroshima. This story conveys the awesome power of self-sustaining nuclear reactions. Have you ever thought about applying those ideas to your life? You should.

56. The Fragilista

They think that the reasons for something are immediately accessible to them, even if they have no clue.

No matter how complex or difficult, no problem results in an “I don’t know.”

They are the fragilista.

Frequently found wearing suits and spending a lot of time in meetings, they prefer to tinker with things they do not understand rather than doing nothing.

This isn’t my idea, it’s Nassim Taleb’s.

In *Antifragile: Things That Gain from Disorder*, he writes:

[The fragilista] defaults to thinking that what he doesn’t see is not there, or what he does not understand does not exist. At the core, he tends to mistake the unknown for the nonexistent.

Fragilistas are naive rationalists.

They think that the reasons for things are, by default, accessible to them. They know the cause and effect of everything, or at least that’s what they think.

Because they mistake what they don’t know for the non-existent, they exhibit a strong — if mistaken — regard for the powers of reason.

They lack humility and respect for the first law of ecology: we can never do merely one thing.

Any action we take, and in this case inaction is a course of action, results in some unwanted consequences.

According to Taleb, the problem with the fragilista is that they “*make you engage in policies and actions, all artificial, in which the benefits are small and visible, and the side effects (are) potentially severe and invisible.*”

Fragilistas are everywhere.

They are the doctors who intervene too much in the body’s natural ability to heal, prescribing powerful medications with small benefit and possibly severe side effects.

There is the management fragilista who: (1) introduces a bureaucratic solution to what is really a people problem; (2) manages by best-seller; (3) seeks refuge in the false security of best-practices; (4) fails to come up with reasonable benchmarks for judging performance of solutions; (5) does everything and thus does nothing; etc.

There is the policy fragilista who feels that continuous interventions into the financial market are necessary for stability.

In *Filters Against Folly*, Garrett Hardin writes:

Whatever plan of action we adopt in our attempt to remake the world, our usual first step is to pin a laudatory label on what we are doing. We may call it development, cure, correction, improvement, help, or progress. We load untested conclusions onto ill-stated premises. But every intervention in an existing system is, for certain, only an intervention. We will make progress faster if we honestly call the changes “interventions” only, until an audit shows what we have actually done. Needless to say, such honesty will be resisted by most promoters of change.

The point isn’t to avoid risk or even intervention but rather to be humble about our knowledge, or lack of it.

To know when we should avoid small, immediate, and visible benefits that introduce the possibility for large (and possibly invisible) side effects. Less is more.

This isn’t foolproof but one possible way to counter the fragilista is to ensure rationale is explicitly (and publicly) stated up front.

When we mess with an existing (complex) system we’re intervening; we can never do merely one thing.

57. Naive Realism — I’m Right; You’re Biased

We're good at spotting others' faults while ignoring our own.

If someone informed you of your biases do you think you'd change your response?

Not likely. Even when we know about our biases and we're asked 'do you want to change what you just said' the results are the same.

We're happy to learn about biases, we even apply this knowledge to better predict the behavior of others. However, when it comes to ourselves, we're unmoved.

You probably think you're an above average driver.

Now I can shake you and tell you that most people have an inflated view of themselves. I can tell you that you're biased. I can tell you to be realistic.

And you're still going to look at me and say "*Other people* may be biased but I *really am* an above average driver."

Why is this? Emily Pronin at Princeton and Lee Ross at Stanford trace our resistance to self-awareness to a phenomenon they call naive realism.

From The Happiness Hypothesis:

Each of us thinks we see the world directly, as it really is.

We further believe that the facts as we see them are there for all to see, therefore others should agree with us.

If they don't agree, it follows either that they have not yet been exposed to the relevant facts or else that they are blinded by their interests and ideologies.

People acknowledge that their own backgrounds have shaped their views, but such experiences are invariably seen as deepening one's insights; for example, being a doctor gives a person special insight into the problems of the health-care industry. But the background of other people is used to explain their biases and covert motivations; for example, doctors think that lawyers disagree with them about tort reform not because they work with the victims of malpractice (and therefore have their own special insights) but because their self-interest biases their thinking.

It just seems plain as day, to the naive realist, that everyone is influenced by ideology and self-interest. Except for me. I see things as they are.

It's so easy for this to move from the individual to the group level. My group is right because we see things as they are and your group is wrong because you are biased by your ideology, religion, or self-interest.

58. Atul Gawande: Why We Fail

“Failures of ignorance we can forgive. If the knowledge of the best thing to do in a given situation does not exist, we are happy to have people simply make their best effort. But if the knowledge exists and is not applied correctly, it is difficult not to be infuriated.”

— Atul Gawande

We fail for two reasons. The first is ignorance, and the second is ineptitude. In The Checklist Manifesto: How to Get Things Right, Atul Gawande explains:

In the 1970s, the philosophers Samuel Gorovitz and Alasdair MacIntyre published a short essay on the nature of human fallibility that I read during my surgical training and haven't stopped pondering since. The question they sought to answer was why we fail at what we set out to do in the world. One reason, they observed, is “necessary fallibility” — some things we want to do are simply beyond our capacity. We are not omniscient or all-powerful. Even enhanced by technology, our physical and mental powers are limited. Much of the world and universe is—and will remain—outside our understanding and control.

There are substantial realms, however, in which control is within our reach. We can build skyscrapers, predict snowstorms, save people from heart attacks and stab wounds. In such realms, Gorovitz and MacIntyre point out, we have just two reasons that we may nonetheless fail.

The first is ignorance—we may err because science has given us only a partial understanding of the world and how it works. There are skyscrapers we do not yet know how to build, snowstorms we cannot predict, heart attacks we still haven't learned how to stop. The second type of failure the philosophers call ineptitude—because in these instances the knowledge exists, yet we fail to apply it correctly. This is the skyscraper that is built wrong and collapses, the snowstorm whose signs the meteorologist just plain missed, the stab wound from a weapon the doctors forgot to ask about.

For most of history, we've failed because of ignorance. We had only a partial understanding of how things worked.

In Taking the Medicine, Druin Burch writes:

Doctors, for most of human history, have killed their patients far more often than they have saved them. Their drugs and their advice have been poisonous. They have been sincere, well-meaning and murderous.

We used to know very little about the illnesses that befell us and even less about how to treat them. But, for the most part, that's changed. Over the last several decades, our knowledge has improved. This advance means that ineptitude plays a more central role in failure than ever before.

Heart attacks are a great example. “Even as recently as the 1950s,” Gawande writes, “we had little idea of how to prevent or treat them.” Back then, and some would argue even today, we knew very little about what caused heart attacks. Worse, even if we had been aware of the causes, we probably wouldn't have known what to do about it. Sure we'd give people morphine for pain and put people on bed rest, to the point where people couldn't even get out of bed to use the bathroom. We didn't want to stress a damaged heart. When knowledge doesn't exist, we do what we've always done. We pray and cross our fingers. Fast-forward to today and Gawande says “we have at least a dozen effective ways to reduce your likelihood of having a heart attack—for instance, controlling your blood pressure, prescribing a statin to lower cholesterol and inflammation, limiting blood sugar levels, encouraging exercise regularly, helping with smoking cessation, and, if there are early signs of heart disease, getting you to a cardiologist for still further recommendations.” *If you should have a heart attack, we have a whole panel of effective therapies that can not only save your life but also limit the damage to your heart: we have clot-busting drugs that can reopen your blocked coronary arteries; we have cardiac catheters that can*

balloon them open; we have open heart surgery techniques that let us bypass the obstructed vessels; and we've learned that in some instances all we really have to do is send you to bed with some oxygen, an aspirin, a statin, and blood pressure medications—in a couple days you'll generally be ready to go home and gradually back to your usual life. Today we know more about heart attacks but, according to Gawande, the odds a hospital deals with them correctly and in time are less than 50%. We know what we should do, and we still don't do it.

So if we know so much, why do we fail? The problem today is ineptitude. Or, maybe, simply “eptitude” — applying knowledge correctly and consistently.

The modern world has dumped a lot of complexity on us, and we're struggling to keep our heads above water. Not only is the complexity of knowledge increasing, but so is the velocity. The world is getting more complex. This challenge is not limited to medicine. It applies to nearly everything.

Know-how and sophistication have increased remarkably across almost all our realms of endeavor, and as a result so has our struggle to deliver on them. You see it in the frequent mistakes authorities make when hurricanes or tornadoes or other disasters hit. You see it in the 36 percent increase between 2004 and 2007 in lawsuits against attorneys for legal mistakes—the most common being simple administrative errors, like missed calendar dates and clerical screw ups, as well as errors in applying the law. You see it in flawed software design, in foreign intelligence failures, in our tottering banks—in fact, in almost any endeavor requiring mastery of complexity and of large amounts of knowledge.

Such failures carry an emotional valence that seems to cloud how we think about them. Failures of ignorance we can forgive. If the knowledge of the best thing to do in a given situation does not exist, we are happy to have people simply make their best effort. But if the knowledge exists and is not applied correctly, it is difficult not to be infuriated. What do you mean half of heart attack patients don't get their treatment on time? What do you mean that two-thirds of death penalty cases are overturned because of errors? It is not for nothing that the philosophers gave these failures so unmerciful a name—ineptitude. Those on the receiving end use other words, like negligence or even heartlessness.

Those of us who make mistakes where knowledge is known, feel like these judgments ignore how difficult today's jobs are. Failure wasn't intentional, and the situation is not as black and white.

Today there is more to know, more to manage, more to keep track of. More systems to learn and unlearn as new ones come online. More emails. More calls. More distractions. On top of that, there is more to get right and more to learn. And this, of course, creates more opportunities for mistakes.

Our typical response, rather than recognizing the inherent complexity of the system by which judgments are made, is to increase training and experience. Doctors, for example, go to school for many years. Engineers too. Accountants the same. And countless others. All of these professions have certifications, continuous training, some method of apprenticeship. You need to practice to achieve mastery.

In the medical field, training is longer and more intense than ever. Yet preventable failures remain.

So here we are today, the start of the twenty-first century. We have more knowledge than ever. We put that knowledge into the hands of people who are the most highly trained, hardest working, and skilled people we can find. Doing so has created impressive outcomes. As a society, we've done some amazing things.

Yet despite this, avoidable failures are common and persistent. Organizations make poor mistakes even when knowledge exists that would lead them to make different decisions. People do the same. The know-how has somehow become unmanageable. Perhaps, the

velocity and complexity of information have exceeded our individual ability to deal with it. We are becoming inept.

Gawande's solution to deal with ineptitude is a checklist. The Checklist Manifesto: How to Get Things Right is fascinating and eye-opening in its entirety.

59. Scarcity: Why Having Too Little Means So Much

“The biggest mistake we make about scarcity is we view it as a physical phenomenon. It’s not.”

We’re busier than ever. The typical inbox is perpetually swelling with messages awaiting attention. Meetings need to be rescheduled because something came up. Our relationships suffer. We don’t spend as much time as we should with those who mean something to us. We have little time for new people; potential friends eventually get the hint and stop proposing ideas for things to do together. Falling behind, turns into a vicious cycle.

Does this sound anything like your life?

You have something in common with people who fall behind on their bills, argue Harvard economist Sendhil Mullainathan and Princeton psychologist Eldar Shafir in their book Scarcity: Why Having Too Little Means So Much. The resemblance, they write, is clear.

Missed deadlines are a lot like over-due bills. Double-booked meetings (committing time you do not have) are a lot like bounced checks (spending money you do not have). The busier you are, the greater the need to say no. The more indebted you are, the greater the need to not buy. Plans to escape sound reasonable but prove hard to implement. They require constant vigilance—about what to buy or what to agree to do. When vigilance flags—the slightest temptation in time or in money—you sink deeper.

Some people end up sinking further into debt. Others with more commitments. The resemblance is striking.

We normally think of time management and money management as distinct problems. The consequences of failing are different: bad time management leads to embarrassment or poor job performance; bad money management leads to fees or eviction. The cultural contexts are different: falling behind and missing a deadline means one thing to a busy professional; falling behind and missing a debt payment means something else to an urban low-wage worker.

What’s common between these situations? Scarcity. “By scarcity,” they write, “we mean having less than you feel you need.”

And what happens when we feel a sense of scarcity? To show us Mullainathan and Shafir bring us back to the past. Near the end of World War II, the Allies realized they would need to feed a lot of Europeans on the edge of starvation. The question wasn’t where to get the food but, rather, something more technical. What is the best way to start feeding them?

Should you begin with normal meals or small quantities that gradually increase?

Researchers at the University of Minnesota undertook an experiment with healthy male volunteers in a controlled environment “where their calories were reduced until they were subsisting on just enough food so as not to permanently harm themselves.” The most surprising findings were psychological. The men became completely focused on food in unexpected ways:

Obsessions developed around cookbooks and menus from local restaurants. Some men could spend hours comparing the prices of fruits and vegetables from one newspaper to the next. Some planned now to go into agriculture. They dreamed of new careers as restaurant owners.... When they went to the movies, only the scenes with food held their interest.

“Scarcity captures the mind,” Mullainathan and Shafir write. Starving people have food on their mind to the point of irrationality. But we all act this way when we experience scarcity. “The mind,” they write, “orients automatically, powerfully, toward unfulfilled needs.”

Scarcity is like oxygen. When you don’t need it, you don’t notice it. When you do need it, however, it’s all you notice.

For the hungry, that need is food. For the busy it might be a project that needs to be finished. For the cash-strapped it might be this month’s rent payment; for the lonely, a lack

of companionship. Scarcity is more than just the displeasure of having very little. It changes how we think. It imposes itself on our minds.

And when scarcity is taking up your mental cycles and putting your attention on what you lack, you can't attend to other things. How, for instance, can you learn?

(There was) a school in New Haven that was located next to a noisy railroad line. To measure the impact of this noise on academic performance, two researchers noted that only one side of the school faced the tracks, so the students in classrooms on that side were particularly exposed to the noise but were otherwise similar to their fellow students. They found a striking difference between the two sides of the school. Sixth graders on the train side were a full year behind their counterparts on the quieter side. Further evidence came when the city, prompted by this study, installed noise pads. The researchers found this erased the difference: now students on both sides of the building performed at the same level.

Cognitive load matters. Mullainathan and Shafir believe that scarcity imposes a similar mental tax, impairing our ability to perform well, and exercise self-control.

We are all susceptible to "the planning fallacy," which means that we're too optimistic about how long it will take to complete a project. Busy people, however, are more vulnerable to this fallacy. Because they are focused on everything they must currently do, they are "more distracted and overwhelmed—a surefire way to misplan." "The underlying problem," writes Cass Sunstein in his review for the New York Review of Books, "is that when people tunnel, they focus on their immediate problem; 'knowing you will be hungry next month does not capture your attention the same way that being hungry today does.' A behavioral consequence of scarcity is "juggling," which prevents long-term planning."

When we have abundance, we don't have as much depletion. Wealthy people can weather a shock without turning their lives upside-down. The mental energy needed to prevail may be substantial, but it will not create a feeling of scarcity.

Imagine a day at work where your calendar is sprinkled with a few meetings and your to-do list is manageable. You spend the unscheduled time by lingering at lunch or at a meeting or calling a colleague to catch up. Now, imagine another day at work where your calendar is chock-full of meetings. What little free time you have must be sunk into a project that is overdue. In both cases time was physically scarce. You had the same number of hours at work and you had more than enough activities to fill them. Yet in one case you were acutely aware of scarcity, of the finiteness of time; in the other it was a distant reality, if you felt it at all. The feeling of scarcity is distinct from its physical reality.

Mullainathan and Shafir sum up their argument:

In a way, our argument in this book is quite simple. Scarcity captures our attention, and this provides a narrow benefit: we do a better job of managing pressing needs. But more broadly, it costs us: we neglect other concerns, and we become less effective in the rest of life. This argument not only helps explain how scarcity shapes our behaviors; it also produces some surprising results and sheds new light on how we might go about managing our scarcity.

In a way, this explains why diets never work.

60. The Hard Thing About Hard Things

The problem with most business books is they present a formula for problems that ultimately have no formula. You're reading something with no practical value and you're not really learning anything. There is no formula for dealing with complexity that's always changing. "There's no recipe for leading a group of people out of trouble," writes Ben Horowitz in *The Hard Thing About Hard Things*. The book is one of the best business books I've read in a long time.

The hard thing isn't setting a big, hairy, audacious goal. The hard thing is laying people off when you miss the big goal. The hard thing isn't hiring great people. The hard thing is when those "great people" develop a sense of entitlement and start demanding unreasonable things. The hard thing isn't setting up an organizational chart. The hard thing is getting people to communicate within the organization that you just designed. The hard thing isn't dreaming big. The hard thing is waking up in the middle of the night in a cold sweat when the dream turns into a nightmare.

Most management books focus on how to avoid screwing up — or at least covering your ass if you do. Ben, however, provides insight into what to do after you screw up. and you will screw up.

Just because there is no formula doesn't mean things are hopeless. Advice and experience can help guide us. But that's the difference between Ben's book and most: he shows you what it's really like to make hard decisions, without offering you a three-step formula. Horowitz walks you through his considerations, deliberations, thoughts, mistakes, regrets, difficulties. Through that journey, we learn. "Circumstances may differ, but the deeper patterns and the lessons keep resonating."

Fear can be good.

Here is an interesting point on fear that's representative and telling of the book.

... It taught me that being scared didn't mean I was gutless. What I did mattered and would determine whether I would be a hero or a coward. I have often thought back on that day, realizing that if I'd done what Roger had told me to do, I would have never met my best friend. That experience also taught me not to judge things by their surfaces. Until you make the effort to get to know someone or something, you don't know anything. There are no shortcuts to knowledge, especially knowledge gained from personal experience. Following conventional wisdom and relying on shortcuts can be worse than knowing nothing at all.

Seeing the world through different lenses.

Looking at the world through such different prisms helped me separate facts from perception. This ability would serve me incredibly well later when I became an entrepreneur and CEO. In particularly dire circumstances when the "facts" seemed to dictate a certain outcome, I learned to look for alternative narratives and explanations coming from radically different perspectives to inform my outlook. The simple existence of an alternate, plausible scenario is often all that's needed to keep hope alive among a worried workforce.

We can't do everything.

My father turned to me and said, "Son, do you know what's cheap?"

Since I had absolutely no idea what he was talking about, I replied, "No, what?"

"Flowers. Flowers are really cheap. But do you know what's expensive?" he asked.

Again, I replied, "No, what?" He said, "Divorce."

Something about that joke, which was not really a joke, made me realize that I had run out of time. Up until that point, I had not really made any serious choices. I felt like I had unlimited bandwidth and could do everything in life that I wanted to do simultaneously. But his joke made it suddenly clear that by continuing on the course I was on, I might lose my family. By doing everything, I would fail at the most important thing. It was the first time that I forced myself to look at the world through priorities that were not purely my own. I thought

that I could pursue my career, all my interests, and build my family. More important, I always thought about myself first. When you are part of a family or part of a group, that kind of thinking can get you into trouble, and I was in deep trouble. In my mind, I was confident that I was a good person and not selfish, but my actions said otherwise.

The best thing about startups.

Marc (Andreessen): *"Do you know the best thing about startups?"*

Ben: *"What?"*

Marc: *"You only ever experience two emotions: euphoria and terror. And I find that lack of sleep enhances them both."*

The type of friends you need in your life.

No matter who you are, you need two kinds of friends in your life. The first kind is one you can call when something good happens, and you need someone who will be excited for you. Not a fake excitement veiling envy, but a real excitement. You need someone who will actually be more excited for you than he would be if it had happened to him. The second kind of friend is somebody you can call when things go horribly wrong—when your life is on the line and you only have one phone call. Who is it going to be?

Doing hard things, not fun things.

Ben had a lot of mentors, Bill Campbell was one of them. Being present and letting people know where they stand is incredibly important. Four-star General Stan McChrystal couldn't have been the leader he was without being out there with the troops sleeping in the same conditions with the same risk. Here is an incredibly important lesson on leadership that most people miss.

After seven weeks, we came to an agreement with EDS. They would buy Loudcloud for \$ 63.5 million in cash and assume its associated liabilities and cash burn. We would retain the intellectual property, Opsware, and become a software company. EDS would then license our software to run both Loudcloud and the larger EDS for \$ 20 million per year. I thought it was a great deal for both EDS and us. It was certainly far better than bankruptcy. I felt 150 pounds lighter. I could take a deep breath for the first time in eighteen months. Still, it wouldn't be easy. Selling Loudcloud meant selling about 150 employees to EDS and laying off another 140.

I called Bill Campbell to tell him the good news: The deal was signed and we would be announcing it in New York on Monday. He replied, "Too bad you can't go to New York and be part of the announcement; you'll have to send Marc." I said, "What do you mean?" He said, "You need to stay home and make sure everybody knows where they stand. You can't wait a day. In fact, you can't wait a minute. They need to know whether they are working for you, EDS, or looking for a fucking job." Damn. He was right. I sent Marc to New York and prepared to let people know where they stood. That small piece of advice from Bill proved to be the foundation we needed to rebuild the company. If we hadn't treated the people who were leaving fairly, the people who stayed would never have trusted me again. Only a CEO who had been through some awful, horrible, devastating circumstances would know to give that advice at that time.

Figuring out what the customer wants is the innovator's job. And innovation requires a combination of skills.

It turns out that is exactly what product strategy is all about—figuring out the right product is the innovator's job, not the customer's job. The customer only knows what she thinks she wants based on her experience with the current product. The innovator can take into account everything that's possible, but often must go against what she knows to be true. As a result, innovation requires a combination of knowledge, skill, and courage.

I've talked about the important role that coding will play in the future. Horowitz offers a simple lesson for programmers and managers alike: "all decisions were objective until the first line of code was written. After that, all decisions were emotional."

Tell it like it is.

When you start losing the truth is the first thing to go and everyone sees it. *One of the most important management lessons for a founder/ CEO is totally unintuitive. My single biggest personal improvement as CEO occurred on the day when I stopped being too positive.*

As a young CEO, I felt the pressure—the pressure of employees depending on me, the pressure of not really knowing what I was doing, the pressure of being responsible for tens of millions of dollars of other people's money. As a consequence of this pressure, I took losses extremely hard. If we failed to win a customer or slipped a date or shipped a product that wasn't quite right, it weighed heavily on me. I thought that I would make the problem worse by transferring that burden to my employees. Instead, I thought I should project a positive, sunny demeanor and rally the unburdened troops to victory. I was completely wrong.

I realized my error during a conversation with my brother in-law, Cartheu. At the time, Cartheu worked for AT& T as a telephone lineman (he is one of those guys who climb the poles). I had just met a senior executive at AT& T, whom I'll call Fred, and I was excited to find out if Cartheu knew him. Cartheu said, "Yeah, I know Fred. He comes by about once a quarter to blow a little sunshine up my ass." At that moment, I knew that I'd been screwing up my company by being too positive.

Why should you tell it like it is?

A few reasons: it builds trust; smart people will see through the lies anyway; it fosters a positive culture and ensures everyone is working from the same page with the same information. The pressure to be positive as a leader is incredible. People are looking to you and you want to inspire them. But the best way to do that is to be real with them. For example, if you're trying to foster a culture where failure is ok, but you don't get up there and talk about one of your massive personal failures, the culture won't even have a chance to change.

The Hard Thing About Hard Things is the best business book I've read in a long time. Perhaps one of the best ever.

61. The Art of Winning An Argument

We spend a lot of our lives trying to convince or persuade others to our point of view. This is one of the reasons that Daniel Pink says that we're all in sales:

Some of you, no doubt, are selling in the literal sense—convincing existing customers and fresh prospects to buy casualty insurance or consulting services or homemade pies at a farmers' market. But all of you are likely spending more time than you realize selling in a broader sense—pitching colleagues, persuading funders, cajoling kids. Like it or not, we're all in sales now.

Persuade or Convince?

But ... how are we to change minds? What's the best way to win an argument? Should we try to convince people, or should we try to persuade them?

In the difference between persuading and convincing, Seth Godin writes:

Marketers don't convince. Engineers convince. Marketers persuade. Persuasion appeals to the emotions and to fear and to the imagination. Convincing requires a spreadsheet or some other rational device.

It's much easier to persuade someone if they're already convinced, if they already know the facts. But it's impossible to change someone's mind merely by convincing them of your point.

Sometimes people just disagree. And it's here where we things start to get interesting.

"What a Man wishes, he will also believe"

— Demosthenes

At first, when people disagree with us we assume they are ignorant ... that they lack information. So we try to convince them with information. If we show them that information and they still don't change their mind, we just think they're idiots.

In her book Being Wrong: Adventures in the Margin of Error, Kathryn Schulz explains:

... The first thing we usually do when someone disagrees with us is that we just assume they are ignorant. You know, they don't have access to the same information we do and when we generously share that information with them, they are going to see the light and come on over to our team.

When that doesn't work. When it turns out those people have all the same information and they still don't agree with us we move onto a second assumption. They're idiots ...

This approach of trying to convince people that we're right and they're wrong is flawed and rarely works. And it's not because people are idiots, most of them are not.

The Illusion of Explanatory Depth

In many cases, we are overconfident about what we think because we're familiar with the material. We think we know more than we actually do because it's available to us. In short, we convince ourselves that we understand how something works when we don't.

In a study about a decade ago, Yale professors Leonid Rozenblit and Frank Keil asked students to explain how simple things work, like a flushing toilet, a sewing machine, piano keys, a zipper, and a cylinder lock. It turns out, we're not nearly as smart as we think.

When knowledge is put to the test, our familiarity with things leads to an (*unwarranted*) overconfidence about how they work.

Discovering that we don't know as much as we think isn't as easy as it may seem. Testing our own knowledge sounds like a lot of work. And most of the time others won't test it either, however, when they do our knowledge doesn't often match our confidence. And this is the beginning of how we start to show others or even ourselves that our view of the world might need updating.

"The first principle is that you must not fool yourself, and you are the easiest person to fool."

— Richard Feynman

The Era of Fake Knowledge

It's never been easier to fake what you know: to both yourself and to others.

It's the conservation of energy. Why put in the effort to learn something if we can get by most of the time without learning it? Why read the entire document when you can just skim the executive summary and get away with it?

Our intellectual laziness, however, comes with a cost. The more we coast the harder it gets to discern the difference between what we think we know and what we actually know. We end up fooling ourselves.

(There are two quick ways you can test your own understanding of something. The first is called the Feynman Technique, and the second is by doing the work required to hold an opinion.)

How to Win an Argument

Recent research shows how the illusion of knowledge might help you convince people they are wrong.

When asked to give reasons for their view, people remain as confident of their positions as they were before giving reasons. This is how we often argue with others. A tennis match of reasons served out and returned from one side to the other. Only no one is listening to the other or even considering they might be wrong. The way to really change minds and soften stances is to ask people to explain why they held views.

(Interestingly this very similar to the technique used by former FBI hostage negotiator Chris Voss to soften people's stances. He simply asks them how am I supposed to do that?)

We often can't explain why we think what we do. And when asked to explain it we realize that we're not as knowledgeable as we thought. That's when we revise our confidence level down and become more open to the views of others.

If you want to win an argument, simply ask the person trying to convince you of something to explain *how* it would work.

Odds are they have not done the work required to hold an opinion. If they can explain why they are correct and how things would work, you'll learn something. If they can't you'll soften their views, perhaps nudging them ever so softly toward your views.

It is worth bearing in mind, however, that someone might do the same to you so make sure you can explain why you think what you do.

62. Warren Buffett on Scorecards, Investing, Friends, and the Family Motto

This website is named after a street located in Omaha, Nebraska. An amazing place, Omaha is famous for being the home of Warren Buffett, one of the world's richest men. The headquarters of Berkshire Hathaway — and his house — just happen to be on “Farnam Street.” The name of this website is an homage to both Buffett and his business partner Charlie Munger.

While Buffett is famous for his investing acumen, he's also full of sage wisdom on life and living.

In October 2009, while the housing crisis was still in full effect, his authorized biography *The Snowball: Warren Buffett and the Business of Life* hit the shelves.

Here are some of his lessons on life and investing.

Three Early Lessons in Investing

Having bought three shares of Cities Service Preferred at the age of 11, Buffett learned a valuable lesson. After the stock plunged from \$38.25 to \$27 a share. His sister Doris reminded him daily on the way to school that her stock was going down. Buffett felt “terribly” responsible. When the stock recovered he sold with a slight \$5 profit. Almost immediately after, Cities Service quickly soared to \$202 a share.

Warren learned three lessons and would call this episode one of the most important of his life. One lesson was not to overly fixate on what he had paid for a stock. The second was not to rush unthinkingly to grab a small profit. He learned these two lessons by brooding over the \$ 492 he would have made had he been more patient. It had taken five years of work, since he was six years old, to save the \$ 120 to buy this stock. Based on how much he currently made from selling golf balls or peddling popcorn and peanuts at the ballpark, he realized that it could take years to earn back the profit he had “lost.” He would never, never, never forget this mistake. And there was a third lesson, which was about investing other people's money. If he made a mistake, it might get somebody upset at him. So he didn't want to have responsibility for anyone else's money unless he was sure he could succeed.

The Scorecard

This is an important one to keep in mind. If we place too much emphasis on what the world thinks, we end up with an outer scorecard.

I feel like I'm on my back, and there's the Sistine Chapel, and I'm painting away. I like it when people say, 'Gee, that's a pretty good-looking painting.' But it's my painting, and when somebody says, 'Why don't you use more red instead of blue?' Good-bye. It's my painting. And I don't care what they sell it for. The painting itself will never be finished. That's one of the great things about it.

“The big question about how people behave is whether they've got an Inner Scorecard or an Outer Scorecard. It helps if you can be satisfied with an Inner Scorecard. I always pose it this way. I say: 'Lookit. Would you rather be the world's greatest lover, but have everyone think you're the world's worst lover? Or would you rather be the world's worst lover but have everyone think you're the world's greatest lover?' Now, that's an interesting question.

This has implications if you're a parent: What you put emphasis on matters.

If all the emphasis is on what the world's going to think about you, forgetting about how you really behave, you'll wind up with an Outer Scorecard.

Hang Around People Better Than You

After graduating from Columbia University, Buffett returned to Omaha to live with his parents. He spent part of that first summer fulfilling his obligation to the National Guard. While he wasn't a natural, it sure beat going off to fight in Korea. Part of his duties in the guard required him to attend training camp in La Crosse, Wisconsin, for a few weeks. That experience taught him an incredible lesson that he'd carry forward for the rest of his life.

“It's a very democratic organization. I mean, what you do outside doesn't mean much. To fit in, all you had to do was be willing to read comic books. About an hour after I got there, I

was reading comic books. Everybody else was reading comic books, why shouldn't I? My vocabulary shrank to about four words, and you can guess what they were.

"I learned that it pays to hang around with people better than you are, because you will float upward a little bit. And if you hang around with people that behave worse than you , pretty soon you'll start sliding down the pole. It just works that way."

The Buffett Family Motto

As simple as it is powerful.

"Spend less than you make" could, in fact, have been the Buffett family motto, if accompanied by its corollary, "Don't go into debt."

Why Buffett Wanted Money

Even when he was little h,e was always fixated on money. He wanted money. Why?

"It could make me independent. Then I could do what I wanted to do with my life. And the biggest thing I wanted to do was work for myself . I didn't want other people directing me. The idea of doing what I wanted to do every day was important to me."

Principles

In July of 1952, Susie Buffett, having been married only a few months to Warren, went to Chicago with her parents and new in-laws for the Republican convention. The convention was covered on television for the first time in history. Warren, who stayed in Omaha, watched eagerly — "struck by the power of this medium to magnify and influence events." The front-runner was Senator Robert Taft, known as "Mr. Integrity." He wanted three things: (1) small government; (2) pro-business; and (3) eradicate Communism. Taft's friend and Warren's father, Howard Buffett, was the head of his presidential campaign. Taft's main opponent was the moderate and popular war hero General Dwight D. Eisenhower. While it might have been the first convention covered by television it still lives in the history books as one of the most controversial Republican conventions. Eisenhower backers pushed through a controversial amendment to the rules that handed him the nomination on the first ballot. Taft and his supporters were, of course, outraged.

But Eisenhower soon made peace with them by promising to combat "creeping socialism." Taft insisted that his followers swallow their outrage and vote for Eisenhower for the sake of regaining the White House. The Republicans united behind him and his running mate, Richard Nixon; "I Like Ike" buttons sprouted everywhere. Everywhere, that is, except on Howard Buffett's chest. He broke with the party by refusing to endorse Eisenhower. This was an act of political suicide. His support within the party evaporated overnight. He was left standing on principle— alone. Warren recognized that his father had "painted himself into a corner." From his earliest childhood, Warren had always tried to avoid broken promises, burned bridges, and confrontation. Now Howard's struggles branded three principles even deeper into his son: that allies are essential; that commitments are so sacred that by nature they should be rare; and that grandstanding rarely gets anything done.

Still Curious?

While reading about Buffett won't make you as smart as he is, you might learn something in the process. Pick up a copy of *The Snowball: Warren Buffett and the Business of Life* and give it a shot.

63. The Uses Of Being Wrong

Confessions of wrongness are the exception not the rule.

Daniel Drezner, a professor of international politics at the Fletcher School of Law and Diplomacy at Tufts University, pointing to the difference between being wrong in a prediction and making an error, writes:

Error, even if committed unknowingly, suggests sloppiness. That carries a more serious stigma than making a prediction that fails to come true.

Social sciences, unlike physical and natural sciences, finds a shortage of high-quality data on which to make predictions.

How does Science Advance?

A theory may be scientific even if there is not a shred of evidence in its favour, and it may be pseudoscientific even if all the available evidence is in its favour. That is, the scientific or non-scientific character of a theory can be determined independently of the facts. A theory is 'scientific' if one is prepared to specify in advance a crucial experiment (or observation) which can falsify it, and it is pseudoscientific if one refuses to specify such a 'potential falsifier'. But if so, we do not demarcate scientific theories from pseudoscientific ones, but rather scientific methods from non-scientific method.

Karl Popper viewed the progression of science as falsification — that is science progresses by elimination of what doesn't work and hold. Popper's falsifiability criterion ignores the tenacity of scientific theories, even in the face of disconfirming evidence.

Scientists, like many of us, do not abandon a theory because the evidence may contradict it.

The wake of science is littered with discussions on anomalies and not refutations.

Another theory on scientific advancement, proposed by Thomas Kuhn, a distinguished American philosopher of science, argues that science proceeds with a series of revolutions with an almost religious conversion.

Imre Lakatos, a Hungarian philosopher of mathematics and science, wrote:

(The) history of science, of course, is full of accounts of how crucial experiments allegedly killed theories. But all such accounts are fabricated long after the theory has been abandoned.

Lakatos bridged the gap between Popper and Kuhn by addressing what they failed to solve.

The hallmark of empirical progress is not trivial verifications: Popper is right that there are millions of them. It is no success for Newtonian theory that stones, when dropped, fall towards the earth, no matter how often this is repeated. But, so-called 'refutations' are not the hallmark of empirical failure, as Popper has preached, since all programmes grow in a permanent ocean of anomalies. What really counts are dramatic, unexpected, stunning predictions: a few of them are enough to tilt the balance; where theory lags behind the facts, we are dealing with miserable degenerating research programmes.

Now, how do scientific revolutions come about? If we have two rival research programmes, and one is progressing while the other is degenerating, scientists tend to join the progressive programme. This is the rationale of scientific revolutions. But while it is a matter of intellectual honesty to keep the record public, it is not dishonest to stick to a degenerating programme and try to turn it into a progressive one.

As opposed to Popper the methodology of scientific research programmes does not offer instant rationality. One must treat budding programmes leniently: programmes may take decades before they get off the ground and become empirically progressive. Criticism is not a Popperian quick kill, by refutation. Important criticism is always constructive: there is no refutation without a better theory. Kuhn is wrong in thinking that scientific revolutions are sudden, irrational changes in vision. [The history of science refutes both Popper and Kuhn:] On close inspection both Popperian crucial experiments and Kuhnian revolutions

turn out to be myths: what normally happens is that progressive research programmes replace degenerating ones.

A lot of the falsification effort is devoted to proving others wrong and not ourselves. “It’s rare for academics, Drezner writes, to publicly disavow their own theories and hypotheses.”

Indeed, a common lament in the social sciences is that negative findings—i.e., empirical tests that fail to support an author’s initial hypothesis—are never published.

Why is it so hard for us to see when we are wrong?

It is not necessarily concern for one’s reputation. Even predictions that turn out to be wrong can be intellectually profitable—all social scientists love a good straw-man argument to pummel in a literature review. Bold theories get cited a lot, regardless of whether they are right.

Part of the reason is simple psychology; we all like being right much more than being wrong.

As Kathryn Schulz observes in *Being Wrong*, “the thrill of being right is undeniable, universal, and (perhaps most oddly) almost entirely indiscriminating It’s more important to bet on the right foreign policy than the right racehorse, but we are perfectly capable of gloating over either one.”

As we create arguments and gather supporting evidence (while discarding evidence that does not fit) we increasingly persuade ourselves that we are right. We gain confidence and try to sway the opinions of others.

There are benefits to being wrong.

Schulz argues that “the capacity to err is crucial to human cognition. Far from being a moral flaw, it is inextricable from some of our most humane and honorable qualities: empathy, optimism, imagination, conviction, and courage. And far from being a mark of indifference or intolerance, wrongness is a vital part of how we learn and change.”

Drezner argues that some of the tools of the information age give us hope that we might become increasingly likely to admit being wrong.

Blogging and tweeting encourages the airing of contingent and tentative arguments as events play out in real time. As a result, far less stigma attaches to admitting that one got it wrong in a blog post than in peer-reviewed research. Indeed, there appears to be almost no professional penalty for being wrong in the realm of political punditry. Regardless of how often pundits make mistakes in their predictions, they are invited back again to pontificate more.

As someone who has blogged for more than a decade, I’ve been wrong an awful lot, and I’ve grown somewhat more comfortable with the feeling. I don’t want to make mistakes, of course. But if I tweet or blog my half-formed supposition, and it then turns out to be wrong, I get more intrigued about why I was wrong. That kind of empirical and theoretical investigation seems more interesting than doubling down on my initial opinion. Younger scholars, weaned on the Internet, more comfortable with the push and pull of debate on social media, may well feel similarly.

64. The History of Cognitive Overload

The Organized Mind: Thinking Straight in the Age of Information Overload, a book by Daniel Levitin, has an interesting section on cognitive overload.

Each day we are confronted with hundreds, probably thousands of decisions. Most of which are insignificant or unimportant or both. Do we really need a whole aisle for toothpaste?

In response to all of these decisions, most of us adopt a strategy of *satisficing*, a term coined by Nobel Prize winner Herbert Simon to describe something that is perhaps not the best but good enough. For things that don't matter, this is a good approach. You don't know which pizza place is the best but you know which ones are good enough.

Satisficing is one of the foundations of productive human behavior; it prevails when we don't waste time on decisions that don't matter, or more accurately, when we don't waste time trying to find improvements that are not going to make a significant difference in our happiness or satisfaction.

All of us, Levitin argues, engage in satisficing every time we clean our homes.

If we got down on the floor with a toothbrush every day to clean the grout, if we scrubbed the windows and walls every single day, the house would be spotless. But few of us go to this much trouble even on a weekly basis (and when we do, we're likely to be labeled obsessive-compulsive). For most of us, we clean our houses until they are clean enough, reaching a kind of equilibrium between effort and benefit. It is this cost-benefits analysis that is at the heart of satisficing.

The easiest way to be happy is to want what you already have. "Happy people engage in satisficing all the time, even if they don't know it."

Satisficing is a tool that allows you not to waste time on things that don't really matter. Who cares if you pick Colgate or Crest? For other decisions, "the old-fashioned pursuit of excellence remains the right strategy."

We now spend an unusual amount of time and energy ignoring and filtering. Consider the supermarket.

In 1976, the average supermarket stocked 9,000 unique products; today that number has ballooned to 40,000 of them, yet the average person gets 80%– 85% of their needs in only 150 different supermarket items. That means that we need to ignore 39,850 items in the store.

This comes with a cost.

Neuroscientists have discovered that unproductivity and loss of drive can result from decision overload. Although most of us have no trouble ranking the importance of decisions if asked to do so, our brains don't automatically do this.

We have a limited number of decisions. After all, there are only so many we can make in a day without compromising quality. Once we've hit that limit it doesn't matter how important they are.

The decision-making network in our brain doesn't prioritize.

Our world has exploded. Information is abundant. I didn't think we could process it all but Levitin argues that we can, at a cost.

We can have trouble separating the trivial from the important, and all this information processing makes us tired. Neurons are living cells with a metabolism; they need oxygen and glucose to survive and when they've been working hard, we experience fatigue. Every status update you read on Facebook, every tweet or text message you get from a friend, is competing for resources in your brain with important things like whether to put your savings in stocks or bonds, where you left your passport, or how best to reconcile with a close friend you just had an argument with.

The processing capacity of the conscious mind has been estimated at 120 bits per second. That bandwidth, or window, is the speed limit for the traffic of information we can pay conscious attention to at any one time. While a great deal occurs below the threshold of

our awareness, and this has an impact on how we feel and what our life is going to be like, in order for something to become encoded as part of your experience, you need to have paid conscious attention to it.

What does this mean?

In order to understand one person speaking to us, we need to process 60 bits of information per second. With a processing limit of 120 bits per second, this means you can barely understand two people talking to you at the same time. Under most circumstances, you will not be able to understand three people talking at the same time. ...

With such attentional restrictions, it's clear why many of us feel overwhelmed by managing some of the most basic aspects of life. Part of the reason is that our brains evolved to help us deal with life during the hunter-gatherer phase of human history, a time when we might encounter no more than a thousand people across the entire span of our lifetime. Walking around midtown Manhattan, you'll pass that number of people in half an hour.

Attention is the most essential mental resource for any organism. It determines which aspects of the environment we deal with, and most of the time, various automatic, subconscious processes make the correct choice about what gets passed through to our conscious awareness. For this to happen, millions of neurons are constantly monitoring the environment to select the most important things for us to focus on. These neurons are collectively the attentional filter. They work largely in the background, outside of our conscious awareness. This is why most of the perceptual detritus of our daily lives doesn't register, or why, when you've been driving on the freeway for several hours at a stretch, you don't remember much of the scenery that has whizzed by: Your attentional system "protects" you from registering it because it isn't deemed important. This unconscious filter follows certain principles about what it will let through to your conscious awareness.

The attentional filter is one of evolution's greatest achievements. In nonhumans, it ensures that they don't get distracted by irrelevancies. Squirrels are interested in nuts and predators, and not much else. Dogs, whose olfactory sense is one million times more sensitive than ours, use smell to gather information about the world more than they use sound, and their attentional filter has evolved to make that so. If you've ever tried to call your dog while he is smelling something interesting, you know that it is very difficult to grab his attention with sound—smell trumps sound in the dog brain. No one has yet worked out all of the hierarchies and trumping factors in the human attentional filter, but we've learned a great deal about it. When our protohuman ancestors left the cover of the trees to seek new sources of food, they simultaneously opened up a vast range of new possibilities for nourishment and exposed themselves to a wide range of new predators. Being alert and vigilant to threatening sounds and visual cues is what allowed them to survive; this meant allowing an increasing amount of information through the attentional filter.

Levitin points out an interesting fact on how highly successful people (HSP) differ from the rest of us when it comes to attentional filters.

Successful people—or people who can afford it—employ layers of people whose job it is to narrow the attentional filter. That is, corporate heads, political leaders, spoiled movie stars, and others whose time and attention are especially valuable have a staff of people around them who are effectively extensions of their own brains, replicating and refining the functions of the prefrontal cortex's attentional filter.

These highly successful persons have many of the daily distractions of life handled for them, allowing them to devote all of their attention to whatever is immediately before them. They seem to live completely in the moment. Their staff handle correspondence, make appointments, interrupt those appointments when a more important one is waiting, and help to plan their days for maximum efficiency (including naps!). Their bills are paid on time, their car is serviced when required, they're given reminders of projects due, and their assistants send suitable gifts to the HSP's loved ones on birthdays and anniversaries. Their ultimate prize if it all works? A Zen-like focus.

Levitin argues that if we organize our minds and our lives “following the new neuroscience of attention and memory, we can all deal with the world in ways that provide the sense of freedom that these highly successful people enjoy.”

To do that, however, we need to understand the architecture of our attentional system. “To better organize our mind, we need to know how it has organized itself.”

Change and importance are two crucial principles used by our attentional filter.

The brain's change detector is at work all the time, whether you know it or not. If a close friend or relative calls on the phone, you might detect that her voice sounds different and ask if she's congested or sick with the flu. When your brain detects the change, this information is sent to your consciousness, but your brain doesn't explicitly send a message when there is no change. If your friend calls and her voice sounds normal, you don't immediately think, “Oh, her voice is the same as always.” Again, this is the attentional filter doing its job, detecting change, not constancy.

Importance can also filter information. But it's not objective or absolute importance but something personal and relevant to you.

If you're driving, a billboard for your favorite music group might catch your eye (really, we should say catch your mind) while other billboards go ignored. If you're in a crowded room, at a party for instance, certain words to which you attach high importance might suddenly catch your attention, even if spoken from across the room. If someone says “fire” or “sex” or your own name, you'll find that you're suddenly following a conversation far away from where you're standing, with no awareness of what those people were talking about before your attention was captured.

The attentional filter lets us live on autopilot most of the time coming out of it only when we need to. In so doing, we “do not register the complexities, nuances, and often the beauty of what is right in front of us.”

A great number of failures of attention occur because we are not using these two principles to our advantage.

Simply put, attention is limited.

A critical point that bears repeating is that attention is a limited-capacity resource— there are definite limits to the number of things we can attend to at once. We see this in everyday activities. If you're driving, under most circumstances, you can play the radio or carry on a conversation with someone else in the car. But if you're looking for a particular street to turn onto, you instinctively turn down the radio or ask your friend to hang on for a moment, to stop talking. This is because you've reached the limits of your attention in trying to do these three things. The limits show up whenever we try to do too many things at once.

Our brain hides things from us.

The human brain has evolved to hide from us those things we are not paying attention to. In other words, we often have a cognitive blind spot: We don't know what we're missing because our brain can completely ignore things that are not its priority at the moment—even if they are right in front of our eyes. Cognitive psychologists have called this blind spot various names, including inattentive blindness.

A lot of instances of losing things like car keys, passports, money, receipts, and so on occur because our attentional systems are overloaded and they simply can't keep track of everything. The average American owns thousands of times more possessions than the average hunter-gatherer. In a real biological sense, we have more things to keep track of than our brains were designed to handle. Even towering intellectuals such as Kant and Wordsworth complained of information excess and sheer mental exhaustion induced by too much sensory input or mental overload.

But we need not fear this cognitive overload, Levitin argues. “More than ever, effective external systems are available for organizing, categorizing, and keeping track of things.”

Information Overload, Then and Now

We've been around a long time. For most of that time we didn't do much of anything other than "procreate and survive." Then we discovered farming and irrigation and gave up our fairly nomadic lifestyle. Farming allowed us to specialize. I could grow potatoes and you could grow tomatoes and we could trade. This created a dependency on each other and markets for trading. All of this trading, in turn required an accounting system to keep tabs on inventory and trades. This was the birthplace of writing.

With the growth of trade, cities, and writing, people soon discovered architecture, government, and the other refinements of being that collectively add up to what we think of as civilization. The appearance of writing some 5,000 years ago was not met with unbridled enthusiasm; many contemporaries saw it as technology gone too far, a demonic invention that would rot the mind and needed to be stopped. Then, as now, printed words were promiscuous—it was impossible to control where they went or who would receive them, and they could circulate easily without the author's knowledge or control. Lacking the opportunity to hear information directly from a speaker's mouth, the antiwriting contingent complained that it would be impossible to verify the accuracy of the writer's claims, or to ask follow-up questions. Plato was among those who voiced these fears; his King Thamus decried that the dependence on written words would "weaken men's characters and create forgetfulness in their souls." Such externalization of facts and stories meant people would no longer need to mentally retain large quantities of information themselves and would come to rely on stories and facts as conveyed, in written form, by others. Thamus, king of Egypt, argued that the written word would infect the Egyptian people with fake knowledge. The Greek poet Callimachus said books are "a great evil." The Roman philosopher Seneca the Younger (tutor to Nero) complained that his peers were wasting time and money accumulating too many books, admonishing that "the abundance of books is a distraction." Instead, Seneca recommended focusing on a limited number of good books, to be read thoroughly and repeatedly. Too much information could be harmful to your mental health.

Cue the printing press, which allowed for the rapid copying of books. This further complicated intellectual life.

The printing press was introduced in the mid 1400s, allowing for the more rapid proliferation of writing, replacing laborious (and error-prone) hand copying. Yet again, many complained that intellectual life as we knew it was done for. Erasmus, in 1525, went on a tirade against the "swarms of new books," which he considered a serious impediment to learning. He blamed printers whose profit motive sought to fill the world with books that were "foolish, ignorant, malignant, libelous, mad, impious and subversive." Leibniz complained about "that horrible mass of books that keeps on growing" and that would ultimately end in nothing less than a "return to barbarism." Descartes famously recommended ignoring the accumulated stock of texts and instead relying on one's own observations. Presaging what many say today, Descartes complained that "even if all knowledge could be found in books, where it is mixed in with so many useless things and confusingly heaped in such large volumes, it would take longer to read those books than we have to live in this life and more effort to select the useful things than to find them oneself."

A steady flow of complaints about the proliferation of books reverberated into the late 1600s. Intellectuals warned that people would stop talking to each other, burying themselves in books, polluting their minds with useless, fatuous ideas.

There is an argument that this generation is at the same crossroads — our Gutenberg moment.

iPhones and iPads, email, and Twitter are the new revolution.

Each was decried as an addiction, an unnecessary distraction, a sign of weak character, feeding an inability to engage with real people and the real-time exchange of ideas.

The industrial revolution brought along a rapid rise in discovery and advancement. Scientific information increased at a staggering clip.

Today, someone with a PhD in biology can't even know all that is known about the nervous system of the squid! Google Scholar reports 30,000 research articles on that topic, with the number increasing exponentially. By the time you read this, the number will have increased by at least 3,000. The amount of scientific information we've discovered in the last twenty years is more than all the discoveries up to that point, from the beginning of language.

This is taxing all of us as we filter what we need to know from what we don't. This ties in nicely with Tyler Cowen's argument that the future of work is changing and we will need to add value to computers.

To cope with information overload we create to-do lists and email ourselves reminders. I have lists of lists. Right now there are over 800 unread emails in my inbox. Many of these are reminders to myself to look into something or to do something, links that I need to go back and read, or books I want to add to my wishlist. I see those emails and think, yes I want to do that but not right now. So they sit in my inbox. Occasionally I'll create a to-do list, which starts off with the best intentions and rapidly becomes a brain dump. Eventually I remember the 18 minute plan for managing your day and I re-focus, scheduling time for the most important things. No matter what I do I always feel like I'm on the border between organized and chaos.

A large part of this feeling of being overwhelmed can be traced back to our evolutionarily outdated attentional system. I mentioned earlier the two principles of the attentional filter: change and importance. There is a third principle of attention— not specific to the attentional filter— that is relevant now more than ever. It has to do with the difficulty of attentional switching. We can state the principle this way: Switching attention comes with a high cost.

Our brains evolved to focus on one thing at a time. This enabled our ancestors to hunt animals, to create and fashion tools, to protect their clan from predators and invading neighbors. The attentional filter evolved to help us to stay on task, letting through only information that was important enough to deserve disrupting our train of thought. But a funny thing happened on the way to the twenty-first century: The plethora of information and the technologies that serve it changed the way we use our brains. Multitasking is the enemy of a focused attentional system. Increasingly, we demand that our attentional system try to focus on several things at once, something that it was not evolved to do. We talk on the phone while we're driving, listening to the radio, looking for a parking place, planning our mom's birthday party, trying to avoid the road construction signs, and thinking about what's for lunch. We can't truly think about or attend to all these things at once, so our brains flit from one to the other, each time with a neurobiological switching cost. The system does not function well that way. Once on a task, our brains function best if we stick to that task.

When you pay attention to something it means you don't see something else. David Foster Wallace hit upon this in his speech, The Truth With A Whole Lot Of Rhetorical Bullshit Pared Away. He said:

Learning how to think really means learning how to exercise some control over how and what you think. It means being conscious and aware enough to choose what you pay attention to and to choose how you construct meaning from experience. Because if you cannot exercise this kind of choice in adult life, you will be totally hosed. Think of the old cliché about the mind being an excellent servant but a terrible master. This, like many clichés, so lame and unexciting on the surface, actually expresses a great and terrible truth.

And Winifred Gallagher, author of the book Rapt: Attention and the Focused Life, wrote:

That your experience largely depends on the material objects and mental subjects that you choose to pay attention to or ignore is not an imaginative notion, but a physiological fact. When you focus on a stop sign or a sonnet, a waft of perfume or a stock-market tip, your brain registers that “target,” which enables it to affect your behavior. In contrast, the things that you don’t attend to in a sense don’t exist, at least for you.

All day long, you are selectively paying attention to something, and much more often than you may suspect, you can take charge of this process to good effect. Indeed, your ability to focus on this and suppress that is the key to controlling your experience and, ultimately, your well-being.

When you walk into the front door of your house after a long day of work to screaming kids and a ringing phone you’re not thinking about where you left your car keys.

Attention is created by networks of neurons in the prefrontal cortex (just behind your forehead) that are sensitive only to dopamine. When dopamine is released, it unlocks them, like a key in your front door, and they start firing tiny electrical impulses that stimulate other neurons in their network. But what causes that initial release of dopamine? Typically, one of two different triggers:

1. Something can grab your attention automatically, usually something that is salient to your survival, with evolutionary origins. This vigilance system incorporating the attentional filter is always at work, even when you’re asleep, monitoring the environment for important events. This can be a loud sound or bright light (the startle reflex), something moving quickly (that might indicate a predator), a beverage when you’re thirsty, or an attractively shaped potential sexual partner.

2. You effectively will yourself to focus only on that which is relevant to a search or scan of the environment. This deliberate filtering has been shown in the laboratory to actually change the sensitivity of neurons in the brain. If you’re trying to find your lost daughter at the state fair, your visual system reconfigures to look only for things of about her height, hair color, and body build, filtering everything else out. Simultaneously, your auditory system retunes itself to hear only frequencies in that band where her voice registers. You could call it the Where’s Waldo? filtering network.

It all comes back to Waldo.

If it has red in it, our red-sensitive neurons are involved in the imagining. They then automatically tune themselves, and inhibit other neurons (the ones for the colors you’re not interested in) to facilitate the search. Where’s Waldo? trains children to set and exercise their visual attentional filters to locate increasingly subtle cues in the environment, much as our ancestors might have trained their children to track animals through the forest, starting with easy-to-see and easy-to-differentiate animals and working up to camouflaging animals that are more difficult to pick out from the surrounding environment. The system also works for auditory filtering— if we are expecting a particular pitch or timbre in a sound, our auditory neurons become selectively tuned to those characteristics.

When we willfully retune sensory neurons in this way, our brains engage in top-down processing, originating in a higher, more advanced part of the brain than sensory processing.

But if we have an effective attention filter, why do we find it so hard to filter out distractions? Cue technology.

For one thing, we’re doing more work than ever before. The promise of a computerized society, we were told, was that it would relegate to machines all of the repetitive drudgery of work, allowing us humans to pursue loftier purposes and to have more leisure time. It didn’t work out this way. Instead of more time, most of us have less. Companies large and small have off-loaded work onto the backs of consumers. Things that used to be done for us, as part of the value-added service of working with a company, we are now expected to do ourselves. With air travel, we’re now expected to complete our own reservations and check-in, jobs that used to be done by airline employees or travel agents. At the grocery

store, we're expected to bag our own groceries and, in some supermarkets, to scan our own purchases. We pump our own gas at filling stations. Telephone operators used to look up numbers for us. Some companies no longer send out bills for their services— we're expected to log in to their website, access our account, retrieve our bill, and initiate an electronic payment; in effect, do the job of the company for them. Collectively, this is known as shadow work— it represents a kind of parallel, shadow economy in which a lot of the service we expect from companies has been transferred to the customer. Each of us is doing the work of others and not getting paid for it. It is responsible for taking away a great deal of the leisure time we thought we would all have in the twenty-first century. Beyond doing more work, we are dealing with more changes in information technology than our parents did, and more as adults than we did as children. The average American replaces her cell phone every two years, and that often means learning new software, new buttons, new menus. We change our computer operating systems every three years, and that requires learning new icons and procedures, and learning new locations for old menu items.

It's not a coincidence that highly successful people tend to offload these tasks to others, allowing them to focus.

As knowledge becomes more available— and decentralized through the Internet— the notions of accuracy and authoritativeness have become clouded. Conflicting viewpoints are more readily available than ever, and in many cases they are disseminated by people who have no regard for facts or truth. Many of us find we don't know whom to believe, what is true, what has been modified, and what has been vetted.

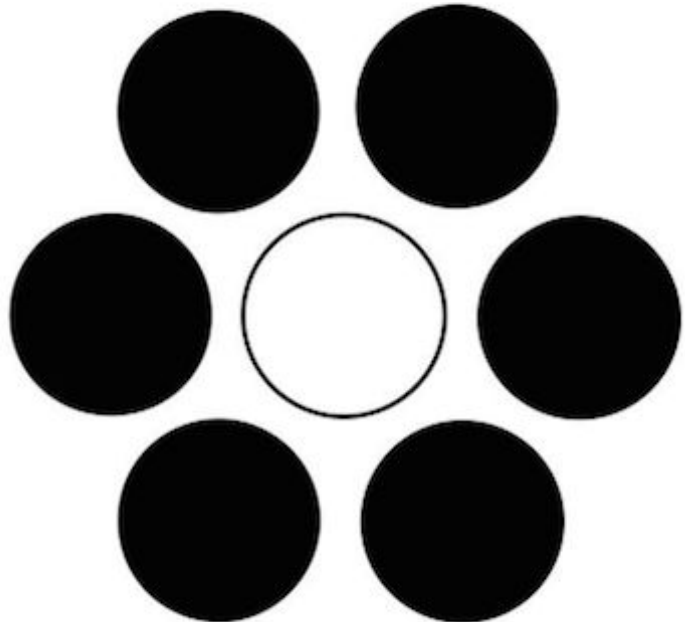
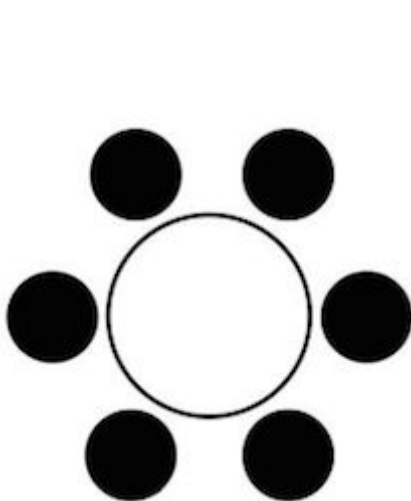
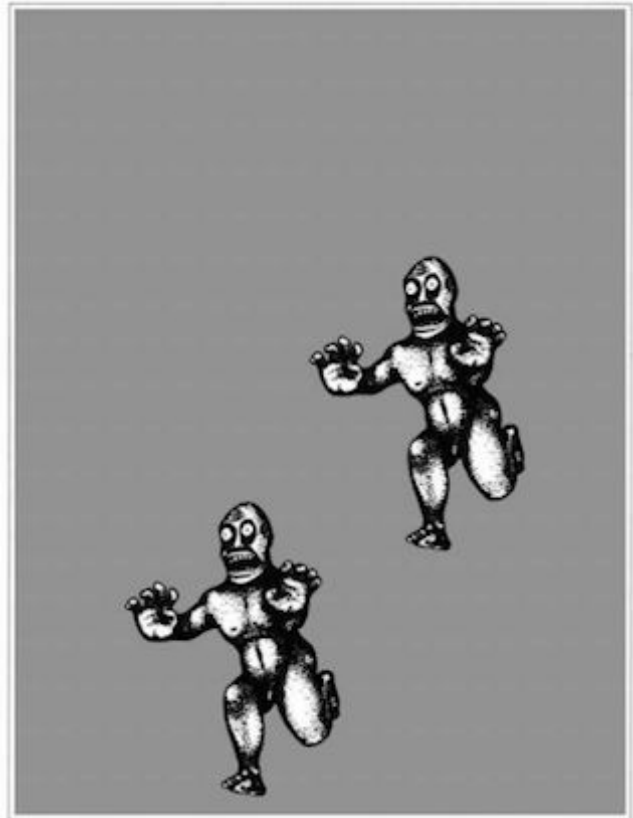
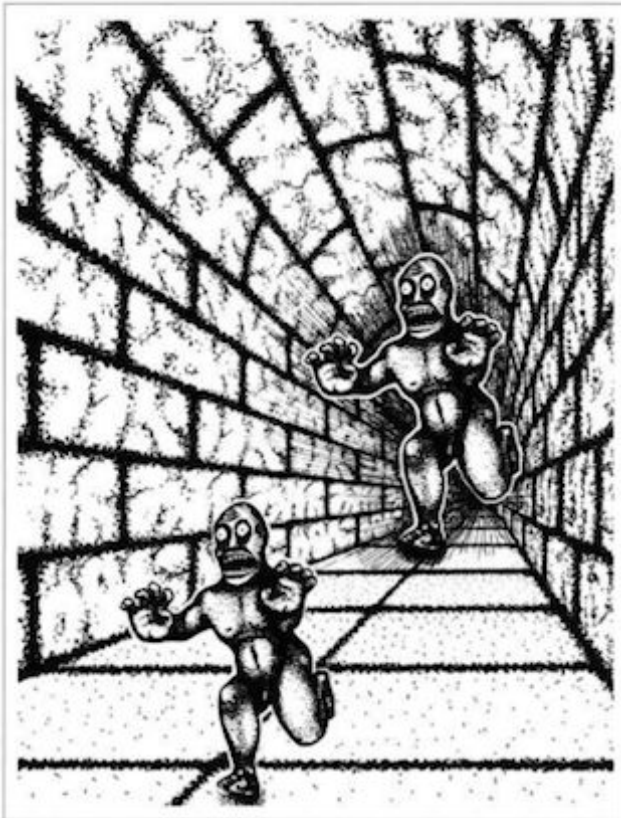
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My teacher, the Stanford cognitive psychologist Amos Tversky, encapsulates this in "the Volvo story." A colleague was shopping for a new car and had done a great deal of research. Consumer Reports showed through independent tests that Volvos were among the best built and most reliable cars in their class. Customer satisfaction surveys showed that Volvo owners were far happier with their purchase after several years. The surveys were based on tens of thousands of customers. The sheer number of people polled meant that any anomaly— like a specific vehicle that was either exceptionally good or exceptionally bad— would be drowned out by all the other reports. In other words, a survey such as this has statistical and scientific legitimacy and should be weighted accordingly when one makes a decision. It represents a stable summary of the average experience, and the most likely best guess as to what your own experience will be (if you've got nothing else to go on, your best guess is that your experience will be most like the average).

Amos ran into his colleague at a party and asked him how his automobile purchase was going. The colleague had decided against the Volvo in favor of a different, lower-rated car. Amos asked him what made him change his mind after all that research pointed to the Volvo. Was it that he didn't like the price? The color options? The styling? No, it was none of those reasons, the colleague said. Instead, the colleague said, he found out that his brother-in-law had owned a Volvo and that it was always in the shop.

From a strictly logical point of view, the colleague is being irrational. The brother-in-law's bad Volvo experience is a single data point swamped by tens of thousands of good experiences— it's an unusual outlier. But we are social creatures. We are easily swayed by first-person stories and vivid accounts of a single experience. Although this is statistically wrong and we should learn to overcome the bias, most of us don't. Advertisers know this, and this is why we see so many first-person testimonial advertisements on TV. "I lost twenty pounds in two weeks by eating this new yogurt— and it was delicious, too!" Or "I had a headache that wouldn't go away. I was barking at the dog and snapping at my loved ones. Then I took this new medication and I was back to my normal self." Our brains focus on vivid, social accounts more than dry, boring, statistical accounts.

So not only does knowledge become easier to access than ever before (frictionless) but as it becomes more available our brains need to cope with it, which they do by magnifying our pre-existing cognitive biases.



In Roger Shepard's version of the famous "Ponzo illusion," the monster at the top seems larger than the one at the bottom, but a ruler will show that they're the same size. In the Ebbinghaus illusion below it, the white circle on the left seems larger than the white circle on the right, but they're the same size. We say that our eyes are playing tricks on us, but in fact, our eyes aren't playing tricks on us, our brain is. The visual system uses heuristics or shortcuts to piece together an understanding of the world, and it sometimes gets things wrong.

We are prone to cognitive illusions when we make decisions. The same type of shortcuts are at play.

65. Seymour Schulich on Deals, Business, Decisions and Life

Seymour Schulich, one of Canada's most successful businessmen and author of Get Smarter: Life and Business Lessons offers some indispensable business wisdom.

1. *Business is a means to an end not an end in itself. Nobody on his or her deathbed says, "I wish I had spent more time in the office."*
2. *Never quit a job unless you have another job. My father taught me this great truth. You are perceived as more valuable if you are working than if you're unemployed. You may feel staying employed doesn't give you the time or latitude to seek a better job. This is a dangerous delusion—don't succumb to it.*
3. *Always ask the question "If this decision is wrong, is it going to be painful or fatal?" Company builders and business leaders keep away from "bet the company" investments.*
4. *Keep away from advisors/consultants. If they knew how to make money, they would. These folks are like the fellow who knows a thousand ways to make love but doesn't know any women.*
5. *The best test of a deal's true attraction is to ask your partners, employees, directors, family, and so on, "Would you put your own money in this deal?" It's amazing how often the answer to this question is, "No! This is good for the company, but I'll take a pass." These deals are invariably losers.*
6. *Always have at least two people from your side present at any negotiating or deal-making sessions. This gives you time to think, plus an ally with whom to compare perceptions.*
7. *Never confront or threaten people or institutions who have more power than you. Examples: police, customs agents, the sec, Ontario Securities Commission, tax agents of the government, or politicians.*
8. *In dealing with the media, never forget to qualify your statements with "not for attribution" and "off the record" where appropriate. Journalists value their contacts and will usually respect a source's desires.*
9. *In negotiations, always try to get the other party to name its asking price. It may often be far lower than your maximum offer. If the other party won't name a price, start very low. You can always go up.*
10. *Almost everything in life is easier to get into than get out of.*
11. *Never bid against yourself. Only raise your bid to top a real counter bid, not an imaginary one.*

66. The Munger Operating System: How to Live a Life That Really Works

In 2007, Charlie Munger gave the commencement address at USC Law School, opening his speech by saying, *“Well, no doubt many of you are wondering why the speaker is so old. Well, the answer is obvious: He hasn’t died yet.”*

Fortunately for us, Munger has kept on ticking. The commencement speech is an excellent response to the Big Question: *How do we live a life that really works?* It has so many of Munger’s core ideas that we think the speech represents the Munger Operating System for life.



To get what you want, deserve what you want. Trust, success, and admiration are earned. *It’s such a simple idea. It’s the golden rule so to speak: You want to deliver to the world what you would buy if you were on the other end. There is no ethos, in my opinion, that is better for any lawyer or any other person to have. By and large the people who have this ethos win in life and they don’t win just money, not just honors. They win the respect, the deserved trust of the people they deal with, and there is huge pleasure in life to be obtained from getting deserved trust.*

Learn to love and admire the right people, alive or dead.

A second idea that I got very early was that there is no love that’s so right as admiration-based love, and that love should include the instructive dead. Somehow, I got that idea and I lived with it all my life; and it’s been very, very useful to me.

Acquiring wisdom is a moral duty as well as a practical one.

And there’s a corollary to that proposition which is very important. It means that you’re hooked for lifetime learning, and without lifetime learning you people are not going to do very well. You are not going to get very far in life based on what you already know. You’re going to advance in life by what you’re going to learn after you leave here...if civilization can progress only when it invents the method of invention, you can progress only when you learn the method of learning.

Attain fluency on the big multidisciplinary ideas of the world and use them regularly.

What I noted since the really big ideas carry 95% of the freight, it wasn’t at all hard for me to pick up all the big ideas from all the big disciplines and make them a standard part of my mental routines. Once you have the ideas, of course, they are no good if you don’t practice — if you don’t practice you lose it.

So I went through life constantly practicing this model of the multidisciplinary approach. Well, I can't tell you what that's done for me. It's made life more fun, it's made me more constructive, it's made me more helpful to others, it's made me enormously rich, you name it, that attitude really helps.

Now there are dangers there, because it works so well, that if you do it, you will frequently find you are sitting in the presence of some other expert, maybe even an expert that's superior to you, supervising you. And you will know more than he does about his own specialty, a lot more. You will see the correct answer when he's missed it.

[...]

It doesn't help you just to know them enough just so you can give them back on an exam and get an A. You have to learn these things in such a way that they're in a mental latticework in your head and you automatically use them for the rest of your life.

Learn to think through problems backwards as well as forward.

The way complex adaptive systems work and the way mental constructs work, problems frequently get easier and I would even say usually are easier to solve if you turn around in reverse.

In other words if you want to help India, the question you should ask is not "how can I help India?", you think "what's doing the worst damage in India? What would automatically do the worst damage and how do I avoid it?" You'd think they are logically the same thing, but they're not. Those of you who have mastered algebra know that inversion frequently will solve problems which nothing else will solve. And in life, unless you're more gifted than Einstein, inversion will help you solve problems that you can't solve in other ways.

Be reliable. Unreliability can cancel out the other virtues.

If you're unreliable it doesn't matter what your virtues are, you're going to crater immediately. So doing what you have faithfully engaged to do should be an automatic part of your conduct. You want to avoid sloth and unreliability.

Avoid intense ideologies. Always consider the other side as carefully as your own.

Another thing I think should be avoided is extremely intense ideology, because it cabbages up one's mind. You've seen that. You see a lot of it on TV, you know preachers for instance, they've all got different ideas about theology and a lot of them have minds that are made of cabbage.

But that can happen with political ideology. And if you're young it's easy to drift into loyalties and when you announce that you're a loyal member and you start shouting the orthodox ideology out what you're doing is pounding it in, pounding it in, and you're gradually ruining your mind. So you want to be very careful with this ideology. It's a big danger.

In my mind I have a little example I use whenever I think about ideology, and it's these Scandinavian canoeists who succeeded in taming all the rapids of Scandinavia and they thought they would tackle the whirlpools in the Grand Rapids here in the United States. The death rate was 100%. A big whirlpool is not something you want to go into and I think the same is true about a really deep ideology.

I have what I call an iron prescription that helps me keep sane when I naturally drift toward preferring one ideology over another. And that is I say "I'm not entitled to have an opinion on this subject unless I can state the arguments against my position better than the people do who are supporting it. I think that only when I reach that stage am I qualified to speak." Now you can say that's too much of an iron discipline..it's not too much of an iron discipline. It's not even that hard to do.

Get rid of self-serving bias, envy, resentment, and self-pity.

Generally speaking, envy, resentment, revenge and self pity are disastrous modes of thought. Self-pity gets pretty close to paranoia, and paranoia is one of the very hardest things to reverse. You do not want to drift into self-pity.

I have a friend who carried a big stack of index cards about this thick, and when somebody would make a comment that reflected self pity, he would take out one of the cards, take the top one off the stack and hand it to the person, and the card said, "Your story has touched my heart, never have I heard of anyone with as many misfortunes as you". Well, you can say that's waggery, but I suggest that every time you find you're drifting into self pity, I don't care what the cause — your child could be dying of cancer — self-pity is not going to improve the situation. Just give yourself one of those cards.

It's a ridiculous way to behave, and when you avoid it you get a great advantage over everybody else, almost everybody else, because self-pity is a standard condition and yet you can train yourself out of it.

And of course self-serving bias, you want to get that out of yourself; thinking that what's good for you is good for the wider civilization and rationalizing all these ridiculous conclusions based on the subconscious tendency to serve one's self.

At the same time, allow for the self-serving bias in others who haven't removed it.

You also have to allow for the self serving bias of everybody else, because most people are not going to remove it all that successfully, the human condition being what it is. If you don't allow for self serving bias in your conduct, again you're a fool.

I watched the brilliant Harvard Law School trained general counsel of Salomon lose his career, and what he did was when the CEO became aware that some underling had done something wrong, the general counsel said, "Gee, we don't have any legal duty to report this but I think it's what we should do it's our moral duty."

Of course, the general counsel was totally correct but of course it didn't work; it was a very unpleasant thing for the CEO to do and he put it off and put it off and of course everything eroded into a major scandal and down went the CEO and the general counsel with him.

The correct answer in situations like that was given by Ben Franklin, he said, "If you want to persuade, appeal to interest not to reason." The self serving bias is so extreme. If the general counsel had said, "Look this is going to erupt, it's something that will destroy you, take away your money, take away your status...it's a perfect disaster," it would have worked!

Avoid being part of a system with perverse incentives.

Incentives are too powerful a controller of human cognition and human behavior, and one of the things you are going to find in some modern law firms is billable hour quotas. I could not have lived under a billable hour quota of 2,400 hours a year. That would have caused serious problems for me — I wouldn't have done it and I don't have a solution for you for that. You'll have to figure it out for yourself but it's a significant problem.

Work with and under people you admire, and avoid the inverse when at all possible.

And that requires some talent. The way I solved that is, I figured out the people I did admire and I maneuvered cleverly without criticizing anybody, so I was working entirely under people I admired. And a lot of law firms will permit that if you're shrewd enough to work it out. And your outcome in life will be way more satisfactory and way better if you work under people you really admire. The alternative is not a good idea.

Learn to maintain your objectivity, especially when it's hardest.

Well we all remember that Darwin paid special attention to disconfirming evidence particularly when it disconfirmed something he believed and loved. Well, objectivity maintenance routines are totally required in life if you're going to be a correct thinker. And there we're talking about Darwin's attitude, his special attention to disconfirming evidence, and also to checklist routines. Checklist routines avoid a lot of errors. You should have all this elementary wisdom and then you should go through and have a checklist in order to use it. There is no other procedure that will work as well.

Concentrate experience and power into the hands of the right people — the wise learning machines.

I think the game of life in many respects is getting a lot of practice into the hands of the people that have the most aptitude to learn and the most tendency to be learning machines. And if you want the very highest reaches of human civilization that's where you have to go.

You do not want to choose a brain surgeon for your child among fifty applicants all of them just take turns during the procedure. You don't want your airplanes designed that way. You don't want your Berkshire Hathaways run that way. You want to get the power into the right people.

You'll be most successful where you're most intensely interested.

Another thing that I found is an intense interest of the subject is indispensable if you are really going to excel. I could force myself to be fairly good in a lot of things, but I couldn't be really good in anything where I didn't have an intense interest. So to some extent, you're going to have to follow me. If at all feasible you want to drift into doing something in which you really have a natural interest.

Learn the all-important concept of assiduity: Sit down and do it until it's done.

Two partners that I chose for one little phase of my life had the following rule: They created a little design/build construction team, and they sat down and said, two-man partnership, divide everything equally, here's the rule; "Whenever we're behind in our commitments to other people, we will both work 14 hours a day until we're caught up."

Well, needless to say, that firm didn't fail. The people died rich. It's such a simple idea.

Use setbacks in life as an opportunity to become a bigger and better person. Don't wallow.

Another thing of course is life will have terrible blows, horrible blows, unfair blows, doesn't matter. And some people recover and others don't. And there I think the attitude of Epictetus is the best. He thought that every mischance in life was an opportunity to behave well, every mischance in life was an opportunity to learn something, and your duty was not to be submerged in self-pity but to utilize the terrible blow in a constructive fashion. That is a very good idea.

The highest reach of civilization is a seamless system of trust among all parties concerned.

The last idea that I want to give you as you go out into a profession that frequently puts a lot of procedure and a lot of precautions and a lot of mumbo jumbo into what it does, this is not the highest form which civilization can reach. The highest form which civilization can reach is a seamless web of deserved trust. Not much procedure, just totally reliable people correctly trusting one another. That's the way an operating room works at the Mayo Clinic. If a bunch of lawyers were to introduce a lot of process, the patients would all die. So never forget when you're a lawyer that you may be rewarded for selling this stuff but you don't have to buy it. In your own life what you want is a seamless web of deserved trust. And if your proposed marriage contract has 47 pages, my suggestion is do not enter.

67. Alignment: The Key to Success Nobody Ever Taught You

I spend a lot of time thinking about this simple idea: The person who aligns themselves with the general principles of the world goes further and faster than the person who doesn't.

What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.

— Joseph Tussman

The way to align yourself with the world is to take simple ideas seriously.

Consider compounding.

We know that spending less than we make, investing the difference in index funds, and waiting for a long time creates financial independence. Yet how many people follow this principle? Not many. Most of us know what works but fail to align ourselves with it.

Compounding applies to relationships too. Not just with your partner, but with your colleagues, friends, and even your customers. For relationships to compound, they must be win-win. But how many people take a consistent win-win approach? Not many. Again, we know what works, but fail to align ourselves with it.

Outcome over Ego

Here's the trick to seeing things differently: put your energy into *being* right, not *feeling* right. While that sounds simple, it's far from easy.

If you want to be right, you have to change your mind. When the evidence indicates the approach isn't working, change the approach. This is easy with something like math, where the answers are black and white, but harder with more subjective things.

Often the hardest things to change our minds about are the things that require us to understand that just because we can't see the results immediately doesn't mean they are not moving us closer or further from the outcome we want. For instance, eating a full pizza once won't make you unhealthy, but repeating that choice daily for years certainly will.

Feeling right, on the other hand, often requires you to believe you are an exception. You know the path to financial independence, but that takes too long. It's boring. Instead, you'd rather try the latest incarnation of a get-rich-quicker scheme that promises the outcome sooner. When it inevitably fails to produce the desired results, rather than tell yourself you made a mistake you chalk it up to the world not working as it should. It's as if that little voice in your head says, "You're not wrong; the world is."

Most of us would rather bargain with how the world works than accept how it does work, cooperate with it, and move forward. This happens in a lot of areas of life. Consider the general concept of health.

A lot of people think they don't have to take care of their health. They get too little sleep. They drink too much. They eat incredible amounts of processed food. They get little to no exercise. While they know health is important, at some level they think they are the exception. Acceptance is knowing you must care for your health because it is the foundation for everything else. Without health, everything else multiplies by zero.

We are tempted to believe we're the exception because it's the easy path.

Aligning with the world often requires you to pre-pay now for a result later. A little bit of pain today for gain tomorrow. And we don't like the sounds of that.

However, if you can align yourself with the world despite what those around you do, you'll quickly discover that it tends to do most of the work for you. It just won't take the first step for you. You have to take that one for yourself.

68. The Central Mistake of Historicism: Karl Popper on Why Trend is Not Destiny

Philosophy can be a little dry in concept. The word itself conjures up images of *thinking about thought, why we exist*, and other metaphysical ideas that seem a little divorced from the everyday world.

One true philosopher who bucked the trend was the genius Austrian philosopher of science, Karl Popper.

Popper had at least three important lines of inquiry:

1. How does progressive scientific thought actually happen?
2. What type of society do we need to allow for scientific progress to be made?
3. What can we say we actually know about the world?

Popper's work led to his idea of falsifiability as the main criterion of a scientific theory. Simply put, an idea or theory doesn't enter the realm of *science* until we can state it in such a way that a test could prove it wrong. This important identifier allowed him to distinguish between science and pseudoscience.

An interesting piece of Popper's work was an attack on what he called *historicism* — the idea that history has fixed laws or trends that inevitably lead to certain outcomes. Included would be the Marxist interpretation of human history as a push and pull between classes, the Platonic ideals of the systemic "rise and fall" of cities and societies in a fundamentally predictable way, John Stuart Mill's *laws of succession*, and even the theory that humanity inevitably progresses towards a "better" and happier outcome, however defined. Modern ideas in this category might well include Thomas Piketty's theory of how capitalism leads to an accumulation of dangerous inequality, the "inevitability" of America's fall from grace in the fashion of the Roman empire, or even Russell Brand's popular diatribe on utopian upheaval from a few years back.

Popper considered this kind of thinking pseudoscience, or worse — a dangerous ideology that tempts wannabe state planners and utopians to control society. (Perhaps through violent revolution, for example.) He did not consider such *historicist* doctrines falsifiable. There is no way, for example, to test whether Marxist theory is actually true or not, even in a thought experiment. We must simply take it on faith, based on a certain interpretation of history, that the bourgeoisie and the proletariat are at odds, and that the latter is destined to create uprisings. (*Destined* being the operative word — it implies inevitability.) If we're to assert that there is a *Law of Increasing Technological Complexity* in human society, which many are tempted to do these days, is that actually a testable hypothesis? Too frequently, these *Laws* become immune to falsifying evidence — any new evidence is interpreted through the lens of the theory. Instead of calling them interpretations, we call them *Laws*, or some similarly connotative word.

More deeply, Popper realized the important point that *history is a unique process* — it only gets run once. We can't derive *Laws of History* that predict the future the way we can with, say, a *law of physics* that carries predictive capability under stated conditions. (i.e. If I drop a ceramic coffee cup more than 2 feet, it will shatter.) We can only merely deduce some tendencies of human nature, laws of the physical world, and so on, and generate some reasonable expectation that if X happens, Y is somewhat likely to follow. But viewing the process of human or organic history as possessing the regularity of a solar system is folly. He discusses this in his book *The Poverty of Historicism*.

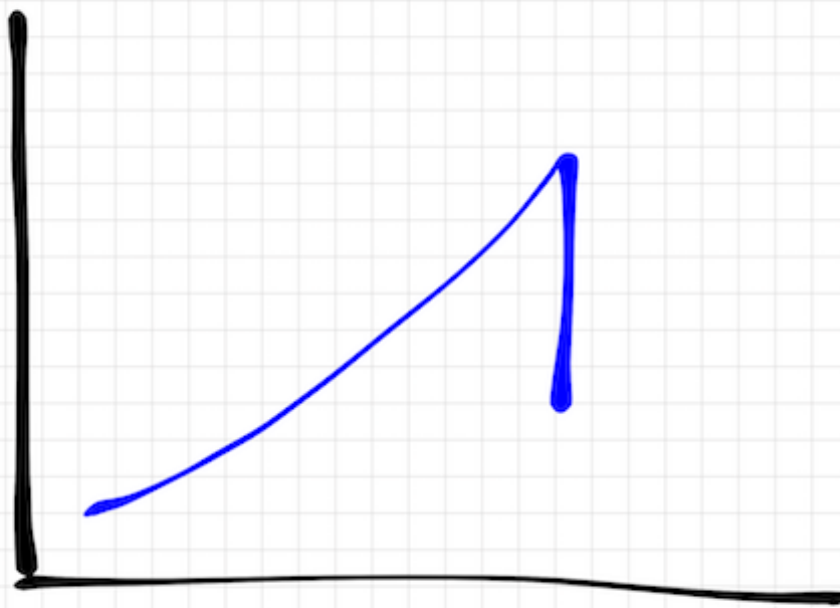
The evolution of life on earth, or of a human society, is a unique historical process. Such a process, we may assume, proceeds in accordance with all kinds of causal laws, for example, the laws of mechanics, of chemistry, of heredity and segregation, of natural selection, etc. Its description, however, is not a law, but only a single historical statement. Universal laws make assertions concerning some unvarying order[...] and

although there is no reason why the observation of one single instance should not incite us to formulate a universal law, nor why, if we are lucky, we should not even hit upon the truth, it is clear that any law, formulated in this or in any other way, must be tested by new instances before it can be taken seriously by science. But we cannot hope to test a universal hypothesis nor to find a natural law acceptable to science if we are ever confined to the observation of one unique process. Nor can the observation of one unique process help us to foresee its future development. The most careful observation of one developing caterpillar will to help us to predict its transformation into a butterfly.

Popper realized that once we deduce a theory of the Laws of Human Development, carried into the ever-after, we are led into a gigantic confirmation bias problem. For example, we can certainly find confirmations for the idea that humans have *progressed*, in a specifically defined way, towards increasing technological complexity. But is that a Law of history, in the inviolable sense? For that, we really can't say.

The problem is that to establish cause-and-effect, in a scientific sense, requires two things: A universal law (or a set of them) and some initial conditions (and ideally these are played out over a really large sample size to give us confidence). Popper explains:

*I suggest that to give a causal explanation of a certain specific event means deducing a statement describing this event from two kinds of premises: from some universal laws, and from some singular or specific statements which we may call specific initial conditions. For example, we can say that we have given a causal explanation of the breaking of a certain thread if we find this thread could carry a weight of only one pound, and that a weight of two pounds was put on it. If we analyze this causal explanation, then we find that two different constituents are involved. (1) Some hypotheses of the character of universal laws of nature; in this case, perhaps: 'For every thread of a given structure *s* (determined by material, thickness, etc.) there is a characteristic weight *w* such that the thread will break if any weight exceeding *w* is suspended on it' and 'For every thread of the structure *s*, the characteristic weight *w* equals one pound.' (2) Some specific statements—the initial conditions—pertaining to the particular event in question; in this case we may have two such statements: 'This is a thread of structure *s*, and 'The weight put on this thread was a weight of two pounds'.*



The trend is
not destiny

Here we hit on the problem of trying to assert any fundamental laws by which human history must inevitably progress. Trend is not destiny. Even if we can derive and understand certain laws of human biological nature, the trends of history itself dependent on conditions, and conditions change.

Explained trends do exist, but their persistence depends on the persistence of certain specific initial conditions (which in turn may sometimes be trends).

Mill and his fellow historicists overlook the dependence of trends on initial conditions. They operate with trends as if they were unconditional, like laws. Their confusion of laws with trends make them believe in trends which are unconditional (and therefore general); or, as we may say, in 'absolute trends'; for example a general historical tendency towards progress—'a tendency towards a better and happier state'. And if they at all consider a 'reduction' of their tendencies to laws, they believe that these tendencies can be immediately derived from universal laws alone, such as the laws of psychology (or dialectical materialism, etc.).

This, we may say, is the central mistake of historicism. Its "laws of development" turn out to be absolute trends; trends which, like laws, do not depend on initial conditions, and which carry us irresistibly in a certain direction into the future. They are the basis of unconditional prophecies, as opposed to conditional scientific predictions.

[...]

The point is that these (initial) conditions are so easily overlooked. There is, for example, a trend towards an 'accumulation of means of production' (as Marx puts it). But we should hardly expect it to persist in a population which is rapidly decreasing; and such a decrease may in turn depend on extra-economic conditions, for example, on chance interventions, or conceivably on the direct physiological (perhaps bio-chemical) impact of an industrial environment. There are, indeed, countless possible conditions; and in order to be able to examine these possibilities in our search for the true conditions of the trend, we have all the time to try to imagine conditions under which the trend in question would disappear. But this is just what the historicist cannot do. He firmly believes in his favorite trend, and conditions under which it would disappear to him are unthinkable. The poverty of historicism, we might say, is a poverty of imagination. The historicist continuously upbraids those who cannot imagine a change in their little worlds; yet it seems that the historicist is himself deficient in imagination, for he cannot imagine a change in the conditions of change.

69. The Munger Operating System: How to Live a Life That Really Works

In 2007, Charlie Munger gave the commencement address at USC Law School, opening his speech by saying, *“Well, no doubt many of you are wondering why the speaker is so old. Well, the answer is obvious: He hasn’t died yet.”*

Fortunately for us, Munger has kept on ticking. The commencement speech is an excellent response to the Big Question: *How do we live a life that really works?* It has so many of Munger’s core ideas that we think the speech represents the Munger Operating System for life.



To get what you want, deserve what you want. Trust, success, and admiration are earned. *It's such a simple idea. It's the golden rule so to speak: You want to deliver to the world what you would buy if you were on the other end. There is no ethos, in my opinion, that is better for any lawyer or any other person to have. By and large the people who have this ethos win in life and they don't win just money, not just honors. They win the respect, the deserved trust of the people they deal with, and there is huge pleasure in life to be obtained from getting deserved trust.*

Learn to love and admire the right people, alive or dead.

A second idea that I got very early was that there is no love that's so right as admiration-based love, and that love should include the instructive dead. Somehow, I got that idea and I lived with it all my life; and it's been very, very useful to me.

Acquiring wisdom is a moral duty as well as a practical one.

And there's a corollary to that proposition which is very important. It means that you're hooked for lifetime learning, and without lifetime learning you people are not going to do very well. You are not going to get very far in life based on what you already know. You're going to advance in life by what you're going to learn after you leave here...if civilization can progress only when it invents the method of invention, you can progress only when you learn the method of learning.

Attain fluency on the big multidisciplinary ideas of the world and use them regularly.

What I noted since the really big ideas carry 95% of the freight, it wasn't at all hard for me to pick up all the big ideas from all the big disciplines and make them a standard part of my mental routines. Once you have the ideas, of course, they are no good if you don't practice — if you don't practice you lose it.

So I went through life constantly practicing this model of the multidisciplinary approach. Well, I can't tell you what that's done for me. It's made life more fun, it's made me more constructive, it's made me more helpful to others, it's made me enormously rich, you name it, that attitude really helps.

Now there are dangers there, because it works so well, that if you do it, you will frequently find you are sitting in the presence of some other expert, maybe even an expert that's superior to you, supervising you. And you will know more than he does about his own specialty, a lot more. You will see the correct answer when he's missed it.

[...]

It doesn't help you just to know them enough just so you can give them back on an exam and get an A. You have to learn these things in such a way that they're in a mental latticework in your head and you automatically use them for the rest of your life.

Learn to think through problems backwards as well as forward.

The way complex adaptive systems work and the way mental constructs work, problems frequently get easier and I would even say usually are easier to solve if you turn around in reverse.

In other words if you want to help India, the question you should ask is not "how can I help India?", you think "what's doing the worst damage in India? What would automatically do the worst damage and how do I avoid it?" You'd think they are logically the same thing, but they're not. Those of you who have mastered algebra know that inversion frequently will solve problems which nothing else will solve. And in life, unless you're more gifted than Einstein, inversion will help you solve problems that you can't solve in other ways.

Be reliable. Unreliability can cancel out the other virtues.

If you're unreliable it doesn't matter what your virtues are, you're going to crater immediately. So doing what you have faithfully engaged to do should be an automatic part of your conduct. You want to avoid sloth and unreliability.

Avoid intense ideologies. Always consider the other side as carefully as your own.

Another thing I think should be avoided is extremely intense ideology, because it cabbages up one's mind. You've seen that. You see a lot of it on TV, you know preachers for instance, they've all got different ideas about theology and a lot of them have minds that are made of cabbage.

But that can happen with political ideology. And if you're young it's easy to drift into loyalties and when you announce that you're a loyal member and you start shouting the orthodox ideology out what you're doing is pounding it in, pounding it in, and you're gradually ruining your mind. So you want to be very careful with this ideology. It's a big danger.

In my mind I have a little example I use whenever I think about ideology, and it's these Scandinavian canoeists who succeeded in taming all the rapids of Scandinavia and they thought they would tackle the whirlpools in the Grand Rapids here in the United States. The death rate was 100%. A big whirlpool is not something you want to go into and I think the same is true about a really deep ideology.

I have what I call an iron prescription that helps me keep sane when I naturally drift toward preferring one ideology over another. And that is I say "I'm not entitled to have an opinion on this subject unless I can state the arguments against my position better than the people do who are supporting it. I think that only when I reach that stage am I qualified to speak." Now you can say that's too much of an iron discipline..it's not too much of an iron discipline. It's not even that hard to do.

Get rid of self-serving bias, envy, resentment, and self-pity.

Generally speaking, envy, resentment, revenge and self pity are disastrous modes of thought. Self-pity gets pretty close to paranoia, and paranoia is one of the very hardest things to reverse. You do not want to drift into self-pity.

I have a friend who carried a big stack of index cards about this thick, and when somebody would make a comment that reflected self pity, he would take out one of the cards, take the top one off the stack and hand it to the person, and the card said, "Your story has touched my heart, never have I heard of anyone with as many misfortunes as you". Well, you can say that's waggery, but I suggest that every time you find you're drifting into self pity, I don't care what the cause — your child could be dying of cancer — self-pity is not going to improve the situation. Just give yourself one of those cards.

It's a ridiculous way to behave, and when you avoid it you get a great advantage over everybody else, almost everybody else, because self-pity is a standard condition and yet you can train yourself out of it.

And of course self-serving bias, you want to get that out of yourself; thinking that what's good for you is good for the wider civilization and rationalizing all these ridiculous conclusions based on the subconscious tendency to serve one's self.

At the same time, allow for the self-serving bias in others who haven't removed it.

You also have to allow for the self serving bias of everybody else, because most people are not going to remove it all that successfully, the human condition being what it is. If you don't allow for self serving bias in your conduct, again you're a fool.

I watched the brilliant Harvard Law School trained general counsel of Salomon lose his career, and what he did was when the CEO became aware that some underling had done something wrong, the general counsel said, "Gee, we don't have any legal duty to report this but I think it's what we should do it's our moral duty."

Of course, the general counsel was totally correct but of course it didn't work; it was a very unpleasant thing for the CEO to do and he put it off and put it off and of course everything eroded into a major scandal and down went the CEO and the general counsel with him.

The correct answer in situations like that was given by Ben Franklin, he said, "If you want to persuade, appeal to interest not to reason." The self serving bias is so extreme. If the general counsel had said, "Look this is going to erupt, it's something that will destroy you, take away your money, take away your status...it's a perfect disaster," it would have worked!

Avoid being part of a system with perverse incentives.

Incentives are too powerful a controller of human cognition and human behavior, and one of the things you are going to find in some modern law firms is billable hour quotas. I could not have lived under a billable hour quota of 2,400 hours a year. That would have caused serious problems for me — I wouldn't have done it and I don't have a solution for you for that. You'll have to figure it out for yourself but it's a significant problem.

Work with and under people you admire, and avoid the inverse when at all possible.

And that requires some talent. The way I solved that is, I figured out the people I did admire and I maneuvered cleverly without criticizing anybody, so I was working entirely under people I admired. And a lot of law firms will permit that if you're shrewd enough to work it out. And your outcome in life will be way more satisfactory and way better if you work under people you really admire. The alternative is not a good idea.

Learn to maintain your objectivity, especially when it's hardest.

Well we all remember that Darwin paid special attention to disconfirming evidence particularly when it disconfirmed something he believed and loved. Well, objectivity maintenance routines are totally required in life if you're going to be a correct thinker. And there we're talking about Darwin's attitude, his special attention to disconfirming evidence, and also to checklist routines. Checklist routines avoid a lot of errors. You should have all this elementary wisdom and then you should go through and have a checklist in order to use it. There is no other procedure that will work as well.

Concentrate experience and power into the hands of the right people — the wise learning machines.

I think the game of life in many respects is getting a lot of practice into the hands of the people that have the most aptitude to learn and the most tendency to be learning machines. And if you want the very highest reaches of human civilization that's where you have to go.

You do not want to choose a brain surgeon for your child among fifty applicants all of them just take turns during the procedure. You don't want your airplanes designed that way. You don't want your Berkshire Hathaways run that way. You want to get the power into the right people.

You'll be most successful where you're most intensely interested.

Another thing that I found is an intense interest of the subject is indispensable if you are really going to excel. I could force myself to be fairly good in a lot of things, but I couldn't be really good in anything where I didn't have an intense interest. So to some extent, you're going to have to follow me. If at all feasible you want to drift into doing something in which you really have a natural interest.

Learn the all-important concept of assiduity: Sit down and do it until it's done.

Two partners that I chose for one little phase of my life had the following rule: They created a little design/build construction team, and they sat down and said, two-man partnership, divide everything equally, here's the rule; "Whenever we're behind in our commitments to other people, we will both work 14 hours a day until we're caught up."

Well, needless to say, that firm didn't fail. The people died rich. It's such a simple idea.

Use setbacks in life as an opportunity to become a bigger and better person. Don't wallow.

Another thing of course is life will have terrible blows, horrible blows, unfair blows, doesn't matter. And some people recover and others don't. And there I think the attitude of Epictetus is the best. He thought that every mischance in life was an opportunity to behave well, every mischance in life was an opportunity to learn something, and your duty was not to be submerged in self-pity but to utilize the terrible blow in a constructive fashion. That is a very good idea.

The highest reach of civilization is a seamless system of trust among all parties concerned.

The last idea that I want to give you as you go out into a profession that frequently puts a lot of procedure and a lot of precautions and a lot of mumbo jumbo into what it does, this is not the highest form which civilization can reach. The highest form which civilization can reach is a seamless web of deserved trust. Not much procedure, just totally reliable people correctly trusting one another. That's the way an operating room works at the Mayo Clinic. If a bunch of lawyers were to introduce a lot of process, the patients would all die. So never forget when you're a lawyer that you may be rewarded for selling this stuff but you don't have to buy it. In your own life what you want is a seamless web of deserved trust. And if your proposed marriage contract has 47 pages, my suggestion is do not enter.

70. 12 Things Lee Kuan Yew Taught Me About the World

"It's no accident that Singapore has a much better record, given where it started, than the United States. There, power was concentrated in one enormously talented person, Lee Kuan Yew, who was the Warren Buffett of Singapore."

— Charlie Munger

Singapore seemed destined for failure or subservience to a more powerful neighbor. The country is by far the smallest in Southeast Asia and was not gifted with many natural resources. Lee Kuan Yew thought otherwise. "His vision," wrote Henry Kissinger, "was of a state that would not simply survive, but prevail by excelling. Superior intelligence, discipline, and ingenuity would substitute for resources."

To give you an idea of the magnitude of success that Lee Kuan Yew achieved, when he took over, per capita income was about \$400 and now, in only about two generations, it exceeds \$50,000.

Here are 12 things I learned from Lee Kuan Yew about the world and the source of many of our present ills reading *Lee Kuan Yew: The Grand Master's Insights on China, the United States, and the World*.

1. You need a free exchange of ideas. "China will inevitably catch up to the U.S. in absolute GDP. But its creativity may never match America's, because its culture does not permit a free exchange and contest of ideas."
2. Technology will change how governance operates. "Technology is going to make (China's) system of governance obsolete. By 2030, 70% or maybe 75% of their people will be in cities, small towns, big towns, mega big towns. They are going to have cell phones, Internet, satellite TV. They are going to be well-informed; they can organize themselves. You cannot govern them the way you are governing them now, where you just placate and monitor a few people, because the numbers will be so large."
3. Don't try to install a democracy in a country that has never had one. "I do not believe you can impose on other countries standards which are alien and totally disconnected with their past. So to ask China to become a democracy, when in its 5,000 years of recorded history it never counted heads; all rulers ruled by right of being the emperor, and if you disagree, you chop off heads, not count heads."
4. Welcome the best the world has to offer. "Throughout history, all empires that succeeded have embraced and included in their midst people of other races, languages, religions, and cultures."
5. It's about results, not promises. "When you have a popular democracy, to win voices you have to give more and more. And to beat your opponent in the next election, you have to promise to give more away. So it is a never-ending process of auctions—and the cost, the debt being paid for by the next generation. Presidents do not get reelected if they give a hard dose of medicine to their people. So, there is a tendency to procrastinate, to postpone unpopular policies in order to win elections. So problems such as budget deficits, debt, and high unemployment have been carried forward from one administration to the next."
6. Governments shouldn't have an easy way out. "American and European governments believed that they could always afford to support the poor and the needy: widows, orphans, the old and homeless, disadvantaged minorities, unwed mothers. Their sociologists expounded the theory that hardship and failure were due not to the individual person's character, but to flaws in the economic system. So

charity became “entitlement,” and the stigma of living on charity disappeared. Unfortunately, welfare costs grew faster than the government’s ability to raise taxes to pay for it. The political cost of tax increases is high. Governments took the easy way out by borrowing to give higher benefits to the current generation of voters and passing the costs on to the future generations who were not yet voters. This resulted in persistent government budget deficits and high public debt.”

7. What goes into a standard of living? “A people’s standard of living depends on a number of basic factors: first, the resources it has in relation to its population . . . ; second, its level of technological competence and standards of industrial development; third, its educational and training standards; and fourth, the culture, the discipline and drive in the workforce.”
8. The single most important factor to national competitiveness ... “The quality of a nation’s manpower resources is the single most important factor determining national competitiveness. It is a people’s innovativeness, entrepreneurship, team work, and their work ethic that give them the sharp keen edge in competitiveness. Three attributes are vital in this competition—entrepreneurship to seek out new opportunities and to take calculated risks. Standing still is a sure way to extinction. . . . The second attribute, innovation, is what creates new products and processes that add value. . . . The third factor is good management. To grow, company managements have to open up new markets and create new distribution channels. The economy is driven by the new knowledge, new discoveries in science and technology, innovations that are taken to the market by entrepreneurs. So while the scholar is still the greatest factor in economic progress, he will be so only if he uses his brains—not in studying the great books, classical texts, and poetry, but in capturing and discovering new knowledge, applying himself in research and development, management and marketing, banking and finance, and the myriad of new subjects that need to be mastered.”
9. Earning your place in history ... “A nation is great not by its size alone. It is the will, the cohesion, the stamina, the discipline of its people, and the quality of their leaders which ensure it an honorable place in history.”
10. Weak leaders rely on opinion polls. “I have never been overconcerned or obsessed with opinion polls or popularity polls. I think a leader who is, is a weak leader. If you are concerned with whether your rating will go up or down, then you are not a leader. You are just catching the wind ... you will go where the wind is blowing. . . . Between being loved and feared, I have always believed Machiavelli was right. If nobody is afraid of me, I am meaningless. When I say something ... I have to be taken very seriously.”
11. We are fundamentally competitive. “Human beings are not born equal. They are highly competitive. Systems like Soviet and Chinese communism have failed, because they tried to equalize benefits. Then nobody works hard enough, but everyone wants to get as much as, if not more than, the other person.”
12. The value of history: “If you do not know history, you think short term. If you know history, you think medium and long term.”

71. The Four Tools of Discipline

"The life of wisdom must be a life of contemplation combined with action."

Life is full of problems. We can moan about them, or we can solve them. Scott Peck argues in The Road Less Traveled: A New Psychology of Love, Traditional Values and Spiritual Growth that discipline is the toolbox for solving problems.

Peck's argument is based on the notion that most of us want to avoid problems – they are painful and often lead us to confront our humanity. They are frustrating. There are false starts. We lack consistent frameworks for improvement. They cause us to feel sad and lonely; things we'd rather avoid. The mental pain and strain often rival physical pain. Yet Peck argues it is in this "whole process of meeting and solving problems that life has meaning."

Problems call forth our courage and our wisdom; indeed, they create our courage and our wisdom. It is only because of problems that we grow mentally and spiritually. When we desire to encourage the growth of the human spirit, we challenge and encourage the human capacity to solve problems, just as in school we deliberately set problems for our children to solve. It is through the pain of confronting and resolving problems that we learn. As Benjamin Franklin said, "Those things that hurt, instruct."

This is why some of us come to welcome problems. Most of us, however, fear them. *Fearing the pain involved, almost all of us, to a greater or lesser degree, attempt to avoid problems. We procrastinate, hoping that they will go away. We ignore them, forget them, pretend they do not exist. We even take drugs to assist us in ignoring them, so that by deadening ourselves to the pain we can forget the problems that cause the pain. We attempt to skirt around problems rather than meet them head on. We attempt to get out of them rather than suffer through them.*

Ultimately however, the suffering from avoiding reality is more painful than reality itself. You can see where this goes right? Now we want to avoid the pseudo-reality that we created to avoid reality. And so it builds, layer on layer.

Avoiding problems avoids the opportunity for growth. Most of the time, problems don't go away, instead they grow.

This inclination to ignore problems is once again a simple manifestation of an unwillingness to delay gratification. Confronting problems is, as I have said, painful. To willingly confront a problem early, before we are forced to confront it by circumstances, means to put aside something pleasant or less painful for something more painful. It is choosing to suffer now in the hope of future gratification rather than choosing to continue present gratification in the hope that future suffering will not be necessary.

The Four Tools of Discipline

There are four tools of discipline: delaying of gratification, acceptance of responsibility, dedication to truth, and balancing

These are easy to learn and yet hard to employ.

1. Delaying Gratification

Delaying gratification is a process of scheduling the pain and pleasure of life in such a way as to enhance the pleasure by meeting and experiencing the pain first and getting it over with. It is the only decent way to live.

2. Accepting Responsibility

The extent to which we will go to avoid responsibility should come as no surprise.

Accepting responsibility is emotionally uncomfortable.

We often feel, incorrectly, that we can solve a problem by saying, "That's not my problem."

Other times we hope that someone else will just solve it for us.

I can solve a problem only when I say "This is my problem and it's up to me to solve it."

But many, so many, seek to avoid the pain of their problems by saying to themselves: "This problem was caused me by other people, or by social circumstances beyond my control,

and therefore it is up to other people or society to solve this problem for me. It is not really my personal problem."

There are extremes of responsibility.

The neurotic assumes too much responsibility; the person with a character disorder not enough. When neurotics are in conflict with the world they automatically assume that they are at fault. When those with character disorders are in conflict with the world they automatically assume that the world is at fault.

Just remember ...

Whenever we seek to avoid the responsibility for our own behavior, we do so by attempting to give that responsibility to some other individual, organization, or entity.

3. Dedication to Reality

This sounds a lot like Joseph Tussman's wise advice. Most of us have problems confronting reality because it does not line up with how we want the world to work. The rise of a political figure that we don't support baffles us because in our mind the world shouldn't work that way.

What Peck outlines below is a version of the map and territory problem.

Superficially, this should be obvious. For truth is reality. That which is false is unreal. The more clearly we see the reality of the world, the better equipped we are to deal with the world. The less clearly we see the reality of the world—the more our minds are befuddled by falsehood, misperceptions and illusions—the less able we will be to determine correct courses of action and make wise decisions. Our view of reality is like a map with which to negotiate the terrain of life. If the map is true and accurate, we will generally know where we are, and if we have decided where we want to go, we will generally know how to get there. If the map is false and inaccurate, we generally will be lost.

While this is obvious, it is something that most people to a greater or lesser degree choose to ignore. They ignore it because our route to reality is not easy. First of all, we are not born with maps; we have to make them, and the making requires effort. The more effort we make to appreciate and perceive reality, the larger and more accurate our maps will be. But many do not want to make this effort. Some stop making it by the end of adolescence. Their maps are small and sketchy, their views of the world narrow and misleading. By the end of middle age most people have given up the effort. They feel certain that their maps are complete and their Weltanschauung is correct (indeed, even sacrosanct), and they are no longer interested in new information. ... Only a relative and fortunate few continue until the moment of death exploring the mystery of reality, ever enlarging and refining and redefining their understanding of the world and what is true.

This biggest problem isn't that our maps are inaccurate but rather that we fail, especially as we age, to revise them. The world is always changing. As Heraclitus said, No man can step in the same river twice.

The world itself is constantly changing. Glaciers come, glaciers go. Cultures come, cultures go. There is too little technology, there is too much technology. Even more dramatically, the vantage point from which we view the world is constantly and quite rapidly changing.

When we've worked so hard over so many years to create a map that we believe represents the world, we tend to ignore information that would suggest we need to redraw our map. We become defensive. Often we don't even passively ignore this information. We go further. We denounce it or crusade against it. We feel that people who listen to it are idiots, and we are the only ones who see the truth. Rather than change our map, we often try to (mentally) destroy the new reality and those that subscribe to it.

Pride and ego come into play.

Truth or reality is avoided when it is painful. We can revise our maps only when we have the discipline to overcome that pain. To have such discipline, we must be totally dedicated to truth. That is to say that we must always hold truth, as best we can determine it, to be

more important, more vital to our self-interest, than our comfort. Conversely, we must always consider our personal discomfort relatively unimportant and, indeed, even welcome it in the service of the search for truth.

Openness to Challenge

What does a life of total dedication to the truth mean? It means, first of all, a life of continuous and never-ending stringent self-examination. We know the world only through our relationship to it. Therefore, to know the world, we must not only examine it but we must simultaneously examine the examiner.

The only way we can ensure our map is correct and accurate is to expose it to the criticism of others. There might be a better answer than the one you have. We need an outside view. Otherwise, we live in a closed system. The tendency to avoid being challenged is a characteristic of human nature.

4. Balancing

Balancing is the discipline that gives us flexibility. Extraordinary flexibility is required for successful living in all spheres of activity.

[...]

To function successfully in our complex world it is necessary for us to possess the capacity not only to express our anger but also not to express it. Moreover, we must possess the capacity to express our anger in different ways. At times, for instance, it is necessary to express it only after much deliberation and self-evaluation. At other times it is more to our benefit to express it immediately and spontaneously. Sometimes it is best to express it coldly and calmly; at other times loudly and hotly. We therefore not only need to know how to deal with our anger in different ways at different times but also how most appropriately to match the right time with the right style of expression. To handle our anger with full adequacy and competence, an elaborate, flexible response system is required. It is no wonder, then, that to learn to handle our anger is a complex task which usually cannot be completed before adulthood, or even mid-life, and which often is never completed.

[...]

Balancing is a discipline precisely because the act of giving something up is painful.

72. Don't Let Your (Technology) Tools Use You

"In an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes.

What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it."

— Herbert Simon

A shovel is just a shovel. You shovel things with it. You can break up weeds and dirt. (You can also whack someone with it.) I'm not sure I've seen a shovel used for much else.

Modern technological tools aren't really like that.

What is an iPhone, functionally? Sure, it's got the *phone* thing down, but it's also a GPS, a note-taker, an emailer, a text messenger, a newspaper, a video-game device, a taxi-calling service, a flashlight, a web browser, a library, a book...you get the point. It does a lot.

This all seems pretty wonderful. To perform those functions 20 years ago, you needed a map and a sense of direction, a notepad, a personal computer, a cell phone, an actual newspaper, a Playstation, a phone and the willingness to talk to a person, an actual flashlight, an actual library, an actual book...you get the point. As Mark Andreessen puts it, the world is being eaten by software. One simple (looking) device and a host of software can perform the functions served by a bunch of big clunky tools of the past.

So far, we've been convinced that use of the New Tools is mostly "upside," that our embrace of them should be wholehearted. Much of this is for good reason. Do you remember how awful using a map was? Yuck.

The problem is that our New Tools are winning the battle of attention. We've gotten to the point where the tools use us as much as we use them. This new reality means we need to re-examine our relationship with our New Tools.



Down the Rabbit Hole

Here's a typical situation.

You're on your computer finishing the client presentation you have to give in two days.

Your phone lights up and makes a chimney noise — you've got a text message. "Hey, have you seen that new Dracula movie?" asks your friend. It only takes a few messages

before the two of you begin to disagree on whether Transylvania is actually a real place. Off to Google!

After a few quick clicks, you get to Wikipedia, which tells you that yes, Transylvania is a region of Romania which the author Bram Stoker used as Count Dracula's birthplace. Reading the Wikipedia entry costs you about 20 minutes. As you read, you find out that Bram Stoker was actually Irish. Irish! An Irish guy wrote Dracula? How did I not know this? Curiosity stoked, you look up Irish novelists, the history of Gothic literature, the original vampire stories...down and down the rabbit hole you go.

Eventually your thirst for trivia is exhausted, and you close the Wikipedia tab to text your friend how wrong they are in regards to Transylvania. You click the Home button to leave your text conversation, which lets you see the Twitter icon. I wonder how many people retweeted my awesome joke about ventriloquism? You pull it up and start "The Scroll." Hah! Greg is hilarious. Are you serious, Bill Gates? Damn — I wish I read as much as Shane Parrish. You go and go. Your buddy tweets a link to an interesting-looking article about millennials — "10 Ways Millennials are Ruining the Workplace". God, they are so self-absorbed. Click.

You decide to check Facebook and see if that girl from the cocktail party on Friday commented on your status. She didn't, but Wow, Susanne went to Hawaii? You look at 35 pictures Susanne posted in her first three hours in Hawaii. Wait, who's that guy she's with? You click his name and go to his Facebook page. On down the rabbit hole you fall...

Now it's been two hours since you left your presentation to respond to the text message, and you find yourself physically tired from the rapid scanning and clicking, scanning and clicking, scanning and clicking of the past two hours. Sad, you go get a coffee, go for a short walk, and decide: Now, I will focus. No more distraction.

Ten minutes in, your phone buzzes. That girl from the cocktail party commented on your status...

Attention for Sale

We've all been there. When we come up for air, it can feel like the aftermath of a mob crowd. *What did I just do?*

The tools we're now addicted to have been engineered for a simple purpose: To keep us addicted to them. The service they provide is secondary to the addiction. Yes, Facebook is a networking tool. Yes, Twitter is a communication tool. Yes, Instagram is an excellent food-photography tool. But unless they get us hooked and keep us hooked, their business models are broken.

Don't believe us?

Take stock of the metrics by which people value or assess these companies. Clicks. Views. Engagement. Return visits. Length of stay. The primary source of value for these products is how much you use them and what they can sell to you while you're there. Increasing their value is a simple (but not easy) proposition: Either get usage up or figure out more effective ways to sell to you while you're there.

As Herbert Simon might have predicted, our attention is for sale, and we're ceding it a little at a time as the tools get better and better at fulfilling their function. There's a version of natural selection going on, where the only consumer technology products that survive are the enormously addictive ones. The trait which produces maximum fitness is addictiveness itself. If you're not using a tool constantly, it has no value to advertisers or data sellers, and thus they cannot raise capital to survive. And even if it's an app or tool that you buy, one that you have to pay money for upfront, they must hook you on Version 1 if you're going to be expected to buy Versions 2, 3, and 4.

This ecosystem ensures that each generation of consumer tech products — hardware or software — gets better and better at keeping you hooked. These services have learned, through a process of evolution, to drown users in positive feedback and create intense habitual usage. They must — because any other outcome is death. Facebook doesn't want

you to go on once a month to catch up on your correspondence. You must be engaged. The service does not care whether it's unnecessarily eating into your life.

Snap Back to Reality

It's up to us to take our lives back then. We must comprehend that the New Tools have a tremendous downside in their loss of focused attention, and that we're giving it up willingly in a sort of Faustian bargain for entertainment, connectedness, and novelty.

Psychologist Mihaly Csikszentmihalyi pioneered the concept of Flow, where we enter an enjoyable state of rapt attention to our work and produce a high level of creative output. It's a wonderful feeling, but the New Tools have learned to provide the same sensation without the actual results. We don't end up with a book, or a presentation, or a speech, or a quilt, or a hand-crafted table. We end up two hours later in the day.

The first step towards a solution must be to understand the reality of this new ecosystem. It follows Garrett Hardin's "First Law of Ecology": You can never merely do one thing. The New Tools are not like the Old Tools, where you pick up the shovel, do your shoveling, and then put the shovel back in the garage. The iPhone is not designed that way. It's designed to keep you going, as are most of the other New Tools. You probably won't send one text. You probably won't watch one video. You probably won't read one article. You're not supposed to!

The rational response to this new reality depends a lot on who you are and what you need the tools for. Some people can get rid of 50% or more of their New Tools very easily. You don't have to toss out your iPhone for a StarTAC, but because software is doing the real work, you can purposefully reduce the capability of the hardware by reducing your exposure to certain software.

As you shed certain tools, expect a homeostatic response from your network. Don't be mistaken: If you're a Snapper or an Instagrammer or simply an avid texter, getting rid of those services will give rise to consternation. They are, after all, networking tools. Your network will notice. You'll need a bit of courage to face your friends and tell them, with a straight face, that you won't be Instagramming anymore because you're afraid of falling down the rabbit hole. But if you've got the courage, you'll probably find that after a week or two of adjustment your life will go on just fine.

The second and more mild type of response would be to appreciate the chain-smoking nature of these products and to use them more judiciously. Understand that every time you look at your iPhone or connect to the Internet, the rabbit hole is there waiting for you to tumble down. If you can grasp that, you'll realize that you need to be suspicious of the "quick check." Either learn to batch Internet and phone time into concentrated blocks or slowly re-learn how to ignore the desire to follow up on every little impulse that comes to mind. (Or preferably, do both.)

A big part of this is turning off any sort of "push" notification, which must be the most effective attention-diverter ever invented by humanity. A push notification is anything that draws your attention to the tool without your conscious input. It's when your phone buzzes for a text message, or an image comes on the screen when you get an email, or your phone tells you that you've got a Facebook comment. Anything that desperately induces you to engage. You need to turn them off. (Yes, including text message notifications – your friends will get used to waiting).

E-mail can be the worst offender; it's the earliest and still one of the most effective digital rabbit holes. To push back, close your email client when you're not using it. That way, you'll have to open it to send or read an email. Then go ahead and change the settings on your phone's email client so you have to "fetch" emails yourself, rather than having them pushed at you. Turn off anything that tells you an email has arrived.

Once you stop being notified by your tools, you can start to engage with them on your own terms and focus on your real work for a change; focus on the stuff actually producing some

value in your life and in the world. When the big stuff is done, you can give yourself a half-hour or an hour to check your Facebook page, check your Instagram page, follow up on Wikipedia, check your emails, and respond to your text messages. This isn't as good a solution as deleting many of the apps altogether, but it does allow you to engage with these tools on your own terms.

However you choose to address the world of New Tools, you're way ahead if you simply recognize their power over your attention. Getting lost in hyperlinks and Facebook feeds doesn't mean you're weak, it just means the tools you're using are designed, at their core, to help you get lost. Instead of allowing yourself to go to work for them, resolve to make them work for you.

73. Mental Models: Getting the World to Do the Work for You

People are working harder and harder to clean up otherwise avoidable messes they created by making poor initial decisions. There are many reasons we're making poor decisions and failing to learn from them.

Under the heading, Sources of Stupidity in an article entitled Smart Decisions we wrote about some of the factors that contribute to suboptimal decisions.

1. We're (sometimes) stupid. Of course, I like to think that I'm rational and capable of interpreting all of the information in a non-biased way. Only I'm not. At least not always. There are situations that increase the odds of irrationality, for instance when we're tired, overly focused on a goal, rushing, distracted or interrupted, operating in a group, or are under the direction of an expert.

2. We have the wrong information. In this case, we're operating with the wrong facts or our assumptions are incorrect.

3. We use the wrong model. We use models to make decisions. The quality of those models often determines the quality of our thinking. There are a variety of reasons that we use false, incomplete, or incorrect models. For instance, we're prone to using less useful models when we are a novice or we operate in a domain outside of our area of expertise. The odds of the wrong model also increase as the pace of environmental change increases.

4. We fail to learn. We all know the person that has 20 years of experience but it's really the same year over and over. Well, that person is sometimes us. If we don't understand how we learn, we're likely to make the same mistakes over and over.

5. Doing what's easy over what's right. You can think of this as looking good over doing good. In this case, we make choices based on optics, explainability, politics, etc. Mostly this comes from not having a strong sense of self and seeking external validation or avoiding punishment.

Simple But Not Easy

One of the metamodels that traverse all five of these sources of stupidity is understanding the world.

If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.

Understanding The World

How can we best understand the world as it is?

Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer.

If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models.

Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of

bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise?

Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right?

We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

2nd Order Thinking

One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question:

"And then what?"

A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it.

We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal.

For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place.

Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold.

Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins.

We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality.

Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain.

But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise.

Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

74. Alexander von Humboldt and the Invention of Nature: Creating a Holistic View of the World Through A Web of Interdisciplinary Knowledge

In his piece in 2014's Edge collection *This Idea Must Die: Scientific Theories That Are Blocking Progress*, dinosaur paleontologist Scott Sampson writes that science needs to "subjectify" nature. By "subjectify", he essentially means to see ourselves connected with nature, and therefore care about it the same way we do the *people* with whom we are connected.

That's not the current approach. He argues: "One of the most prevalent ideas in science is that nature consists of objects. Of course, the very practice of science is grounded in objectivity. We objectify nature so that we can measure it, test it, and study it, with the ultimate goal of unraveling its secrets. Doing so typically requires reducing natural phenomena to their component parts."

But this approach is ultimately failing us.

Why? Because much of our unsustainable behavior can be traced to a broken relationship with nature, a perspective that treats the nonhuman world as a realm of mindless, unfeeling objects. Sustainability will almost certainly depend upon developing mutually enhancing relations between humans and nonhuman nature.

This isn't a new plea, though. Over 200 years ago, the famous naturalist Alexander Von Humboldt (1769-1859) was facing the same challenges.

In her compelling book *The Invention of Nature: Alexander Von Humboldt's New World*, Andrea Wulf explores Humboldt as the first person to publish works promoting a holistic view of nature, arguing that nature could only be understood in relation to the subjectivity of experiencing it.

Fascinated by scientific instruments, measurements and observations, he was driven by a sense of wonder as well. Of course nature had to be measured and analyzed, but he also believed that a great part of our response to the natural world should be based on the senses and emotions.

Humboldt was a rock star scientist who ignored conventional boundaries in his exploration of nature. Humboldt's desire to know and understand the world led him to investigate discoveries in all scientific disciplines, and to see the interwoven patterns embedded in this knowledge — mental models anyone?

If nature was a web of life, he couldn't look at it just as a botanist, a geologist or a zoologist. He required information about everything from everywhere.

Humboldt grew up in a world where science was dry, nature mechanical, and man an aloof and separate chronicler of what was before him. Not only did Humboldt have a new vision of what our understanding of nature could be, but he put humans in the middle of it.

Humboldt's Essay on the Geography of Plants promoted an entirely different understanding of nature. Instead of only looking at an organism, ... Humboldt now presented relationships between plants, climate and geography. Plants were grouped into zones and regions rather than taxonomic units. ... He gave western science a new lens through which to view the natural world.

Revolutionary for his time, Humboldt rejected the Cartesian ideas of animals as mechanical objects. He also argued passionately against the growing approach in the sciences that put man atop and separate from the rest of the natural world. Promoting a concept of unity in nature, Humboldt saw nature as a "reflection of the whole ... an organism in which the parts only worked in relation to each other."

Furthermore, that "poetry was necessary to comprehend the mysteries of the natural world."

Wulf paints one of Humboldt's greatest achievements as his ability and desire to make science available to everyone. No one before him had "combined exact observation with a 'painterly description of the landscape'".

By contrast, Humboldt took his readers into the crowded streets of Caracas, across the dusty plains of the Llanos and deep into the rainforest along the Orinoco. As he described a continent that few British had ever seen, Humboldt captured their imagination. His words were so evocative, the Edinburgh Review wrote, that 'you partake in his dangers; you share his fears, his success and his disappointment.'

In a time when travel was precarious, expensive and unavailable to most people, Humboldt brought his experiences to anyone who could read or listen.

On 3 November 1827, ... Humboldt began a series of sixty-one lectures at the university. These proved so popular that he added another sixteen at Berlin's music hall from 6 December. For six months he delivered lectures several days a week. Hundreds of people attended each talk, which Humboldt presented without reading from his notes. It was lively, exhilarating and utterly new. By not charging any entry fee, Humboldt democratized science: his packed audiences ranged from the royal family to coachmen, from students to servants, from scholars to bricklayers – and half of those attending were women. Berlin had never seen anything like it.

The subjectification of nature is about seeing nature, experiencing it. Humboldt was a master of bringing people to worlds they couldn't visit, allowing them to feel a part of it. In doing so, he wanted to force humanity to see itself in nature. If we were all part of the giant web, then we all had a responsibility to understand it.

When he listed the three ways in which the human species was affecting the climate, he named deforestation, ruthless irrigation and, perhaps most prophetically, the 'great masses of steam and gas' produced in the industrial centres. No one but Humboldt had looked at the relationship between humankind and nature like this before.

His final opus, a series of books called Cosmos, was the culmination of everything that Humboldt had learned and discovered.

Cosmos was unlike any previous book about nature. Humboldt took his readers on a journey from outer space to earth, and then from the surface of the planet into its inner core. He discussed comets, the Milky Way and the solar system as well as terrestrial magnetism, volcanoes and the snow line of mountains. He wrote about the migration of the human species, about plants and animals and the microscopic organisms that live in stagnant water or on the weathered surface of rocks. Where others insisted that nature was stripped of its magic as humankind penetrated into its deepest secrets, Humboldt believed exactly the opposite. How could this be, Humboldt asked, in a world in which the coloured rays of an aurora 'unite in a quivering sea flame', creating a sight so otherworldly 'the splendour of which no description can reach'? Knowledge, he said, could never 'kill the creative force of imagination' – instead it brought excitement, astonishment and wondrousness.

This is the ultimate subjectivity of nature. Being inspired by its beauty to try and understand how it works. Humboldt had respect for nature, for the wonders it contained, but also as the system in which we ourselves are an inseparable part.

Wulf concludes at the end that Humboldt,

...was one of the last polymaths, and died at a time when scientific disciplines were hardening into tightly fenced and more specialized fields. Consequently his more holistic approach – a scientific method that included art, history, poetry and politics alongside hard data – has fallen out of favour.

Maybe this is where the subjectivity of nature has gone. But we can learn from Humboldt the value of bringing it back.

In a world where we tend to draw a sharp line between the sciences and the arts, between the subjective and the objective, Humboldt's insight that we can only truly understand nature by using our imagination makes him a visionary.

75. How the Many Sides to Every Story Shape our Reality

"We can select truths that engage people and inspire action, or we can deploy truths that deliberately mislead. Truth comes in many forms, and experienced communicators can exploit its variability to shape our impression of reality."

The truth is not as straightforward as it seems. There are many truths, some of them more honest than others. "On most issues," writes Hector Macdonald in his book *Truth: How the Many Sides to Every Story Shape Our Reality*, "there are multiple truths we can choose to communicate. Our choice of truth will influence how those around us perceive an issue and react to it."

We are often left with several truths, some more flattering to us than others. What we choose to see, and what we share with others, says a lot about who we are.

"There is no worse lie than a truth misunderstood by those who hear it."

— William James

Competing Truths

According to MacDonald, there are often many legitimate ways of describing a situation. Of course, it's possible for anyone to cherry-pick the facts or truths they prefer, shaping the story to meet their needs. MacDonald offers an apt demonstration.

A few years ago, I was asked to support a transformation programme at a global corporation that was going through a particularly tough patch. ... I interviewed the corporation's top executives to gather their views on the state of their industry and their organization. After consolidating all the facts they'd given me, I sat down with the CEO in a plush Manhattan executive suite and asked him whether he wanted me to write the 'Golden Opportunity' story or the 'Burning Platform' story of his business.

These two phrases, "Golden Opportunity" and "Burning Platform," describe two different approaches to telling the same story, or in this case, promoting the same plan. The first describes the incredible potential the client company can realize by transforming itself to meet growing demand. The profit is out there for them if they work together to make the necessary changes! The second phrase refers to internal struggles at the company and a potential downward spiral that can only be arrested if the company transforms itself to correct the problems. Both stories are true, and both are intended to create the same outcome: supporting a painful and difficult transformation. Yet they can create very different impressions in the minds of employees.

MacDonald illustrates how, when we interact with someone, especially someone who knows more than we do, they have an opportunity to shape our reality. That is, they can shape how we think, our ideas and opinions about a subject. Our perception of reality changes and "because we act on the basis of our perceptions" they change not only our thinking but our actions.

Spin Masters

I remember watching ads on TV when I was a kid claiming that 80 percent of dentists recommended Colgate-Palmolive. I wondered if my mom was trying to kill me by giving me Crest. I wasn't the best in math, but I reasoned that if 80% of dentists were recommending Colgate, at most 20% were recommending Crest.

Of course, that's exactly what Colgate wanted people to think—the survey was in comparison to other brands. But that wasn't the whole story. The survey actually asked dentists which brands they would recommend, and almost all of them listed several.

Colgate wasn't lying—but they were using a very distorted version of the truth, designed to mislead. The Advertising Standards Authority eventually banned the ad.

People use this sort of spin all the time. Everyone has an agenda. You can deceive without ever lying. Politicians get elected on how effective they are at “spinning truths in a way that create a false impression.” It’s only too easy for political agendas to trump impartial truth.

The Three Types of Communicators

“It’s not simply that we’re being lied to; the more insidious problem is that we are routinely misled by the truth.”

In *Truth*, Macdonald explores the effects of three types of communicators: advocates, misinformers, and misleaders.

Advocates select competing truths that create a reasonably accurate impression of reality in order to achieve a constructive goal.

Misinformers innocently propagate competing truths that unintentionally distort reality.

Misleaders deliberately deploy competing truths to create an impression of reality that they know is not true.

We may feel better believing there is one single truth, and thinking everyone who doesn’t see things the way we do simply doesn’t have the truth. That’s not...true. Everyone, including you and me, has a lens on the situation that’s distorted by what they want, how they see the world, and their biases. The most dangerous truths are the credible ones that we convince ourselves are correct.

One idea I find helpful when faced with a situation is perspective-taking. I construct a mental room that I fill with all the participants and stakeholders around a table. I then put myself into their seats and try to see the room through their eyes. Not only does this help me better understand reality by showing me my blind spots, but it shows me what other people care about and how I can create win-wins.

Truth: How the Many Sides to Every Story Shape Our Reality, goes on to explore partial truths, subjective truths, artificial truths, and unknown truths. It’s a terrific read for checking your own perspective on truth, and understanding how truth can be used to both inform and mislead you.

76. Yuval Noah Harari: Why We Dominate the Earth

Why did Homo sapiens diverge from the rest of the animal kingdom and go on to dominate the earth? Communication? Cooperation? According to best-selling author Yuval Noah Harari, that barely scratches the surface.

Yuval Noah Harari's Sapiens is one of those uniquely breathtaking books that comes along but rarely. It's broad, but scientific. It's written for a popular audience, but never feels dumbed down. It's new and fresh, but not based on any new primary research. *Sapiens* is pure synthesis.

Readers will easily recognize the influence of Jared Diamond, author of Guns, Germs, and Steel, The Third Chimpanzee, and other similarly broad-yet-scientific works with vast synthesis and explanatory power. It's not surprising, then, that Harari, a history professor at the Hebrew University of Jerusalem, has noted Diamond's contributions to his thinking. Harari says:

It [Guns, Germs, and Steel] made me realize that you can ask the biggest questions about history and try to give them scientific answers. But in order to do so, you have to give up the most cherished tools of historians. I was taught that if you're going to study something, you must understand it deeply and be familiar with primary sources. But if you write a history of the whole world you can't do this. That's the trade-off.

Harari sought to understand the history of humankind's domination of the earth and its development of complex modern societies. He applies ideas from evolutionary theory, forensic anthropology, genetics, and the basic tools of the historian to generate a new conception of our past: humankind's success was due to our ability to create and sustain grand, collaborative myths.

To make the narrative more palatable and sensible, we must take a different perspective. Calling us humans keeps us too close to the story to have an accurate view. We're not as unique as we would like to believe. In fact, we're just another animal. We are *Homo sapiens*. Because of this, our history can be described just like that of any other species. Harari labels us like any other species, calling us "Sapiens" so we can depersonalize things and allow the author the room he needs to make some bold statements about the history of humanity. Our successes, failures, flaws and credits are part of the makeup of the Sapiens.[1]

Sapiens existed long before there was recorded history. Biological history is a much longer stretch, beginning millions of years before the evolution of any forbears we can identify. When our earliest known ancestors formed, they were not at the top of the food chain. Rather, they were engaged in an epic battle of trench warfare with the other organisms that shared their habitat.[2]

"Ants and bees can also work together in huge numbers, but they do so in a very rigid manner and only with close relatives. Wolves and chimpanzees cooperate far more flexibly than ants, but they can do so only with small numbers of other individuals that they know intimately. Sapiens can cooperate in extremely flexible ways with countless numbers of strangers. That's why Sapiens rule the world, whereas ants eat our leftovers and chimps are locked up in zoos and research laboratories."

— Yuval Noah Harari, *Sapiens*

These archaic humans loved, played, formed close friendships and competed for status and power, but so did chimpanzees, baboons, and elephants. There was nothing special about humans. Nobody, least of all humans themselves, had any inkling their descendants would one day walk on the moon, split the atom, fathom the genetic code and write history books. The most important thing to know about prehistoric humans is that they were

insignificant animals with no more impact on their environment than gorillas, fireflies or jellyfish.

For the same reason that our kids can't imagine a world without Google, Amazon and iPhones, we can't imagine a world in which we have not been a privileged species right from the start. Yet we were just one species of smart, social ape trying to survive in the wild. We had cousins: *Homo neanderthalensis*, *Homo erectus*, *Homo rudolfensis*, and others, both our progenitors and our contemporaries, all considered human and with similar traits. If chimps and bonobos were our second cousins, these were our first cousins.

Eventually, things changed. About 70,000 or so years ago, our DNA showed a mutation (Harari claims we don't know quite why) which allowed us to make a leap that no other species, human or otherwise, was able to make. We began to cooperate flexibly, in large groups, with an extremely complex and versatile language. If there is a secret to our success—and remember, success in nature is survival—it was that our brains developed to communicate.

Welcome to the Cognitive Revolution

Our newfound capacity for language allowed us to develop abilities that couldn't be found among our cousins, or in any other species from ants to whales.

First, we could *give detailed explanations* of events that had transpired. We weren't talking mental models or even gravity. At first, we were probably talking about things for survival. Food. Water. Shelter. It's possible to imagine making a statement something like this: "I saw a large lion in the forest three days back, with three companions, near the closest tree to the left bank of the river and I think, but am not totally sure, they were hunting us. Why don't we ask for help from a neighboring tribe, so we don't all end up as lion meat?"[3]

Second, and maybe more importantly, we could also gossip about each other. Before religion, gossip created a social, even environmental pressure to conform to certain norms. Gossip allowed control of the individual for the aid of the group. It wouldn't take much effort to imagine someone saying, "I noticed Frank and Steve have not contributed to the hunt in about three weeks. They are not holding up their end of the bargain, and I don't think we should include them in distributing the proceeds of our next major slaughter."[4]

Harari's insight is that while the abilities to communicate about necessities and to pressure people to conform to social norms were certainly pluses, they were not the great leap. Surprisingly, it's not our shared language or even our ability to dominate other species that defines us but rather, our shared fictions. The exponential leap happened because we could talk about things that were not real. Harari writes:

As far as we know, only Sapiens can talk about entire kinds of entities that they have never seen, touched, or smelled. Legends, myths, gods, and religions appeared for the first time with the Cognitive Revolution. Many animals and human species could previously say, "Careful! A lion!" Thanks to the Cognitive Revolution, *Homo sapiens* acquired the ability to say, "The lion is the guardian spirit of our tribe." This ability to speak about fictions is the most unique feature of Sapiens language.... You could never convince a monkey to give you a banana by promising him limitless bananas after death in monkey heaven.

Predictably, Harari mentions religion as one of the important fictions. But just as important are fictions like the limited liability corporation; the nation-state; the concept of human rights, inalienable from birth; and even money itself.

Shared beliefs allow us to do the thing that other species cannot. Because we believe, we can cooperate effectively in large groups toward larger aims. Sure, other animals cooperate. Ants and bees work in large groups with close relatives but in a very rigid manner. Changes in the environment, as we are seeing today, put the rigidity under strain. Apes and wolves cooperate as well, and with more flexibility than ants. But they can't scale.

If wild animals could have organized in large numbers, you might not be reading this. Our success is intimately linked to scale. In many systems and in all species but ours, as far as we know, there are hard limits to the number of individuals that can cooperate in groups in a flexible way.[5] As Harari puts it in the quotation at the beginning of this post, “Sapiens can cooperate in extremely flexible ways with countless numbers of strangers. That’s why Sapiens rule the world, whereas ants eat our leftovers and chimps are locked up in zoos and research laboratories.”

Sapiens diverged when they—or I should say we—hit on the ability of a collective myth to advance us beyond what we could do individually. As long as we shared some beliefs we could work toward something larger than ourselves—itsself a shared fiction. With this in mind, there was almost no limit to the number of cooperating, believing individuals who could belong to a belief-group.

With that, it becomes easier to understand why we see different results from communication in human culture than in whale culture, or dolphin culture, or bonobo culture: a shared trust in something outside of ourselves, something larger. And the result can be extreme, *lollapalooza* even, when a lot of key things converge in one direction, from a combination of critical elements.

Any large-scale human cooperation—whether a modern state, a medieval church, an ancient city, or an archaic tribe—is rooted in common myths that exist only in people’s collective imagination. Churches are rooted in common religious myths. Two Catholics who have never met can nevertheless go together on crusade or pool funds to build a hospital because they both believe God was incarnated in human flesh and allowed Himself to be crucified to redeem our sins. States are rooted in common national myths. Two Serbs who have never met might risk their lives to save one another because both believe in the existence of the Serbian nation, the Serbian homeland and the Serbian flag. Judicial systems are rooted in common legal myths. Two lawyers who have never met can nevertheless combine efforts to defend a complete stranger because they both believe in the existence of laws, justice, human rights, and money paid out in fees.

Not only do we believe them individually, but we believe them collectively.

Shared fictions aren’t necessarily lies. Shared fictions can create literal truths. For example, if I trust that you believe in money as much as I do, we can use it as an exchange of value. Yet just as you can’t get a chimpanzee to forgo a banana today for infinite bananas in heaven, you also can’t get him to accept three apples today with the idea that if he invests them wisely in a chimp business, he’ll get six bananas from it in five years—no matter how many compound interest tables you show him. This type of collaborative and complex fiction is uniquely human, and capitalism is as much an imagined reality as religion.

Once you start to see the world as a collection of shared fictions, it never looks the same again.

This leads to the extremely interesting conclusion that comprises the bulk of Harari’s great work: If we collectively decide to alter the myths, we can relatively quickly and dramatically alter behavior.

For instance, we can decide slavery, one of the oldest institutions in human history, is no longer acceptable. We can declare monarchy an outdated form of governance. We can decide women should have the right to as much power as men, reversing the pattern of history. We can also decide all Sapiens must follow the same religious text and devote ourselves to slaughtering the resisters.

There is no parallel in other species for these quick, large-scale shifts. General behavior patterns in dogs or fish or ants change due to a change in environment, or to broad genetic evolution over a period of time. Lions will likely never sign a Declaration of Lion Rights and suddenly abolish the idea of an alpha male lion. Their hierarchies are rigid, primal even.

But humans can collectively change the narrative over a short span of time, and begin acting very differently with the same DNA and the same set of physical circumstances. If we all believe in Bitcoin, it becomes real for the same reason that gold becomes real. Thus, we can conclude that Harari's Cognitive Revolution is what happens when we decide that, while biology dictates what's physically possible, we as a species decide norms. This is where biology enables and culture forbids. "The Cognitive Revolution is accordingly the point when history declared its independence from biology," Harari writes. These ever-shifting alliances, beliefs, myths—ultimately, cultures—define what we call human history.

A thorough reading of *Sapiens* is recommended to understand where Harari takes this idea, from the earliest humans to who we are today.

77. The Anatomy of a Great Decision

Making better decisions is one of the best skills we can develop. Good decisions save time, money, and stress. Here, we break down what makes a good decision and what we can do to improve our decision-making processes.

Improving our decision-making abilities is a central goal at Farnam Street. Better decisions save time, money, and stress. While it's an investment now, in the long run, learning principles and developing a multidisciplinary lens that we can apply throughout life is a worthy investment.

As we have said before, a decision should not be judged solely on its outcome.

Sometimes good decisions produce bad results. A recruiting process that has resulted in mostly excellent candidates will still occasionally fail to weed out a bad fit. It is impossible to have perfect and complete information for all the variables involved. So we do the best with what we have.

Using a decision journal can move us to that place where we are consistently making better decisions. At its core, the technique of identifying and reflecting on process from beginning to end helps us achieve the two main qualities in better decisions:

1. Using principles, not tactics
2. Looking at a situation through a multidisciplinary lens

These qualities are what we need to improve over time. And in the same way compounding interest increases our bank balance, better decisions produce exponentially better results the more of them we make. Hard decisions today, made well, prepare us to make decisions more easily in the future.

When we look around, however, to see what we can learn from others who made great decisions, we often judge based solely on the outcomes. Whether a decision by a family member to buy Coca-Cola stock in the '80s, or Caesar to cross the Rubicon, we evaluate a decision as good based on how things turned out.

Evaluating decisions on outcomes prevents us from learning. We need to dive into a decision, cut it open and examine its parts. Regardless of what happened, learning how a decision was made is the place to find knowledge. So what does the anatomy of a great decision look like?

// Evaluating
decisions on
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prevents us from
learning. //

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The Marshall Plan

After WWII, Europe was in ruins. Much of the infrastructure had been destroyed. Many people were starving, and had lost everything they possessed. Those systems we take for granted, but on which we rely daily—transportation, manufacturing, agriculture—had been devastated. The economies were essentially broken, and the countries that saw a lot of fighting had much to rebuild. But with what money? Many countries were in serious debt. Continued, widespread economic hardships were on the horizon.

In 1947, Secretary of State General George Marshall put forward a plan that has since carried his name, a plan to give a massive amount of money to several European nations. Those countries accepted, the continent was rebuilt, and Marshall is credited with one of the most positive defining acts of economics, politics, and ethics in the last century. But when you look at the thinking that went into the Marshall Plan, the reasoning behind the details, you see that it would have been a great decision regardless of the outcome.

Asking the Right Questions

At the beginning, participants asked questions. What do we want to achieve? What problems are we addressing? What does a successful outcome look like?

From there came the principles, things like: strong economies minimize social unrest; countries that work toward mutual goals are less likely to fight each other; let's not have another war in Europe anytime soon.

Starting from these principles, decision makers evaluated the situation through a multidisciplinary lens. Economics, politics, humanitarian responsibilities, historical and psychological factors—the plan sought to address issues on many fronts and took a wide perspective into account.

The plan was developed in the State Department of the United States. It was not the work of a single individual, and contributions from many people made it into the final version that Marshall fought for in Congress.

In the end, there were three key decisions made in terms of the structure of the plan:

1. To give, versus lend, the majority of the aid
2. To require the nations receiving the aid to work out how to allocate it
3. To invite Russia to partake

Using Multiple Lenses

The decision to give rather than lend the majority of the aid was the result of looking at the situation through economic, political, and humanitarian lenses. It was also a win-win.

Immediately following the war, the European nations had put significant effort into restarting their economies. But they were doing it with borrowed dollars, needing to import far more than they were capable of exporting. Many economies needed modernization, which was impossible to fund while paying for imports at the same time. Without full economic recovery in Europe, there was great danger of a recession, or even a second depression. Basically, Europe needed money.

But economies are also about people. It is people who produce and consume and develop the economy. So it wasn't just the countries that needed financial assistance, but the people in them. The designers of the plan knew that hungry, desperate people would only create more social unrest. They saw that if they didn't give the money to Europe they might very well have to spend it on national security as Europe fell apart.

And we can't discount the impact of the physical reality of the aftermath of the war that the liberating forces confronted—starving people, towns reduced to rubble. The case for humanitarian assistance was strong.

Letting the World Do the Work For You

The decision to have the participating nations allocate the aid among themselves was the answer to what the historical, political and psychological lenses revealed.

Many people felt that the approach to reparations after WWI was a significant impetus for WWII. The First World War had a similar effect on the economies and infrastructures of the nations involved. In 1918, angry at Germany, France and Britain had demanded huge sums of money. The problem was, it essentially crippled Germany economically, and caused a social and political situation that created enmity among the European nations. Many argue that it was this series of events that produced a situation in which Hitler could come to power.

The creators of the Marshall Plan were aware of this, and it was one of the elements that influenced the design of the terms. If Germany collapsed again, they might be fighting World War III in twenty years.

By asking enemies to work together and approve each other's share, the plan created a buy-in that defused much of the anger and animosity between the nations. Just a couple of years earlier they had been at war with each other. After sacrificing so much in both lives and money, it was natural that the various peoples were angry over both who started the war, and the many violent and destructive events that were enacted over those six years.

But the US decided to not take sides and extend the alliances of the war. The plan creators realized this wouldn't help fulfill the principles they had chosen to abide by. Europe working meant Europe working together.

Outcomes Over Optics

Inviting Russia to share in the aid was another important result of applying those political, historical, psychological, and humanitarian lenses.

The end of WWII marked the beginning of the Cold War. More nebulous by nature, starting a couple of years after the liberation of Europe and the dropping of the atomic bomb, this political climate would shape international relations for the next 40 years. The Marshall Plan took into account how best to navigate this complicated territory. Russia had been a valuable ally during the war, holding the eastern front and inflicting considerable damage on Hitler's efforts. But immediately post-war their actions demonstrated a desire to at least influence, if not control, the political structure of the world. Their version of communism was at direct odds with US democracy, and was thus considered a legitimate threat. Even though there was very little expectation that Russia would participate, and possibly even less desire to give them money, Russia and its allied countries were invited by both the US and the European nations to participate in the talks involving the implementation of the plan. They chose not to, and followed up with accusing the plan of being a front to American imperialist goals. This was important because it forced Russia's hand. They could not later claim that the Iron Curtain was something that was thrust on them. It was, instead, something they deliberately chose to build.

The Marshall Plan is remembered as a great decision, not strictly because of its outcomes—though it did contribute to the debatably successful reconstruction of Europe, it did not succeed in preventing the deterioration of relations with Russia—but because it was firmly grounded in principles that were identified and executed through a multidisciplinary lens.

78. Letting the World Do the Doing

By Freya Mathews

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What is nature, and how are we to live *with* it rather than *against* it, as ecophilosophers enjoin? My own understanding of nature and of our proper relation to it is ultimately traceable to a metaphysics that could be broadly described as panpsychist, in that it attributes an internal principle, or subjectival dimension, to matter generally. I have explored such a metaphysic elsewhere, and do not propose to detail these studies here.² My purpose is rather to consider the implications of such a broadly panpsychist premise for specifically environmental approaches to 'nature'.

There have of course been innumerable answers to the question, 'what is nature?' (Rolston 1988, Brennan 1998, Seddon 1997). One of the most common has been that 'nature' denotes the domain of physics – either the physical universe in its entirety or the laws that undergird it. In this widest sense, nature will not be of particular interest to environmentalists, since such a nature cannot be threatened, and does not, on the face of it at any rate, stand in need of human protection or conservation. In what sense then is nature understood by environmentalists as in need of defence? It is often assumed that, in speaking about nature, environmentalists are referring to the domain of biology, the realm of living things – forests and swamps, for instance, or plants and animals generally, or wildlife in particular – since it is this biological realm which is clearly under threat from the engines of industry and the appetites of global markets today. However, where the cosmological definition is too wide, this strictly biological definition of nature will usually turn out to be too narrow for environmental purposes, since many environmental battles are fought over inorganic, or only partly organic, features of the environment, such as rivers, dunefields, caves, mountains and rock formations, as well as over organic systems.

What environmentalists in fact usually seem to have in mind, in their references to nature, is parts or aspects of the world which have not been created or unduly modified by human agency. Is this a tenable environmental definition of nature? Implied in the definition is a distinction between the artefactual and the natural. I however, like many others, would immediately question the validity of defining the natural in contrast to the artefactual in this way, on the grounds that, since human beings, as biological organisms, surely belong to nature, and since making things comes to us as naturally as eating and drinking do, our handiwork itself has as much a claim to be considered part of nature as the handiwork of spiders, insects and marine life does (Mathews 1996). Therefore to regard trees and rocks and animals, not to mention webs, hives, termite mounds and coral reefs, as falling within nature, and cars and ships and computers as falling outside it, is to over-simplify the issue.

However, there *is* a distinction buried within this over-simplification which does, I think, call for further investigation. This is the distinction between what happens when things are allowed to unfold in their own way, or run their own course, and what happens when, under the direction of abstract thought, agents intentionally intervene to change that course of events for the sake of abstractly conceived ends of their own. By 'abstractly conceived ends' I mean here not ends discovered through abstraction from the particular but ends constructed through reduction of the actual to a blank slate for the abstractly imagined possible. In this latter sense, abstraction, or as I shall characterize it here, *abstractiveness*, is a matter of finding one's starting point for a course of action in the realm of the abstractly conceived or imagined rather than finding it within the reference frame of the actual. From the point of view of this distinction then, nature might be

understood as whatever happens when we, or other agents under the direction of abstractive thought, let things be, while artifice is what happens when such agents redirect events towards their own ends. The radical environmental injunction to live with rather than against the grain of nature then translates into an injunction to *let things be*.

It should be pointed out that the distinction between processes under the direction of abstractive thought and processes which unfold of themselves does not coincide with the distinction between conscious and unconscious processes, or even living and non-living ones. That is, it is not a distinction between processes which occur in, or as a function of, consciousness, and processes which occur in, or as a function of, unconscious matter. All things, whether conscious or unconscious, living or non-living, have laws of their own unfolding. In the case of the non-living, these laws may be embodied in the physical and chemical dispositions of the things in question. In the case of living beings, they may reside in biological or instinctual dispositions, which may be described as their immanent telos or conatus.³ Even conscious beings such as humans are imbued with an underlying conatus, an inherent 'law' of self-realization which is not a product of our own reflection or ratiocination, but which already informs our instincts, reflexes, and other spontaneous responses.⁴

All these processes however, whether in ourselves or in the world, are capable of being re-routed by the interventions of agents under the direction of abstractive thought – which is to say, agents seeking to realize abstractly conceived end-states rather than unthinkingly following their own immediate impulses. Thus inorganic physical processes can be redirected by such intervention; the behaviour of organisms can likewise be so modified; and spontaneous impulses in human beings can be suppressed or sublimated by the interventions of the individuals themselves or by societies. At each level a contrast can be drawn between an undisturbed state of affairs, in which everything unfolds or behaves in accordance with its intrinsic dispositions or an innate conatus, and a state of affairs in which the dispositions of things are diverted by agents to produce end-states which match those agents' abstract ideals or imagined scenarios. The undisturbed unfolding of events may be described as 'natural', according to the present definition, and the intentional re-direction of such a course of events as 'artificial'.

The contrast between the natural and the artificial, drawn this way, though not absolute,⁵ is, I think, a significant and defensible one for environmentalists. For the primary aim of environmentalists is to protect the biosphere from the depredations of modern civilizations, and it is arguable that when all things are left to realize themselves in their own way, the life process will be assured, at least in the long term. This conclusion is supported by commonsense and evolutionary theory: 'nature knows best' because life has had countless millennia to adjust itself to terrestrial conditions. But in many ecophilosophies, this faith in the capacity of the life process to take care of itself rests on deeper metaphysical foundations, involving an attribution of purpose or intelligence to reality. My own argument for this position rests on a view of the world as constituting on the one hand a subjectival whole (the One) imbued with its own conatus, or impulse towards self-realization, and on the other hand a manifold of relatively self-realizing individuals (the Many), whose conative impulses generally intermesh to further the self-realization of the whole (Mathews 2003).

To affirm the view that nature knows best is not to deny that when things are left to their own devices, the interests of individual organisms and smaller-scale ecosystems might not be subordinated to those of greater ecosystems or the biosphere as a whole: competition, predation and disease may further the ends of the greater systems at the expense of the smaller ones. But by and large, when the Many are following their own innate individual

patterns or principles of self-realization, the self-realization of the One is assured. If this is accepted, then to allow the Many to unfold in their own distinctive ways is presumably the surest approach to the protection of life on earth.⁶

How different is the outcome when agents under the direction of abstractive thought take control of events however. In accordance with their abstract ideas, such agents may make arbitrary interventions: they may kill off a particular species for the sake of its coloured feathers, for instance, or pollute a lake with manufacturing dye for the sake of people who have decided they want purple hair. With our powers of abstractive thought we can conjure up inexhaustible numbers of ways the world could be, ways ranging from the demonic to the absurd and whimsical through to the humanitarian or utopian; and with the same abstractive powers we can, increasingly, devise means for making the actual world conform to our fantasies, at least in the short term.

Historically speaking, abstractive thought has developed hand in hand with civilizations dedicated to the remaking of the world in accordance with variable human interests, values, dreams and conceits. By 'civilization' here I mean that form of social organization that was initially characterized by a settled way of life involving both the building of cities and the practice of agriculture and animal husbandry. The salient feature of civilization as a form of life is, in this context, its refusal to live within the terms of the given, as earlier hunter-gatherer societies had by and large done. Instead, civilized societies sought to change those terms – they strove to re-shape the world to suit their own purposes. They imagined categories of possibility beyond the already manifest – new kinds and classes of things in addition to those already in existence: houses to provide shelter, for instance, and wheels for transport, and animals subdued into pulling the wheeled vehicles, and succulent leafy vegetables growing in neat rows right at the back door of the houses. In order to conceive of these new kinds and classes of things, it was necessary to abstract quite radically from the world as it was, to look beneath the appearances at the underlying structures, and then to imagine ways those structures could be reassembled. This kind of thinking involves a different level of abstraction from that of the hunter imagining a kangaroo roasting on the fire at the day's end. Hunters and gatherers seek to satisfy their material and spiritual needs and desires within the categories of the given. They carefully study all the subtle particularities of life's tides, and learn to swim intelligently with those tides in order to achieve their ends. Civilized societies, in contrast, seek to transcend those particularities – the various vicissitudes of fortune, the reversals of the seasons, the manifold burdens of the flesh – by remaking the world to their own design. Rather than swimming with the tides, they try to uncover the laws of hydrodynamics and gravitation, in the hope of re-orchestrating and maybe even abolishing tides.

At the level of self, latterday civilizations have involved the re-deployment of our instinctual self-realizing energies in the service of socially prescribed ideals of individual selfhood. Our intelligence has been harnessed to abstract self-images and self-stories rather than to the deeper imperatives emanating from our conatus. Instead of letting ourselves be, we compulsively make ourselves over to match external ideals, where this can result in all kinds of aberrations, from neurotic individualism to fanatical collectivism or patriotism.

At the level of both world and self then, civilization tends to induce a preference for the abstractly imagined over the given, and seeks to substitute the possible for the actual. This tendency of civilization has become progressively more pronounced in the modern period, with its repudiation of tradition and its exponentially increasing power to manipulate matter, until it has resulted, today, in the dizzying regime of international capitalism, involving almost incessant, runaway erasure of the actual in favour of the possible, a regime euphemistically going under the name of 'development'.

When human beings are freed from excessively abstract thought however, and restored to their conative nature, then the world is relatively safe from such 'development'. For the conative natures of all beings are, from an environmental point of view, relatively trustworthy, simply because, as I have already noted, all have evolved in concert with one another, with the consequence that their natures are mutually cross-referencing. Self-realization is achieved, at the conative level, within the parameters of the already existent rather than the merely possible, and thus, at a conative level, all beings have a broad interest in maintaining the world as it is.

To recapitulate then, when 'nature' is defined, as it has been here, in contrast with artifice, it is arguable that generally, on the terrestrial scale, though not perhaps in every conceivable circumstance, nature knows best. By this I mean that when things are left to themselves, the biosphere is likely to fare better than it is when things are subject to our arbitrary interventions. There will of course be casualties at the level of individuals and smaller-scale systems when things are left to unfold in their own way, and as beings with a constitutive interest in our own self-preservation and the preservation of our nearest and dearest, we are on occasion called upon to intervene in these unfoldings, just as hunter-gatherers do in the course of their daily lives. Such interventions will not count as arbitrary however, and will be compatible with a general attitude of letting things be, an attitude which renders the overall project of life on earth relatively assured.

2. RETURNING TO NATURE

The trap for environmentalists, in thinking about nature, is to reify it, to conceive of it in terms of things rather than processes. When we think of it in this way, we understand it as consisting of all those things which are not the product of abstract human design: forests, swamps, mountains, oceans, etc. We then contrast nature with the human-made environment, consisting of cities, artefacts, technologies, etc. We make the same mistake in thinking about nature at the level of the self: the *natural* self is equated with the body, the instincts, intuitions, emotions etc, and this is contrasted with the civilized self, consisting of the controlled rational ego. The environmentalist's defence of nature is accordingly read as a project not only to save existing swamps, forests, etc, but to restore lost ones. Introspectively it is taken to imply a counter-cultural ethos of spontaneity, intuitiveness and instinctuality. From the present point of view, this is a mistaken reading. To 'return to nature' is not to restore a set of lost things or attributes, but rather to allow a certain process to begin anew. This is the process that takes over when we step back, when we cease intervening and making things over in accordance with our own abstract designs. Such a process can recommence anywhere, any time. It is not logically tied to those aspects of the world that we mistakenly reify as nature – the forests, swamps, instincts, bodily functions, etc – but can start to unfold again in the midst of the most intensively urbanized and industrialized environments on earth and in the most controlled and civilized of persons.

In a world already urbanized, 'returning to nature' means not tearing down the cities and factories, and planting woods and gardens in their stead. Such action would merely perpetuate the cycle of making the world over in accordance with abstract designs – albeit in this case ecological designs – and would reinforce the mind-set involved in living against nature. Rather, 'returning to nature' in an urbanized world means allowing this world to go its own way. It means letting the apartment blocks and warehouses and roads grow old. Yes, we shall have to maintain them, since we shall need to continue to use and inhabit them. Inhabitation will also call for adaptation and aesthetic enhancement. But this is compatible with a fundamental attitude of letting be, of acquiescence in the given, and of working within its terms of reference, rather than insisting upon further cycles of demolition

and 'redevelopment'. Gradually such a world, left to grow old, rather than erased for the sake of something entirely new, will be absorbed into the larger process of life on earth. Concrete and bricks will become weathered and worn. Moss and ivy may take over the walls. Birds and insects may colonize overhangs and cavities within buildings. Green fingers will open up cracks in pavements. Bright surfaces will fade, acquiring natural patinas. Under the influence of gravity, the hard edges of modern architecture will soften, and imitate the moulded contours of landforms. Given time, everything is touched by the processes of life, and eventually taken over by them, to be fed into the cycle of decay and rebirth. Left to itself, the living world reclaims its own. Things which initially seemed discordant and out of place gradually fall into step with the rest of Creation. Old cars take their place beside old dogs and old trees; antiquity naturalizes even the most jarring of trash.⁷

When the world is allowed to grow old, when things are retained, or left to unfold in their own way, then it is possible truly to *inhabit* places, to come to belong to them, in ways that are undreamed of in change-based societies. As years pass, and places retain their identities, they can, if we let them, come to be inscribed with our histories and the histories of our families and communities. They acquire meaning for us as our life experiences are woven into them. Here, on this road going down to the creek, where I walk my dog every week, is the house my great grandfather built. I have a faded photograph of it on lock-up day, sometime late in the 19th century. Around the corner is the store my grandfather ran, and over there is the park in which my parents walked, each evening, holding hands, for sixteen years. Here, alongside it, is the cemetery where I roamed in my gothic youth, looking for the grave of that same great grandfather, keeping trysts in the peppercorn groves, composing poems about roses. And it was along the tree-lined avenue at the edge of this cemetery that I pushed my baby son to creche. Layers and layers of significance accrete as our lives unfold amidst familiar spaces, significance that can for us never be reproduced in any other setting. The setting itself infiltrates our identity. This irreplaceable significance of our own place or places for us binds us to them. We become their natives.

This belonging is reinforced in another way when we let our world – whether urban or rural – grow old. For when the lay-out and structures and constellation of physical features that define a particular place are allowed to endure for a long time, then not only can it become interwoven with our individual and collective identity in a way that binds us to it, but, from a panpsychist point of view, *it* can come to know *us*. In time, and only in time, a place can, if we commit to it, come to accept us, open its arms to us, receive us – it agrees to be our place, attentive to us, attuned to us. We become its people. The land, or place, claims its own. It can never receive the casual or expedient sojourner or stranger in such familiar fashion. In this way too then, through time, and the reinhabitation of places that are allowed to be, we become native to our world.⁸

The self-realization of the biosphere – which is to say, the unfolding of nature on earth – involves a pattern of gradual but continuous change – a pattern of aging and decomposition followed by spontaneous reconstitution into new forms. This is what happens to things when we let them be. Artifice, as here understood, correspondingly consists in any regime of abrupt, wholesale change, change that involves the erasure of one environment, or order of things, and its replacement with an entirely new one. Such regimes generally come about only at the instigation of agents in the grip of abstract ideas or images which they are intent on actualizing irrespective of context – irrespective of what existed before and what surrounds the new 'development'. In this sense an old factory site, overlaid with grime and saturated with heavy metals, but in its cracks and neglected crannies also burgeoning with hardy and creative biological and social forms of life, is

more natural than a town planner's lush park stocked with store-bought indigenous plants and subject to wholesale redesign or 'redevelopment' at any time.

I should note here that by making the point that 'nature' in its deeper sense connotes not trees and grass and wildlife, but the processes which occur to any and all things when they are no longer subject to the interventions of agents under the influence of abstractive thought, I am by no means wanting to say that the conservation of trees and grass and wildlife – which is to say, environmentalism in its traditional form – becomes superfluous. Existing ecosystems should, like cities and selves, be allowed to unfold in their own way, free from undue human disturbance. Where such ecosystems have already been modified by the introduction of exotic species however, the application of the principle of letting-be is more complex. One might on the one hand infer that the new and old species should in principle be left to sort the conflict out themselves. To respect nature in this situation may not imply that we should eradicate the exotics and restore the indigenous. It might mean that we should forego interventionist "management" and allow natural processes to reassert themselves, however distressing it might be to watch native plants and animals disappearing under the onslaught of aggressive invaders. Such stepping back is, according to one reading of the principle, the course that would allow for a true "return to nature": some of the original species would presumably decline, and new ones would steal their niches, but as soon as competition had stabilized, speciation would begin again in situ, because we would no longer be intervening to reverse this trend.

However, in situations in which custody has properly been assumed by one party for another, it might seem that a balance needs to be struck between the attitude of letting-be, on the one hand, and due responsibility, on the other. The attitude of letting-be must not be allowed to degenerate, when applied to living systems which have already been annexed into our care, and deprived of their own conativity, into mere neglect, an ethos of letting-die. In the next section I shall suggest modalities of proactivity that would to a degree enable us to protect and preserve not only ourselves but other species and lands in a manner consistent with the principle of letting-be.

A certain stepping back, then, is what is involved in 'returning to nature' in the outer world. At the level of self, making the transition from civilization to a more natural state is no more a matter of trying to reinstate an instinctual, free-and-easy, impulsive regime than returning the world to nature is a matter of restoring lost forests and swamps. To try to transform the tensed, guarded, rationally-minded self of civilized society in this way would only be to perpetuate the process of control – the process of making the self over to match a socially approved ideal. At deeper psychic, and perhaps somatic, levels, such an attempt, with the self-rejection it implies, would presumably only exacerbate the tension to which the self in question is subject. The way for a self-censoring self to 'return to nature' is simply for it to stop altogether the business of attempting to make itself over in accordance with abstract ideals, and surrender instead to what it already is. When we give up being dissatisfied with ourselves, and reconcile ourselves to our 'unnaturalness', our tedious up-tightness, for instance, then, ironically, we start to relax anyway; as we stop forcing ourselves to follow the latest social prescriptions, our own instinctual conatus has a chance to make itself felt again. Gradually we become re-animated with our native will to self-realization.

I am not suggesting here, by the way, that continuing to be repressed and civilized does not itself require effort. Clearly it involves enormous effort. But since this is a form of effort to which we may already be habituated, it is not likely to be as great as the effort that would be required to convert our entire system of response to a more spontaneous, impulsive mode. Nor am I suggesting that the self animated by its own conatus is a passive, nothing-is-worth-the-effort kind of self. Conatus in humans, as in other animals,

involves quantities of striving. People will go to great lengths to find food to satisfy their hunger, for instance. They will expend themselves utterly in sexual activity. But these are exertions that the organism *wants* to perform – the effort is made with rather than against the grain of its innate desire. In this sense it is no effort for the organism to make such an effort, whereas the effort required for an organism to act against its innate tendency, in favour of socially prescribed ideals, for instance, is immense.

At the level of both self and world then, it is never too late to return to nature. No matter how artificial our self or world has become, they can always, at any given moment, become subject again to natural processes, simply by our decision to call a halt to 'development' and 'progress' and 'self improvement', and to allow things to remain as they are, to be retained rather than replaced. In saying this I am not of course intending to ban change altogether, but to insist that change should not disrupt the general unfolding of things. It should not raze the old and superimpose on the space that is left something unrelated to what preceded it. Change should carry us gently and smoothly into the future, respecting the cycles of creation, decay and regeneration. It should grow from within the shell of the given.

It might be objected at this point that the attitude of letting things be that I am recommending here is too passive to be of use to the environment movement, that in the end it amounts to little more than a laissez-faire acquiescence in the political status quo. To dispel this fear, let me explain in a little more detail how such an attitude would, if adopted by a significant proportion of the populace, in its quiet way thoroughly disable the present world-destroying order of capitalism, by systematically negating the following values on which that order rests.

Consumerism. When we embrace those things that are already at hand, we do not seek to replace them with new ones. Such embracing of the given is thus an antidote to the culture of disposability and conspicuous consumption fostered by capitalism. From the viewpoint of letting things be, we would be most pleased, not with our brightest and newest things, but with those that were our oldest and most well-worn, things which had long figured in our lives, and mingled their identity and destiny with ours. 'Keeping up with the Joneses', if it applied at all in the letting-be scenario, would entail having fewer and older things than the Joneses. (Of course it would not apply, since in the new scenario we would not be measuring ourselves against the kind of social expectations personified by the Joneses.) Acquisitiveness, and hence consumerism, melt away in the face of an attitude of letting be.

Commodification. When we value things and places for the meaning that our own lives have invested in them, via our relationship with them, this removes them from the market place. They cannot be replaced by other things and places, even things and places of the same type, since the substitutes will not share our history nor hence be imbued with the same meaning for us. From this point of view, I could no more buy or sell things or places which had become part of the landscape of my life, part of my very identity, than I could buy or sell members of my family. Thus the pool of commodities is continually diminished.

Productivity. When we embrace the world as it is, and are no longer forever seeking to make it better, according to abstract (generally egocentric or anthropocentric) conceptions of the good, then greed is effectively abolished. We no longer crave bigger and better houses, cars, roads, cities, whatever. We are instead attached to what is already given. There is thus no call for ever-increasing productivity.

Progress. When people no longer believe that the world can always be improved, the slate wiped clean and a better world, a better society, inscribed on it, then the ideological

rationalization for capitalism viz that it can continue to improve peoples' 'standard of living' indefinitely, collapses.

Efficiency. In late capitalism, efficiency – patently a notion pertaining to means – has acquired an almost fetishistic status. Tools (where this includes all kinds of techniques and procedures as well as implements and technologies) are valued not so much for what they do as for their efficiency, and they are retained only so long as their efficiency is perceived as maximal. When the attitude of letting be is assumed however, tools are valued not merely for their efficiency, but for their meaning. I may continue to use an old plough, or a leaky fountain pen, or a certain laborious method for making dough, simply because this is the plough, or pen, or method, that my mother or grandfather used. Efficiency may still be a consideration, but it will be only one factor determining the means I choose to achieve my ends.

Industry/business. These are the two definitive modalities of capitalism – industriousness and busy-ness – both connoting a certain kind of externally driven, externally focussed, hectic state of doing or acting. Those who are busy and industrious act on the world, they take initiatives and make things happen. When we assume the attitude of letting be however, we let the world do the doing, and we fit in with it. We favour 'inaction', in something like the Taoist sense of this term, which signifies not passivity, but action which is effortless because emanating from our own conatus and meshed with the conatus of other beings rather than driven by external social expectations or ideologies.

Development. When we understand 'development' in terms of the transformation and regeneration that eventually transpires when things are left to grow old, to unfold in their own way, then we will not tolerate the erasure of the given which is the precondition and prelude to 'development' in the capitalist sense ie the replacement of the given by the decontextualized abstractly imagined new.

Profit. If we do elect to let things be, it is on the assumption, as I explained earlier, that nature knows best – that nature, left to itself, conserves itself, does not exhaust itself, but rather replenishes itself, in accordance with the law of birth, decay and rebirth. To sustain itself in this way, nature returns *everything* to the life cycle, it recycles everything. There is no 'surplus' in this system, and hence no accumulation. The law of return makes nonsense of the notion of 'profit'. 'Profit' in one part of the system merely signals loss and depletion in another part.⁹

Automation. For the capitalist, labour is merely a means to production; if automation provides a cheaper, more efficient means, it will be preferred. From the viewpoint of letting things be, human labour is, or can be, a vehicle for meaning. Things become significant to us partly as a result of our building, making, repairing or decorating them ourselves. How much more of a presence in our lives is a church – like the Russian Orthodox Church in my neighbourhood – which is built by the hands of the parishioners themselves, over a period of many years, than one which is contracted out to professional builders and erected 'efficiently' in eight weeks. To 'mix our labour' with things is, as Locke said, though with entirely different intent, to make them ours, in a sense analogous to that in which our family is ours. To make things ourselves, or to have them made by the hands of others, then, is in certain respects preferable, from the present point of view, to mechanization of the processes of production.

Property. When people honour the world as it is – honour its immanent telos, its capacity to unfold in its own way – they no longer seek to *own* the world, but rather to *belong* to it. They belong to their world by being faithful to the things it contains, keeping and tending

them and letting the world manifest through them as they endure. The world expresses itself, reveals itself, through the changes it induces in these things, through the lichen on the walls, the cracks in the glaze, the slow, stooping, inevitable return to earth. By continually replacing things we never witness the way the world reclaims its own, so we miss out on knowing it, encountering it. Strangers to the world, we do not belong, we are anything but natives. We comport ourselves as invaders, conquerors, buying up the matter which means nothing to us, and trashing it when we are tired of it. We treat ourselves, our own bodies, in the same way, truculently professing to own them and reluctant to allow them to be reclaimed by the world, reluctant to see the world tenderly revealing itself to us through them, through the fading and crazywork and mute surrender of flesh to gravity. But of course, at the final call, the world claims us anyway, and we go, back into the earth, but no wiser, and a lot lonelier, strangers to the end.

To assume a panpsychist worldview, and to express this worldview via an attitude of letting be, is thus inevitably to extricate oneself, to a significant degree, from the ideological grid of capitalism. It is to begin to shift towards an entirely different form of praxis and of management of the material dimension of life – in other words, to an entirely different ‘economics’, or way of ensuring the satisfaction of our material wants and needs. Since economics involves a certain engagement, on our part, with the world of matter, an economics with panpsychist presuppositions will obviously differ from an economics based on a mechanistic worldview. For when the material world is viewed as a subject, or as a manifold of subjects, then economics constitutes an opportunity for encounter: the ways in which we utilize matter must not conflict with, but enhance, our intersubjective engagement with it. The basis of an economics structured in accordance with the principle of letting-be will be briefly sketched in the next section.

From a panpsychist perspective, respect for nature, as we have seen, is not a matter of protecting only ecosystems, but *all* material things, from undue human disturbance, including things that do not usually arouse the concern of environmentalists, even non-anthropocentric environmentalists, such as deep ecologists. This view of nature, and what it is to live with rather than against it, implies an ethos that is far more encompassing than that of the traditional environment movement. It is an ethos as encompassing in fact as the ethos of modernity that it seeks to reverse. For the hallmark of modernity is radical change – in the form of development, control, management, design, intervention, progress, improvement, even salvation. (This is reflected in the very etymology of the word, ‘modern’, which is derived from ‘mode’, meaning ‘of the present’, as in ‘à la mode’, keeping up with the latest. Modernity is that period which can be characterized in terms of its commitment to the ever-emerging new, its dissatisfaction with the given, its radical discontinuity with the past and its dissociation from tradition.) The ethos of letting be challenges modernity head on, trusting as it does the innate wisdom of things, and eschewing as it does the definitive ambition of modernity, to remake the world in accordance with abstract ideas. From the present point of view, not only is environmentalism, even in its deep-ecological forms, missing the larger metaphysical picture in its approach to modernity; it is also itself deeply entangled or imbued with the modernist ethos in its understanding of its own mission; it needs to extricate its legitimate concern for nature from heroic modernist assumptions about its own world-changing, world-saving role.

I am suggesting that instead of perpetuating this profoundly modernist ethos of changing or saving the world, the environment movement could assume an attitude of letting things be. We could step right outside the presuppositions of modernity, and dare *not* to try to make things better, at any rate if ‘making things better’ is a rationalization for continually

replacing one regime with another. When we say, 'let's fix the world up – let's pull down these slummy old tenement blocks and build a brand new eco-permacultural-urban-village in their stead' – we are just as much in the grip of the old ethos of domination and control as the city fathers were. We are rejecting the given in favour of an abstract or imagined alternative of our own – we are refusing to 'let things be' – and it is this hubristic mentality which is the motor of modern civilization and the source of the environmental crisis. In remaining in the grip of the old ethos, in nursing the desire to make things better, we are simply continuing to water the deeper modernist roots of the present predatory economic system.

An ethos which tries to avoid the pitfalls of this mentality will, of course, be an ethos of conservatism rather than radicalism. This conservatism has always been implicit in the environment movement, as plainly betokened by the fact that the term 'conservation' is often regarded as synonymous with 'environmentalism'. However, such conservatism does not imply that the attitude of letting be is aligned with the political right. The political right has historically, of course, been conservative, that is, committed to the given, while the left has been opposed to the given, and committed to the abstract possible or ideal. The historical right however, though conservative, differed from the present position inasmuch as it was socially rather than ontologically motivated – it was at heart a defence of social, political and economic privilege, rather than a defence of the world for its own sake. In other words, the right insisted on the preservation of traditions and institutions because it was through these traditions and institutions that the upper classes retained their privileges. A degree of ontological conservatism – the conservation of architecture and landscapes, for instance – was implicit in this position, but this ontological conservatism was in reality a mere spin-off from a self-interested politics of oppression. The historical left rejected this politics of oppression, and demanded the overthrow – and ongoing readjustment – of the existing social order, in order to end the systematic privileging of the powerful few at the expense of the many. This revolutionary or radical politics however sustained an unremitting antagonism not only to traditions and institutions, but to the world that these traditions and institutions had built, and this legacy has served, in the long run, to legitimate a rapacious contempt for the given in all its social and ontological forms, where this contempt is the hallmark of late capitalist modernity.[10](#)

The attitude of letting things be, in contrast, is conservative out of genuine respect for the world, for the capacity of things to unfold in their own way. Its conservatism is ontologically rather than socially motivated, and it extends primarily to material things rather than to cultures, traditions and social institutions. This attitude certainly does not spring from a desire to preserve the privileges of the few, as that of the historical right has done. Indeed, it tends, almost incidentally, towards a de facto form of non-hierarchism, inasmuch as it is antithetical to the accumulation of wealth, as I have explained above. It achieves this 'equalizing' effect, however, without recourse to the radicalism, to the ethos of intervention and overthrow, of the historical left. So, without itself resorting to the ideality of morality, the ethos of letting be reconciles something of the custodial role of the right with something of the moral intent of the left. In this respect it is in fact the reverse image of the market-driven politics which is achieving hegemony in the industrialized world today, and which is also neither of the left nor the right. This latter politics – the new 'economism' – combines the old rightwing investment in the perpetuation of minority privilege, and moral indifference to the suffering of the majority, with the old radicalism of the left, its dissatisfaction with the given, and its dedication to building ever new, ever more extravagant, worlds. In other words, 'economism' has managed to combine the downsides of both the right and the left. In this unholy new regime, nothing is sacred, everything – every being, every object, every place, every institution, every element of culture and

society, every relationship – is subject to obliteration or co-optation by a commerce that sustains fewer and fewer. The attitude of letting things be effectively inverts this nightmare and, by stepping outside the game of left and right altogether, inadvertently combines the essence of the upside of each of the old right and left.

3. AGENCY IN A SYNERGISTIC MODE

To many people concerned about the fate of the global environment, the principle of letting-be, as here outlined, may still appear unduly quietistic. How are we to wrest a living from the world without subordinating its ends to ours? How are we to address environmental degradation and the loss of ecosystem integrity caused by human intervention if we simply step back and let things take their course? How are we to defend our world and all its human and other-than-human inhabitants against those with the political will and muscle to oppress them if we merely acquiesce in the given, and decline to take up a posture of resistance? Yes, the attitude of letting-be may represent the deepest challenge that can be issued to the mindset of modernity, but if it does not also prescribe positive modes of agency it must ultimately be self-defeating.

However, the principle of letting-be is not, as it turns out, entirely inconsistent with certain modes of proactivity, including modes of resistance. The modes of proactivity in question are those that work with, rather than against, the grain of the given. By this I mean that there are forms of action that achieve their ends by engaging with pathways of energetic flow and communicative influence already at play in the world. An agent in this mode is a kind of metaphysical hitchhiker, catching a ride in a vehicle that is already bound for her destination. Or, more usually, via the hitchhiker's communicative engagement with the driver of the vehicle, both the hitchhiker's own plans and those of the driver are changed. The vehicle heads for a destination that neither hitchhiker nor driver had previously entertained, but which now seems more in accordance with their true will than either of their previous destinations.

The hitchhiker lets things be in the sense that she does not seek to turn back processes and conative unfoldings already in train. Her mode of proactivity, in seeking her own conative fulfilment, is through engagement with these existing unfoldings. It necessarily follows that the matrix of these unfoldings sets limiting conditions on her agency: she does not entertain ends or means defined outside the reference frame of the already given. This is a mode of agency that I have elsewhere termed *synergy* (Mathews, 2003). In synergistic mode, the agent can pursue ends of her own, and can even seek to transform the status quo, but not by abstracting from the given, and trying to replace it, holus bolus, with an arbitrary design of her own. She does not seek to erase the given, or contradict it, but by joining her own conativity to its she elicits from it a new response, a spontaneous unfolding in a new direction.

Let's consider, in briefest outline, how a synergistic mode of agency would operate in the economic, environmental and political contexts foreshadowed in the questions posed at the beginning of this section. These examples of synergistic agency are intended merely to illustrate the manifold possibilities for activity consistent with the principle of letting-be. They are not put forward as themselves a design for an alternative society!

Economics in synergistic mode. Extractive economics, based on the inactivation, the rendering inert, of "natural resources", can readily be reformed along synergistic lines; mutualistic partnership with animate natural processes then replaces the inactivation of those processes, their subordination to our ends. Such synergistic possibilities have already been extensively explored in the literature of alternative economics under the

rubric of sustainability. Prime examples of synergy in this context are the alternative energy industries, employing techniques for harnessing energy from renewable sources; wind and sun, for instance, are not diminished or denatured by being temporarily diverted to serve our purposes. Windflows and lightflows are tapped without basic meteorological and solar patterns being fractured. (Water, though a renewable source of energy, is more problematic in this context: diversions and dammings of water often do result in the death of rivers.)

The ecological disposal of “waste” is another example of synergistic praxis. Much of our productive activity could be conceptualised ecologically as accessing elements and energies (“resources”) not otherwise available to ecosystems, then, incidentally to our productive intentions, converting them into forms available for re-use by other species. Like nitrogen-fixing plants, whose metabolism benefits the entire ecological system, the side effects of our productive activities could vastly enhance rather than diminish the biosphere.¹¹

Similarly, primary industries such as agriculture and pastoralism could be organized with a view to their potential for enhancing rather than degrading the environment. Pastoralism has brought water, in the shape of wells, to the arid rangelands of Australia, for instance, and has hence enhanced conditions for wildlife there, though the introduction of exotic grazers and browsers has at the same time in other ways diminished ecosystem integrity. But there is no reason why a pastoral agenda could not bring net benefits to these lands, if pastoralism were conducted on synergistic lines. Provision of water together with the judicious harvesting of certain wild species rather than the husbanding of domestic ones, for instance, could possibly lead both to positive ecological outcomes and to an increase in profitability for pastoralists.¹² Similar possibilities are well recognized, though little practised, in agriculture: hedgerows and wildlife corridors restore lost habitat while providing refuge for insectivorous birds and mammals that control crop pests. Even more directly, authorities are now suggesting that farmers be encouraged to produce environmental goods, such as pollen, in addition to traditional crops, as the economic value of environmental goods is finally being recognized and factored into production.¹³

Environmentalism in synergistic mode. Where ecosystems are disrupted or degraded as a result of human intervention, the principle of letting-be may, on the face of it, seem to require that we step back and allow things to take their own course, even if this entails species loss or ecological damage. In this case however, as noted earlier, the principle of letting-be could degenerate into a rationale for neglect. Is there a third, synergistic way between outright interventionism and mere letting die? Such a way does exist, I believe, and it can be characterized as the way of environmental *healing*. Healing, in a synergistic sense, would involve not mechanistic intervention – the substitution of new parts or suites of species for old – but the reactivation of a system’s own conative energies. Healing draws upon forces or powers already present within the existing state of things to restore the system in question to dynamic equilibrium. Healing represents a synergistic approach to human as well as to ecological illness and malaise. In the human case, it consists not in the prolongation of life by way of mechanical life support systems in patients whose own conativity is terminally impaired, but rather in the strengthening of conativity – the boosting of the immune system, for instance – in cases where such strengthening is still achievable. In the case of ecosystems, healing might consist in the replenishment of exhausted soils or the removal of exotic organisms to enable the ecosystemic impulse towards biodiversification to be maintained. The wholesale “restoration” of an original suite of species however would constitute interventionism rather than healing.

It might be asked, however, whether exotic organisms, or feral species generally, can be removed from susceptible environments, or whether their impact on these environments can be diminished, without recourse to strategies that violate the spirit of letting-be. Can such removals or reductions be effected synergistically rather than in the typical dominate-and-control modality of environmental management? Synergistic strategies in this connection will presumably have to mesh the fate of exotics and ferals with the conativities of the ecosystem in which they are located. They will, in other words, have to utilize the resources comprised by exotics and ferals to service the ecosystem. When situations involving exotics and ferals are viewed in this light, it often turns out that removal is not required. As Tim Low reports, “Foreign plants – weeds and crops – now feed and shelter millions of native animals, and even a few native plants. Exotic animals – especially rats, mice and rabbits – feed millions of natives too. A typical bird of prey, parrot or orchard swallowtail now eats foreign food. Many species now rely largely on alien tucker. If Australia’s foreign contingent vanished overnight, many ecosystems would be kicked into chaos.” (Low, 2002, p. 93) “Environmental management” is not necessarily, from this point of view, a matter of trying to reinstate pristinely indigenous biotic regimes but rather of evaluating environments on a case by case basis, identifying the flows – food chains and disease vectors and catalysing factors, for instance – and opening them up or closing them off to one another in ways best calculated to promote the further unfolding of ecosystems. Where a given feral invasion is demonstrably destructive to a particular local environment, and proves intractable in the face of local synergistic measures, the systemic frame of reference can be expanded to include human populations. It is these populations, after all, that are placing the greatest pressure on global ecological systems, and if vital needs of human populations can be satisfied by harvesting exotics or ferals –for food, for instance, or fertilizer – then to that extent exotics or ferals are reintegrated back into the larger system. They supply a demand that would have been made anyway, so that redeploying them to this end prevents further pressure being placed on the larger ecosystem. In other words, the problem of feral invasions can often be solved by us in the simplest of ways: *by eating the ferals*.

However, to propose this synergistic solution to the problem of feral invasions returns us to the discussion of economics. Environmentalism in a synergistic mode cannot always be grafted onto an economic system that is still organized along dominate-and-control lines. To implement the above synergistic solution to the problem of exotics and ferals in any systematic way would call for major adjustments to our economic arrangements. Our system of production and consumption is rooted in the same kind of agrarian civilization of which the abstractive mentality, which seeks to adapt the world to our needs rather than adapting our needs to the world, is an expression. The abstractive mentality, as outlined earlier, abstracts altogether from the actual in setting its goals: it erases the actual in favour of the abstract possible. It entertains abstract ends as *idees fixes*, which it pursues regardless of cost or context. Both production and consumption in modern societies follow this pattern. Agricultural centres or manufacturing plants are established on permanent sites to produce specific products that have generally originated abstractly in market researchers’ imaginations and then become fixed in consumers’ expectations. Primary industry insists on producing lamb, for instance, in spite of the fact that the countryside is teeming with feral goats, rabbits and camels; this *idée fixe* is then imparted to the consumer, who expects lamb for Sunday lunch and will not countenance the idea of roast feral.

Modern producers and consumers are in this sense still agrarian at heart: they decide what will be produced and what will be consumed well in advance of discovering what is actually on offer, what is already available in their local environment. They

are *makers* rather than *finders*, preferring their own version of reality to reality as it is given. All the infrastructure of production reflects this outlook. Both production and consumption could however be geared along the lines of finding rather than making. Production infrastructure could be designed for assembly and disassembly and hence for mobility as well as for flexibility of output, and consumers could develop a taste for the given, in all its unpredictability, rather than for the ideally prescribed.

Of course, an economics of the given such as this would have to conform to the general or overarching principle of synergy if it were not to become merely another excuse for environmental rip-off. After all, the availability of native forests has not been overlooked by modern societies, and native forests have consequently been consumed to the point of obliteration. The same fate could await not only ferals but native wildlife if the ethos of utilizing the given were followed without caution and due regard for the larger principles of synergy and letting-be.

Politics in a synergistic mode. It was noted in the previous section that if everyone assumed an attitude of letting-be, then the consumerist motor of capitalism would stall and the progressivist thrust of modernity subside. Indeed, ideologies of oppression – oppression on grounds of sex, race, class, age, sexual preference or species membership – would crumble in the face of a generalized respect for the conativity of things. But in reality it is not the case that everyone has assumed, or ever will assume, an attitude of letting-be. On the contrary, modern societies are profoundly committed to taking charge of things, to manipulating the world so that it serves sectorial human interests rather than ends of its own. Wouldn't following the principle of letting-be, in the context of this political reality, amount merely to leaving everything as it is, abandoning the world to those whose goal is to appropriate and exploit it? In other words, the principle of letting-be seems to afford no possibility for *resisting* the political status quo, where that status quo is a function of a systematic inversion of letting-be itself. In a political context then, the principle seems self-defeating: in deference to it we are required to step back and allow regimes of cooptation, which obstruct and divert the general unfolding of things, to prevail.

It is important to note here that the principle of letting-be does not apply to ideas, ideologies or discourses in their own right. Our reason for letting things be is that they are imbued with a conativity of their own; left to themselves they take care of themselves and in taking care of themselves they promote the self-realization of the systems that constitute them. Clearly this is so only in the case of embodied things, things that are elements of the concrete, corporeal world. It makes no sense to ask of abstract things – ideas, ideologies, discourses – that they take care of themselves. But when ideas, ideologies, discourses are operative in society – as institutions, customary practices, cultural attitudes – then they are implicated in real, embodied entities. In other words, as we find them in society, ideas, ideologies and discourses are not merely attenuated abstract entities, but ride on the back of actual individual and collective conativities. In addressing discursive aspects of society then, we are engaging with these conativities, and in this sense we are indeed negotiating the concrete, corporeal given. The principle of letting-be accordingly comes into play.

So what is the advocate of letting-be to do in the face of institutions and practices that contradict her principle? Once again she must try to hitch a ride with the very forces that offend her, giving them their due as (possibly distorted) instances of conativity, but trying, by engagement, to induce them to flow towards a place of true conative increase rather than diminishment. So, for instance, confronted with sexist discourse, the advocate of letting-be will not confront but nor will she merely acquiesce. She will try to use sexism to transcend sexism. To the extent that sexism is legitimated by an ethos of masculine superiority, she might represent masculinity as an ideal of worthiness rather than of

violence, so that men will measure up as most masculine, most manly, not when they are abusing women but when they are most respectful of them. Similarly with racism. Our advocate of letting-be might try to transform the ideal of white superiority into an ideal of justice, equality and reason, the liberal virtues of the Western enlightenment, so that people will never qualify as more white than when they are respecting the rights of others. Militaristic impulses can be harnessed to the goals of peace by converting military forces into peace-keeping forces, thereby putting courage, valour and strategic acumen to good use. When conflicts between parties of different ideological or religious persuasion break out, one party can seek peaceful resolution by appealing to the ideological or religious terms of reference of the other. (So, for instance, in current conflicts between the modern West and certain strains of Islam, the West could find resources within the sacred literature of Islam itself to query the grounds of Islamic antagonism and enjoin Islamic good will.) Anthropocentric attitudes can be recruited to the cause of the environment via a demonstration that what sets humanity above and apart from the rest of life is our human capacity for awareness of metaphysical unity. In the very act of affirming our human superiority then, we are at the same time acknowledging our unity, our kinship, with all of Creation, and our consequent responsibility for it.

Faced with the devastating environmental and social impacts of corporate capitalism and contemporary global markets, the advocate of letting-be might search for the essence of capitalism and find it in the liberal tenet of freedom – the right of everyone to pursue their own good in their own way subject only to a minimal requirement that their doing so not extinguish the like right of others. She notices the isomorphism between this principle of freedom and her own principle of letting-be. Instead of opposing this freedom, out of disgust for the havoc it wreaks on the environment and on the fabric of society, she expands its scope: truly to follow through on liberalism, she points out, is to let *everything*, human and other-than-human alike, work out its own good in its own way – in other words, to let everything be. How is she to convince liberals that not only human beings but all things are entitled to work out their own good in their own way? She will have to persuade them to change their metaphysical premise. And how is she to accomplish this? By couching her argument within her opponents' terms of reference. If, as is generally the case, liberals' terms of reference are rationalist, then she must demonstrate rationally that a change of metaphysical premise is needed. She must out-reason, out-argue, the proponents of reason and argument.

The advocate of letting-be thus takes the world as she finds it – ecologically degraded, infested with ferals, rife with prejudicial attitudes, desecrated by commerce. She doesn't change the world. But by intelligently engaging with it as it is, rather than contradicting it, and by seeking synergistically to extend and enlarge the conativities she encounters there, she allows the world to change itself.

Synergy in this sense is, again, comparable to the Taoist notion of inaction, *wu wei*. Inaction, as was noted earlier, is not mere inactivity, but activity that is undertaken with rather than against the grain of conativity, whether this be the conativity of self or world. One who is committed to inaction in this sense seeks to overcome oppression, disturbance and malaise not by confronting them head on, in the name of utopian norms, but by attuning and joining herself to ambient conativites, to the conative dynamics of self increase. Although this synergistic modality can be articulated discursively – as it has been here – it can operate nondiscursively. It is called forth not by discursive deliberation but by encounter with the dynamics of a psychically activated world.

4. DISCOVERING THE TAO IN AUSTRALIA

The position that I have outlined in this paper is then basically a Taoist one. Nature, according to my definition, is more or less equivalent to the Tao: it is the wise way the world unfolds when left to its own devices. The Taoism of Lao Tzu does not announce itself as panpsychist, but clearly a world animated by the Tao is one which is possessed of some intelligent inner principle, a principle that can be trusted to guide us into the deepest channels of life.

It is not my place to comment in detail here on the affinities between the broadly Taoist attitude of letting be and certain fundamental characteristics of Aboriginal thought. Suffice it to say that Aboriginal cultures evince a powerful engagement with the given that ensures their continuity with their own past but also their flexibility in the face of an almost unimaginable scale of externally imposed change. For while not *craving* the possible and the ideal, they exhibit a genius for accommodating the new once it has become actual. One of the flashpoints in the evolution of my own thinking occurred when a non-indigenous friend who had married into an Aboriginal family in the far north-west of Australia told me about an elder there who included *motorboats* in his Dreaming stories. Years later I happened to find myself living for a while in the very community to which the old man – by now deceased – had belonged, and I was enchanted by the way in which the people in this community refused nothing. They accepted – though they never craved – anything and everything that drifted their way, all the trappings and junk of modern civilization. But in the process of accepting this tawdry stuff, they also uncannily Aboriginalized it, so that it assumed an entirely different significance in the context of their community from its intended significance within the framework of a capitalist culture. Somehow, through this affectionate trust in the given, the everyday was rendered numinously spiritual, and the spiritual unpretentiously everyday.

Mary Graham has declared that one of the most taken-for-granted assumptions of Aboriginal thought is that spirit is real; another is that land is all there is (Graham 1992). That is to say, spirit has a status, in Aboriginal thought, as incontestable as that of energy and matter; and, since there is no heaven and hell, and since theories and ideas, however dazzling, are not real, land is ultimately the only thing that exists. If 'land' is expanded to encompass the concrete given – all that is actual in a physical sense – then I think that the attitude of letting be follows from these twin premises: spirit animates the given rather than existing in the realm of the abstract, so we connect with spirit by engaging – and not unnecessarily interfering – with the given. By embracing the given even in its most adulterated forms, we reinhabit our own contemporary, mundane reality in the same kind of profound way that traditional Aboriginal peoples inhabited their reality, the still edenic land.

Aboriginal peoples learned to inhabit the real rather than escaping into the ideal by remaining attuned to the wisdom that this peaceful old land imparts to those who pay attention to it. I believe that my own early glimpses of this way of living came to me not in the first instance through explicit Aboriginal influences – though these influences later helped to bring it to consciousness – but through the opportunities for such attentiveness that were vouchsafed me as a child. Born into this intimately companionable land that has for so long been singing along, humming along, with its human inhabitants, non-Aboriginal Australians might also, if we collectively pause to feel the resonance of the endlessly poetic communiques that surround us, rediscover, in a contemporary context, some of the fundamental aspects of the Aboriginal relation to the world.

- Parts of this article originally appeared in "Letting the World Grow Old: an Ethos of Countermodernity", *Worldviews: Environment, Culture, Religion* vol 3 no 2, 1999, pp 119-137; The White Horse Press, Cumpidge, UK
- My argument for a broadly panpsychist view of matter was begun in my book, *The Ecological Self* (Mathews 1991) and developed further in *For Love of Matter: a Contemporary Panpsychism*, SUNY Press, Albany NY, 2003. The present article is extracted from a chapter of a further book, forthcoming in 2004, in which the implications of panpsychism for environmental praxis are drawn out.
- I have expanded elsewhere on the thesis that living systems, including individual organisms, may be characterized as self-realizing systems imbued with their own conatus. (Mathews 1991, 2003)
- To defend this essentialist claim against the social constructionism of contemporary postmodernism and poststructuralism would take me too far afield here. Suffice it to say that at a minimal level, this claim is self-evidently true: people's hunger, thirst, sociability, disposition to learn and use language, to build cultures, to live collectively, all operate independently of ideology – which is not to say that they may not become disturbed by ideology in dysfunctional circumstances.
- It could be said that it is part of the 'disposition' of things to be susceptible of manipulation by intentional agents, and to respond to such manipulation in determinate ways. While this is no doubt a fair semantical point, it overlooks the significance of the patterning that occurs when things are not subjected to manipulation compared with the failure of such patterning when they are subject to arbitrary human interventions.
- This is not to say that nature necessarily has an answer for everything. The scenario that immediately springs to mind is that of the life-shattering asteroid. It is not obvious that the biosphere has a 'contingency plan' for this circumstance. On the other hand, the likelihood of this catastrophe occurring is very small.
- I have observed a similar attitude to junk and rubbish in Aboriginal communities in Australia. Lots of litter and old machinery and cars and fridges and so on are left lying around in some of the remoter communities, apparently on the assumption that these things, like all others, have their place in the world, so there is no point in pretending that they do not exist by putting them out of sight. They will in time, again like everything else, be received back into the land, back into the cycles of life.
- For a comparable account of the way the land claims its native sons and daughters in the Aboriginal world, see Deborah Bird Rose 1992, 1996.
- Vandana Shiva offers a beautiful account of the incompatibility of the profit motive with ecology in Shiva, 1988.
- Anthony Giddens has explored the peakdown of the left-right distinction in the context of globalization, and has identified the conservative element of ecological politics. He regards ecological politics however as an essentially confused response to the new global situation of de-traditionalization and the humanization of nature, and no extension of it, such as is proposed here on the basis of a new metaphysical premise, holds any kind of key. The way forward in the new global context, according to Giddens, is via a multivalent approach that draws on both conservative and socialist thinking. See Giddens, 1994.
- Biologist Tim Low offers many examples of waste products that are, often inadvertently, recycled to the benefit of other-than-human species. In a study of the ecology of sewerage, for example, he details many ways in which wildlife thrives even on untreated waste. Albatrosses used to travel from as far afield as islands east of South America to fatten up on the abattoir wastes that were once pumped into the ocean through Sydney sewers. As many as 700 birds would congregate to

feed on the “plume of lard” that was discharged raw into the harbour. In the 1970s Sydney upgraded its sewerage treatment plants and the albatross population plummeted. The wandering albatross is now on the endangered list. See Low, 2002.

- While such commercial use of wildlife certainly illustrates the principle of synergy, I think any in-practice proposal to harvest wildlife must be subjected to rigorous scrutiny. Commercial harvesting holds many, many dangers for wildlife as it will rarely be undertaken on a genuinely synergistic basis or respect the social and age profile of a species; for this reason well-meaning ecological proposals can result in destruction and harm for wildlife.
- Neil Byron, a commissioner at the Productivity Commission of Australia, has said that in many parts of Australia, “ farmers are trying to produce bales of wool and bags of wheat, and not making a great deal of money out of it, and it may turn out to be much better for land and much better for the farm family to produce a few less bales of wool and bags of wheat and a bit more environmental services, whether that’s in water quality or yield, or wildlife conservation services, or any of this set of ecosystem services.”

Certainly! Aligning oneself with the world involves developing a holistic understanding of one's surroundings, cultivating empathy and compassion for others, and actively contributing to the well-being of the global community. Here are comprehensive steps to help you align yourself with the world:

1. Cultivate Awareness:

- **Self-Reflection:** Take time to introspect and understand your values, beliefs, and aspirations.
- **Stay Informed:** Keep abreast of current events, global issues, and diverse perspectives through reputable sources of information.

2. Develop Empathy and Understanding:

- **Practice Active Listening:** Listen attentively to others' experiences, perspectives, and concerns without judgment.
- **Seek Diversity:** Engage with people from different backgrounds, cultures, and viewpoints to broaden your understanding and empathy.

3. Foster Connection and Community:

- **Build Relationships:** Cultivate meaningful connections with family, friends, and communities to create a support network and sense of belonging.
- **Volunteer:** Contribute your time and skills to local or global initiatives that address social, environmental, or humanitarian challenges.

4. Promote Equity and Justice:

- **Advocate for Change:** Speak up against injustice, discrimination, and inequality in your community and beyond.
- **Support Marginalized Groups:** Stand in solidarity with marginalized communities and support efforts to amplify their voices and rights.

5. Practice Sustainability:

- **Reduce Consumption:** Minimize your environmental footprint by conserving resources, reducing waste, and adopting sustainable practices in daily life.
- **Promote Conservation:** Support initiatives and policies that protect biodiversity, preserve natural habitats, and mitigate climate change.

6. Embrace Cultural Exchange and Learning:

- **Embrace Diversity:** Celebrate cultural diversity and engage in cross-cultural exchange to foster mutual understanding and respect.
- **Educate Yourself:** Learn about different cultures, traditions, and histories to promote intercultural dialogue and appreciation.

7. Foster Personal Growth and Well-Being:

- **Prioritize Self-Care:** Take care of your physical, mental, and emotional well-being to sustain your capacity for positive impact and resilience.
- **Continuous Learning:** Pursue opportunities for personal and professional growth to expand your knowledge, skills, and perspectives.

8. Practice Gratitude and Mindfulness:

- **Gratitude Practice:** Cultivate gratitude for the blessings in your life and acknowledge the interconnectedness of all beings.
- **Mindful Living:** Practice mindfulness to stay present, reduce stress, and cultivate a deeper connection with yourself and the world around you.

9. Act with Integrity and Compassion:

- **Lead by Example:** Demonstrate integrity, honesty, and compassion in your interactions and decision-making.
- **Act Responsibly:** Take responsibility for your actions and their impact on others, striving to do no harm and contribute positively to the world.

10. Reflect and Adapt:

- **Regular Reflection:** Set aside time for reflection to evaluate your alignment with the world, identify areas for growth, and recalibrate your actions and priorities.
- **Stay Flexible:** Remain open to feedback, new information, and changing circumstances, adapting your approach as needed to better align with your values and the needs of the world.

By following these steps and continuously striving to align yourself with the world, you can contribute to a more compassionate, equitable, and sustainable global community. Aligning oneself with the way the world really works and the complexities of the world involves gaining a deep understanding of various systems, dynamics, and patterns that govern our reality. Here are comprehensive steps to help you align yourself with the complexities of the world:

1. Cultivate Curiosity and Open-mindedness:

- **Seek Knowledge:** Develop a thirst for learning and understanding the world around you through reading, research, and exploration.
- **Challenge Assumptions:** Question your existing beliefs and assumptions, remaining open to new perspectives and insights.

2. Study Systems Thinking:

- **Learn about Systems:** Explore the principles of systems thinking, understanding how different components interact to form complex systems.
- **Analyze Interconnections:** Identify interdependencies and feedback loops within systems to grasp their holistic nature.

3. Embrace Complexity:

- **Acknowledge Uncertainty:** Accept the inherent complexity and uncertainty of the world, recognizing that simple solutions may not always suffice.
- **Appreciate Emergence:** Understand how complex phenomena emerge from the interactions of simpler elements, often leading to unexpected outcomes.

4. Study Multidisciplinary Perspectives:

- **Explore Diverse Disciplines:** Study various fields such as economics, psychology, sociology, ecology, and geopolitics to gain diverse perspectives on complex issues.
- **Integrate Insights:** Seek to integrate insights from different disciplines to develop a more comprehensive understanding of complex phenomena.

5. Analyze Dynamic Systems:

- **Study Dynamic Systems:** Learn about dynamic systems such as ecosystems, economies, and social networks, understanding their non-linear behavior and feedback mechanisms.
- **Identify Patterns and Trends:** Analyze patterns and trends within dynamic systems to anticipate changes and potential future scenarios.

6. Develop Critical Thinking Skills:

- **Evaluate Evidence:** Practice critical thinking by evaluating evidence, assessing arguments, and discerning fact from opinion.
- **Recognize Biases:** Be aware of cognitive biases and logical fallacies that may distort your perception of reality.

7. Engage in Continuous Learning:

- **Stay Informed:** Keep abreast of current events, scientific discoveries, and emerging trends to stay informed about the ever-changing world.
- **Adapt and Evolve:** Remain flexible and adaptable, continuously updating your understanding and skills to navigate evolving complexities.

8. Apply Mental Models:

- **Choose Relevant Models:** Select appropriate mental models such as Occam's Razor, Second-Order Thinking, or Bayesian Reasoning to analyze and navigate complex situations.
- **Apply Models Thoughtfully:** Use mental models as frameworks for understanding and decision-making, recognizing their limitations and context-specific applicability.

9. Foster Collaboration and Dialogue:

- **Engage in Discourse:** Participate in discussions and dialogues with individuals from diverse backgrounds and viewpoints to broaden your perspective.
- **Seek Collaborative Solutions:** Work collaboratively with others to address complex challenges, leveraging collective intelligence and creativity.

10. Practice Adaptability and Resilience:

- **Adapt to Change:** Embrace change as a constant in the complex world, remaining flexible and resilient in the face of uncertainty.
- **Learn from Failure:** View setbacks and failures as opportunities for learning and growth, iterating and improving your approach over time.

11. Reflect and Iterate:

- **Regular Reflection:** Set aside time for reflection to assess your understanding of the complexities of the world, identify areas for growth, and refine your approach.
- **Iterative Learning:** Embrace a process of continuous improvement, iterating on your understanding and strategies based on feedback and experience.

By following these steps and actively engaging with the complexities of the world, you can develop a deeper understanding of reality and align yourself more effectively with its intricate dynamics and systems.

Understanding how the world really works and how the complex world operates involves grasping a multitude of interconnected systems, phenomena, and dynamics. Here are comprehensive steps to help you develop a deeper understanding:

Steps to Understand How the World Really Works:

1. Study Natural Sciences:

- **Physics, Chemistry, Biology:** Gain foundational knowledge of natural sciences to understand fundamental principles governing the physical world.
- **Ecology, Geology, Astronomy:** Explore ecological systems, geological processes, and celestial phenomena to understand Earth's interconnectedness with the cosmos.

2. Explore Social Sciences:

- **Economics:** Study economic systems, market dynamics, and resource allocation to understand societal behavior and decision-making.
- **Psychology, Sociology:** Explore human behavior, social interactions, and cultural influences to understand societal structures and dynamics.

3. Understand Political and Geopolitical Dynamics:

- **Political Science:** Study political systems, governance structures, and power dynamics at local, national, and global levels.
- **Geopolitics:** Explore the interactions between nations, geopolitical interests, and the impact of geography on international relations.

4. Analyze Technological Advancements:

- **Information Technology:** Understand the role of technology in shaping communication, commerce, and social interactions.
- **Emerging Technologies:** Explore advancements in fields like artificial intelligence, biotechnology, and renewable energy to anticipate future trends.

5. Consider Environmental and Ecological Factors:

- **Climate Science:** Study climate patterns, environmental degradation, and the impact of human activities on ecosystems.
- **Biodiversity and Conservation:** Understand the importance of biodiversity and conservation efforts in maintaining ecological balance.

Steps to Understand How the Complex World Really Works:

1. Study Systems Thinking:

- **Systems Theory:** Learn about systems thinking and complexity science to analyze interconnected systems and emergent properties.
- **Feedback Loops:** Understand how feedback loops and nonlinear dynamics contribute to complex behavior in systems.

2. Analyze Networks and Interconnections:

- **Social Networks:** Explore the structure and dynamics of social networks, understanding how information and influence flow within them.
- **Supply Chains:** Analyze global supply chains and logistical networks to understand the interdependence of economies and industries.

3. Consider Multidimensional Perspectives:

- **Multidisciplinary Approach:** Integrate insights from diverse fields to analyze complex phenomena from multiple perspectives.
- **Interdisciplinary Collaboration:** Engage in interdisciplinary collaboration to address complex challenges and develop holistic solutions.

4. Evaluate Emergent Properties:

- **Emergence:** Understand how complex systems exhibit emergent properties that cannot be fully explained by analyzing their individual components.
- **Self-Organization:** Explore self-organizing principles in complex systems, such as flocking behavior in birds or traffic flow in cities.

5. Recognize Nonlinear Dynamics:

- **Chaos Theory:** Study chaos theory to understand the behavior of nonlinear systems and the concept of sensitive dependence on initial conditions.
- **Tipping Points:** Analyze tipping points and phase transitions in complex systems, understanding how small changes can lead to significant shifts.

Steps to Synthesize Understanding:

1. Integration of Knowledge:

- **Synthesize Insights:** Integrate knowledge from various disciplines to develop a comprehensive understanding of how the world operates.
- **Identify Patterns:** Recognize recurring patterns and universal principles that apply across different domains.

2. Critical Thinking and Analysis:

- **Evaluate Evidence:** Practice critical thinking to evaluate evidence, arguments, and hypotheses related to complex phenomena.
- **Analyze Cause and Effect:** Investigate causal relationships and unintended consequences in complex systems.

3. Continuous Learning and Adaptation:

- **Stay Informed:** Keep abreast of new developments and emerging trends through continuous learning and exploration.

- **Adaptability:** Remain flexible and adaptable in your understanding, updating your mental models and frameworks as new information becomes available.

4. Engage in Dialogue and Collaboration:

- **Exchange Perspectives:** Engage in dialogue with others to exchange perspectives, share insights, and deepen understanding.
- **Collaborative Problem-Solving:** Work collaboratively with diverse stakeholders to address complex challenges and explore innovative solutions.

5. Reflect and Iterate:

- **Regular Reflection:** Set aside time for reflection to consolidate your learning, identify areas for further exploration, and refine your understanding.
- **Iterative Approach:** Embrace an iterative approach to learning, revisiting concepts and frameworks to deepen your understanding over time.

By following these comprehensive steps, you can develop a nuanced understanding of how the world really works and how the complexities of our interconnected world manifest across various domains. This understanding will enable you to navigate and engage with the world more effectively, whether it be in personal, professional, or societal contexts.

Aligning oneself with the complexities of the world involves developing a deep understanding of interconnected systems, embracing adaptability, and cultivating a holistic perspective. Here's how you can align yourself with the complex world:

1. Cultivate Systems Thinking:

- **Understand Interconnections:** Recognize that the world is composed of interconnected systems, where changes in one area can have ripple effects elsewhere.
- **Analyze Feedback Loops:** Identify feedback loops and nonlinear dynamics within systems to understand how they evolve over time.

2. Embrace Complexity:

- **Accept Uncertainty:** Embrace the inherent uncertainty and unpredictability of complex systems, understanding that outcomes may be influenced by multiple factors.
- **Appreciate Emergence:** Recognize that complex phenomena often emerge from simple rules and interactions, leading to unpredictable outcomes.

3. Foster Adaptability:

- **Remain Flexible:** Be open to change and adapt your mindset and strategies in response to evolving circumstances.
- **Learn from Feedback:** Embrace feedback as an opportunity for growth, adjusting your approach based on lessons learned from successes and failures.

4. Develop Multidisciplinary Perspectives:

- **Explore Diverse Disciplines:** Engage with knowledge and insights from various fields, integrating perspectives from science, humanities, arts, and social sciences.
- **Synthesize Insights:** Synthesize diverse perspectives to develop a comprehensive understanding of complex issues and phenomena.

5. Promote Collaboration and Dialogue:

- **Seek Collaboration:** Collaborate with individuals from diverse backgrounds and expertise to tackle complex challenges collectively.
- **Facilitate Dialogue:** Foster open and constructive dialogue to exchange ideas, share insights, and explore innovative solutions.

6. Practice Critical Thinking:

- **Evaluate Information:** Critically evaluate information and sources, discerning fact from opinion and identifying biases and assumptions.
- **Analyze Cause and Effect:** Analyze causal relationships and unintended consequences in complex systems to anticipate potential outcomes.

7. Act Responsibly and Ethically:

- **Consider Long-Term Impacts:** Assess the long-term consequences of your actions on both human and environmental systems.
- **Promote Equity and Justice:** Advocate for fairness, equity, and social justice in your interactions and decision-making.

8. Cultivate Resilience:

- **Build Resilience:** Develop resilience to navigate uncertainty and adversity, bouncing back from setbacks and challenges.
- **Maintain Balance:** Strike a balance between adaptation and stability, recognizing the importance of both continuity and change.

9. Engage in Continuous Learning:

- **Stay Curious:** Foster a lifelong commitment to learning and exploration, staying curious about the world and its complexities.
- **Keep Abreast of Developments:** Stay informed about emerging trends, scientific discoveries, and global events to adapt to evolving circumstances.

10. Foster Empathy and Compassion:

- **Practice Empathy:** Cultivate empathy for others by seeking to understand their perspectives, experiences, and challenges.
- **Act with Compassion:** Act with compassion and kindness towards others, recognizing our interconnectedness and shared humanity.

11. Reflect and Iterate:

- **Regular Reflection:** Set aside time for introspection and reflection to assess your alignment with the complex world, identify areas for growth, and refine your approach.
- **Iterative Improvement:** Embrace an iterative approach to personal and professional development, continuously refining your understanding and strategies over time.

By embracing these principles and practices, you can align yourself with the complexities of the world, navigate uncertainty with resilience, and contribute positively to the collective well-being of humanity and the planet.

Understanding how the world really works and how the complex world operates requires a multifaceted approach that considers various disciplines, systems, and dynamics. Here's an overview of both concepts:

How the World Really Works:

1. Fundamental Principles:

- **Natural Laws:** The world operates based on fundamental laws of physics, chemistry, and biology, governing the behavior of matter and energy.
- **Economic Principles:** Economic systems function based on principles of supply and demand, competition, and resource allocation.
- **Social Dynamics:** Human societies are shaped by cultural norms, social structures, and interpersonal relationships.

2. Interconnected Systems:

- **Ecological Systems:** Ecosystems are interconnected networks of living organisms and their environment, where changes in one component can affect the entire system.
- **Economic Systems:** Global economies are interconnected through trade, finance, and supply chains, influencing each other's stability and growth.
- **Political Systems:** Political institutions and governance structures shape the distribution of power, influence, and decision-making within societies and across nations.

3. Emergent Phenomena:

- **Emergence:** Complex phenomena emerge from interactions among simpler components, leading to properties and behaviors that cannot be predicted from individual parts.
- **Self-Organization:** Systems exhibit self-organizing properties where order and patterns emerge spontaneously from local interactions, without centralized control.

How the Complex World Really Works:

1. Complex Adaptive Systems:

- **Nonlinear Dynamics:** Complex systems exhibit nonlinear behaviors, where small changes can lead to disproportionate effects or sudden shifts in behavior.
- **Feedback Loops:** Feedback mechanisms within systems can amplify or dampen effects, leading to self-regulation or instability.

2. **Multidimensional Interactions:**

- **Network Effects:** Interconnected networks, such as social networks or ecological webs, generate complex interactions and feedback loops that shape their structure and dynamics.
- **Interdisciplinary Perspectives:** Complex problems often require interdisciplinary approaches that integrate insights from multiple fields to address their multifaceted nature.

3. **Uncertainty and Adaptation:**

- **Uncertainty:** Complex systems are inherently uncertain, with multiple interacting variables and dynamic changes over time.
- **Adaptive Behavior:** Agents within complex systems exhibit adaptive behavior, adjusting their strategies and responses based on feedback and changing conditions.

4. **Emergent Properties and Patterns:**

- **Emergent Properties:** Complex systems exhibit emergent properties that arise from interactions among their components, such as collective behaviors or spontaneous order.
- **Pattern Formation:** Patterns and structures emerge within complex systems, often reflecting underlying principles of self-organization and emergent phenomena.

5. **Dynamics of Change:**

- **Resilience and Adaptability:** Complex systems display resilience, the ability to absorb disturbances and maintain stability, as well as adaptability, the capacity to evolve and respond to changing conditions.
- **Phase Transitions and Tipping Points:** Complex systems can undergo phase transitions or reach tipping points, leading to abrupt changes in behavior or state.

Understanding how the world really works and how the complex world operates requires a nuanced understanding of fundamental principles, interconnected systems, emergent phenomena, and adaptive dynamics. By embracing complexity and adopting interdisciplinary perspectives, we can better navigate the intricacies of our ever-changing world.

Step - Letting The World Do The Work

For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 12: Deep Work and Decision Making

Step 78-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 79-NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 80-You Have Required To Do The Work For Decision Making.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XIII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIV. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.

XV.Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XVI.Never use cheap shots to win argument, like logical fallacies.

XVII.Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 81-Use Rules of Reading for Decision Making

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Decision Making.
 - A. **VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. **VERY FAST READING- Entertainment.**
 - I. **Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. **Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. **Method 6-Devotional Bible Read. Pages 73-74.**
 - D. **Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.**
 - I. **Method 1-Chapter Summary Method. Pages 143-147.**
 - II. **Method 2-Character Quality Method. Pages 148-160.**
 - III. **Method 3-Thematic Method. Pages 161-163.**
 - IV. **Method 4-Biographical Method. Pages 164-176.**
 - V. **Method 5-Topical Method. Pages 177-180.**
 - VI. **Method 6-Word Study Method. Pages 181-189.**
 - VII. **Method 7-Book Background Method. Pages 190-194.**
 - VIII. **Method 8-Book Survey Method. Pages 195-205.**

- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books To My Decision

Step 82 - Decision Making Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 10, before looking into Decision Making.**
2. **Listen, Follow and Apply the following Books.**
 - A. **Critical Thinking_ Tools for Taking Charge of Your Professional and Personal Life.**
 - B. **Decisive_ How to Make Better Choices in Life and Work.**
 - C. **The Decision Book_ Fifty Models for Strategic Thinking.**
 - D. **The Thinking Manager's Toolbox_ Effective Processes for Problem Solving and Decision Making.**
 - E. **Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**
 - F. **How To Read A Book.**
 - G. **Socratic Method.**

Step 83-Decision Making

Decision Making Tools

Getting the World to Do the Work for You

“What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.” Joseph Tussman.

The key to getting what you want out of life is to identify how the world works and align yourself accordingly. The problem is we often think the world *should* work differently than it does. The word “should” is important. Because we think the world should work in a way that it doesn’t, our approach is suboptimal.

Why don’t we align ourselves with reality?

Part of the answer is we don’t listen to the feedback of reality. When we don’t get the outcome we’re seeking, the last place we look is with our actions. It’s too easy to wiggle out of responsibility by blaming others and circumstances. It’s not that this approach is entirely ineffective. We eventually get the job half done in twice the time. The person working with the world, however, gets the job fully done in half the time.

The most common source of feedback is people not reality. One problem with feedback from people is that it’s hard to give someone else high quality feedback. Think about it. People will tell you a few helpful things but they’ll often avoid the big thing that’s holding you back. They don’t want to hurt your feelings. They want you to like them. That’s not the biggest problem. The biggest problem is that people rarely know much more than you do. If they had all the answers, they’d get better results.

Another form of people feedback comes from groups, institutions, and society. This is the way things have been done. And while there might be good reason for doing things the same way they’ve always been done, if you take your feedback from these folks, you’ll incrementally improve what’s already exists rather than use first principles to design something new. If existing institutions knew what they were doing, we wouldn’t have startups or bankruptcy lawyers.

How do we identify how the world really works?

Outcome over ego. You are accountable for your outcomes. When you take responsibility for your outcomes you get feedback from reality. When you get feedback from reality, you adjust your behavior.

The Four Villains of Decision Making

1. **Narrow Framing:** "... the tendency to define our choices too narrowly, to see them in binary terms. We ask, "Should I break up with my partner or not?" instead of "What are the ways I could make this relationship better?"
2. **Confirmation Bias:** "When people have the opportunity to collect information from the world, they are more likely to select information that supports their preexisting attitudes, beliefs, and actions." We pretend we want the truth, yet all we really want is reassurance.
3. **Short-term Emotion:** "When we've got a difficult decision to make, our feelings churn. We replay the same arguments in our head. We agonize about our circumstances. We change our minds from day to day. If our decision was represented on a spreadsheet, none of the numbers would be changing—there's no new information being added—but it doesn't feel that way in our heads."
4. **Overconfidence:** "People think they know more than they do about how the future will unfold."

Why We Fail At Effective Decision Making

1. We're unintentionally stupid. I like to think that I'm rational and capable of interpreting all information in a non-biased way but that's a dream. Cognitive biases are great at explaining how our evolutionary programming leads us astray. Knowledge of these biases in advance rarely helps us make better decisions. There are, however, many easily recognizable situations that increase the odds we're about to do something stupid. Whether we're tired, overly focused on a goal, rushing, distracted, operating in a group, or under the influence of a group, we're more prone to stupidity.²

2. We have the wrong information. Making decisions with the wrong assumptions or facts is likely to lead to disaster.

3. We use the wrong model. We use mental models to make decisions. The quality of those models determines the quality of our thinking. There are a variety of reasons that we use false, incomplete, or incorrect models. Novices are prone to using models that the expert knows are incomplete or irrelevant. The odds of employing the wrong models increase as the pace of environmental change increases.

4. We fail to learn. We all know the person that has 20 years of experience but it's really the same year over and over. Well, that person is sometimes us. If we don't understand how we learn, we're likely to make the same mistakes over and over.

5. Looking over doing good. Our evolutionary programming conditions us to do what's easy over what's right. After all it's often easier to signal being virtuous than actually being virtuous. We unconsciously make choices based on optics, politics, and defendability. We hate criticism and seek the validation of our peers and superiors. We often want to feel good about ourselves first and have the outcome we desire second.

How We Make Decisions

When was the last time you thought about how you make decisions?

If you're like most people, you've never been explicitly taught how to make effective decisions. You make decisions like a golfer who never took any lessons: miserable with the state of your game and yet not seeking to learn a better swing, and instead hoping for the best every time you lift the club. Hoping that this time your choice will finally work out.

In the early 1980s, Charlie Munger and his partner Warren Buffett realized that a Savings & Loan operation they owned, as with the rest of the industry, was doomed to fail miserably due to forces outside of their control. At a time when almost none of their peers were taking action, they changed course dramatically, massively reducing the effect of the bank's failure on the rest of their business holdings. These two men knew they had to act much differently than their peers.

It worked: The S&L industry collapsed, yet Munger and Buffett escaped with barely a scratch. They saved themselves a great deal of stress and financial pain by applying a uniquely effective system of organized common sense. In hindsight, it seems like an obvious good decision; at the time, it seemed odd and unusual.

The lesson for us is that the people making consistently good decisions take advantage of how the world works. That's wisdom.

Real knowledge of the art of decision making, which remains true across time and circumstances, eras and epochs, can help increase the odds that we get what we want and reduce costly mistakes.

While everyone else is guessing, falling into old patterns, blindly following cognitive biases, we can be clear-headed and laser-focused.

That's what Farnam Street is all about.

Here are some examples of applying — or failing to apply — knowledge about how the world really works.

- It doesn't matter how smart you are if you don't realize where things are additive and where they are multiplicative. Nikola Tesla failed to understand Multiplication by Zero when he failed to realize that poor relations with others affected his life. While the Serbian-American was a brilliant inventor, he had difficulty relating to others, which made him difficult to work with. This problem cost him a Nobel Prize and a fortune that today would likely have made him the richest man in the world.
- While we all rely on maps, which are reductions of complexity, to make decisions, they are not always accurate. General George S. Patton Jr. understood that the map is not the territory. When he visited the troops near Coutances, he found them

sitting on the side of the road, studying a map. Responding to Patton's inquiry as to why they had not crossed the Seine, the troops informed him that they were studying the map and could not find a safe place to wade across. Patton informed them that he had just waded across it and it was not more than two feet deep.

- While we all like to be in the sexy industries, that desire shows an under-appreciation for the laws of thermodynamics. Smart companies like Berkshire Hathaway, guided by legendary investor Warren Buffett, understand that contrast is important. Sexy internet businesses are rarely effective, no matter how good they are, because the others are nearly just as good. What you want is contrast — to be the big fish in a small pond. And when you analyze the types of investments he's made over the years, that's what you find. If you're going to compete with people, you want to compete with people who are way less sophisticated than you.
- Understanding and applying the mental model of relativity helped Michael Abrashoff take the worst-performing ship in the US Pacific Fleet and turn it into the best. In his book, *It's Your Ship*, he wrote: "The most important skill a skipper can have is the ability to see through the eyes of the crew."

Questions to Ask

Decision-Making Checklist

- Is this an example of survivorship bias?
- Am I confusing the factor for selection with the result?
- Am I seeing a pattern where there isn't one?
- Am I changing my behaviour or opinion because others are doing/acting/thinking this way? Because of social proof?
- Am I looking at only the future costs and benefits? Disregard any costs to date.
- Do I feel obligated to return a favour here? Have they done something for me that might make me subject to reciprocity?
- Can I find disconfirming evidence for my current hypothesis? What are the limitations of this evidence? How might someone with the opposing viewpoint interpret this evidence?
- Is some sort of authority figure exerting an influence on me?
- What am I judging this in relation to? How would this look in a different context, compared to something else? What sort of small, gradual changes might I be missing?
- Am I overvaluing evidence because of my own experience or the ease with which I can recall it? Who can I get an opinion from who has a different expertise and experience than me?
- What evidence would I have to see to make a judgement about whether this situation is improving? What are clear and verifiable milestones?
- Am I trying to shape this into a story? What is my confidence level that I actually understand this?
- What predictions am I making about this? How confident am I? What historical decisions do I have recorded that might indicate my prediction level?
- What is the pessimistic scenario here? How far off is my own prediction from this scenario?
- Does this person (or do I) truly understand this situation? Or is it outside my circle of competence?
- What specific things can I actually control in this situation?
- What incentives are at play here? How do they likely affect the behaviour of those involved?
- Could this situation be explained by random variation, or regression to the mean?

- Was the process behind this good or bad, regardless of the result? Do I have enough evidence to evaluate the effectiveness of the process? What information did I have at the time?
- How can I reduce the number of choices here? What are the key factors I want to evaluate?
- Do I like this person? Is that affecting my decision-making process?
- Am I valuing this too highly because it is already mine? What does the market think?
- How unlikely is this event? Could it be caused by random chance?
- What is the devil's advocate view of this situation? Have we expressed our opinions independently?
- What is the rational response based on the probability and consequences of this event? What is the expected value or risk?
- Have I assessed this option based solely on costs and benefits? How would I evaluate it if it were available in abundance?
- What is the base rate in this situation? Is there an analogous situation I can rely on?
- What factors are independent and which are dependent in this situation?
- What anchors might I be using here when I shouldn't be?
- What are the objective upsides and downsides here? Am I overweighting the downside, or the fear of loss?
- Are we behaving differently here because we are a group? How are we evaluating individual performance?
- Is there an exponential factor at play here? Or is it linear?
- Am I competing with someone here? Is that changing my behaviour? What is my "line in the sand" if I'm bidding for something? Can I avoid an auction situation?
- What are the broader factors influencing the situation here? What degree of influence do they really have?
- Is there actually a link between these two factors? How do we know that one causes the other? How do we know they are linked at all?
- What are the limits of this piece of information? Is it causing me to look at other things favourably or unfavourably?
- If I try and evaluate from an outside view, what are all the possible outcomes for this situation? What are the associated risks with each path?
- What incentives is this person subject to? Is there a downside if the prediction is wrong? How good is his success rate?

- Am I dealing with a subset here? Am I trying to fit a plausible story to the situation?
- What if I present this situation in the opposite way? How does that change my perception?
- Am I just trying to act here? What if I just wait? Will I be able to better assess my options?
- Am I avoiding a particular path because the consequences are bad, but less bad than inaction?
- What bluntly honest friends, or enemies, could I ask for an honest assessment of strengths and weaknesses?
- Will this lead to long-term or short-term happiness? Would this lead to something guaranteed to be negative?
- How does this sample affect the conclusions I'm trying to make? What would be the ideal sample?
- Am I transferring qualities between things that are unrelated? Am I shooting the messenger?
- Is the sample size enough to make a conclusion about luck vs. skill here? Are there a large number of players here? (Likely to cause random winners). Can I disprove my conclusion?
- Am I trying to reinterpret things to maintain a previous attitude or belief?
- Am I making an impulsive decision right now? Am I playing the long game or short game?
- Is the reasoning behind this sound, or am I just going along with a "because" reason?
- Am I making this decision fresh? Am I well-rested and well-fed?
- Do I have a connection to this in some way?
- Does the average mean anything in this situation? What is the actual underlying distribution?
- Are financial incentives crowding my judgement? Are they crowding other incentives for the people involved here?
- What is being said here? Is it actually useful?
- How are these factors grouped? How has it changed? Have the groups been rearranged to manipulate the averages?
- What information is actually useful here? Am I falsely increasing my confidence levels because of additional, but useless information?

- Am I overvaluing parts of this because I put effort into them? What is the value of the result, discounting the process and effort put in?
- Is this sample size sufficient to draw conclusions? Or am I in fact extrapolating too far from a small sample?
- What expectations am I holding about this situation? Are they appropriate? What is the worst-case scenario?
- Am I evaluating this situation rationally? Or using intuition?
- Could this information apply to anyone? Are there any negatives, or are they all positive traits?
- Is this the best use of my time?
- Are my feelings about this subject, topic, or my current feelings contributing to my evaluation?
- Am I being critical with myself? How would I regard these internal observations if they were coming from someone else?
- Am I just trying to keep options open? What should I focus on *not* pursuing?
- Am I overvaluing this option because of the novelty?
- What is the source of this argument or opinion?
- What is the next best alternative to this option?
- Am I avoiding an option out of fear or jealousy of someone or something outdoing me?
- Am I overvaluing this information because it was the first I'd heard? Or because I heard it more recently?
- Am I overvaluing my own ideas? Who can give me an objective opinion?
- Have I put us in a position to guard against negative Black Swans? And take advantage of positive Black Swans?
- Am I within my circle of competence? Or am I trying to transfer knowledge from one domain to another?
- How do other people feel? What are their opinions? Have I truly gathered information about them?
- Do I know for sure this happened, or am I relying on memory?
- What groups are currently affecting my thinking? Have I sought opinions from outside my group?
- Am I falsely relying on probabilities just to avoid ambiguity?
- Would I make this same decision from a different position, if the status quo was different?

- Am I avoiding a decision out of fear of regret?
- Am I attributing undue weight to this factor because of its prominence? Which discreet factors am I failing to value?
- Is my behaviour different because I won this money or got something for free?
- Am I avoiding this because it's unpleasant? Can I set a deadline to force myself to get this done? Can I make a public commitment?
- Am I envious of something here?
- What are the facts and statistical distribution behind this story? Is the human aspect causing bias?
- Am I focusing on something here? What am I missing? What other scenarios are possible?
- What is the past performance behind this claim? Are there other situations similar to this where I can find data? What safeguards do I have in place?
- Is this a complex situation, or could I rely some on my emotions?
- What similar projects can I look at for objective data on my situation? What does the pre-mortem look like here?
- Have I gathered a number of sufficiently different perspectives to see how experts with different tools would solve this?
- Have I gone into enough detail in the plan on how to deal with this situation?
- Is there an illusion of skill here? Is this likely due to chance, or is there a demonstrated record of success?
- What features or factors am I missing here? Why do these factors exist instead of nothing?
- What has been cherry-picked here? Where are the negative results?
- Am I falsely attributing this to a single cause?
- What test subjects or information has been removed from the sample?
- Is this valuable information or just news?

List of Decision Making Tools

1. Overcome these villains and make better choices.

- You encounter a choice. But narrow framing makes you miss options. So **Widen Your Options**. How can you expand your set of choices?
- You analyze your options. But the confirmation bias leads you to gather self-serving information. So, **Reality-Test Your Assumptions**. How can you get outside your head and collect information you can trust?
- You make a choice. But short-term emotion will often tempt you to make the wrong one. So **Attain Distance Before Deciding**. How can you overcome short-term emotion and conflicted feelings to make better choices?
- Then you live with it. But you'll often be overconfident about how the future will unfold. So **Prepare to Be Wrong**. How can we plan for an uncertain future so that we give our decisions the best chance to succeed?

2. Inversion

Inversion is a powerful tool to improve your thinking because it helps you identify and remove obstacles to success. The root of inversion is “invert,” which means to upend or turn upside down. As a thinking tool it means approaching a situation from the opposite end of the natural starting point. Most of us tend to think one way about a problem: forward. Inversion allows us to flip the problem around and think backward. Sometimes it's good to start at the beginning, but it can be more useful to start at the end.

Spending time thinking about the opposite of what you want doesn't come naturally to most people. And yet many of the smartest people in history, have done this naturally.

Inversion helps improve understanding of the problem. By forcing you to do the work necessary to have an opinion you're forced to consider different perspectives.

3. Second Order Thinking

Almost everyone can anticipate the immediate results of their actions. This type of first-order thinking is easy and safe but it's also a way to ensure you get the same results that everyone else gets. Second-order thinking is thinking farther ahead and thinking holistically. It requires us to not only consider our actions and their immediate consequences, but the subsequent effects of those actions as well. Failing to consider the second and third order effects can unleash disaster.

Second-order thinking is more deliberate. It is thinking in terms of interactions and time, understanding that despite our intentions our interventions often cause harm. Second order thinkers ask themselves the question "And then what?" This means thinking about the consequences of repeatedly eating a chocolate bar when you are hungry and using that to inform your decision. If you do this you're more likely to eat something healthy.

First-level thinking looks similar. Everyone reaches the same conclusions. This is where things get interesting. The road to out-thinking people can't come from first-order thinking. It must come from second-order thinking. Extraordinary performance comes from seeing things that other people can't see.

Improving Your Ability To Think.

Here are three ways you can use to put second order thinking into practice today.

1. Always ask yourself "And then what?"
2. Think through time — What do the consequences look like in 10 minutes? 10 months? 10 Years? 1.
3. Create templates like the second image above with 1st, 2nd, and 3rd order consequences. Identify your decision and think through and write down the consequences. If you review these regularly you'll be able to help calibrate your thinking.
4. (Bonus) If you're using this to think about business decisions, ask yourself how important parts of the ecosystem are likely to respond. How will employees deal with this? What will my competitors likely do? What about my suppliers? What about the regulators? Often the answer will be little to no impact, but you want to understand the immediate and second-order consequences before you make the decision.

A lot of extraordinary things in life are the result of things that are first-order negative, second order positive. So just because things look like they have no immediate payoff, doesn't mean that's the case. All it means is that you'll have less competition if the second

and third order consequences are positive because everyone who thinks at the first order won't think things through.

Second-order thinking takes a lot of work. It's not easy to think in terms of systems, interactions, and time. However, doing so is a smart way to separate yourself from the masses.

4. The map is not the Territory

The map of reality is not reality. Even the best maps are imperfect. That's because they are reductions of what they represent. If a map were to represent the territory with perfect fidelity, it would no longer be a reduction and thus would no longer be useful to us. A map can also be a snapshot of a point in time, representing something that no longer exists. This is important to keep in mind as we think through problems and make better decisions.

5. How Not to Be Stupid-stupidity as overlooking or dismissing conspicuously crucial information.

6. Apply Rational Decision Process

1. Define the problem. Accurate judgment is required to identify and define the problem. Managers often err by (a) defining the problem in terms of a proposed solution, (b) missing a bigger problem, or (c) diagnosing the problem in terms of its symptoms. Your goal should be to solve the problem not just eliminate its temporary symptoms.

2. Identify the criteria. Most decisions require you to accomplish more than one objective. When buying a car, you may want to maximize fuel economy, minimize cost, maximize comfort, and so on. The rational decision maker will identify all relevant criteria in the decision-making process.

3. Weight the criteria. Different criteria will vary in importance to a decision maker. Rational decision makers will know the relative value they place on each of the criteria identified. The value may be specified in dollars, points, or whatever scoring system makes sense.

4. Generate alternatives. The fourth step in the decision-making process requires identification of possible courses of action. Decision makers often spend an inappropriate amount of search time seeking alternatives, thus creating a barrier to effective decision making. An optimal search continues only until the cost of the search outweighs the value of added information.

5. Rate each alternative on each criterion. How well will each of the alternative solutions achieve each of the defined criteria? This is often the most difficult stage of the decision-making process, as it typically requires us to forecast future events. The rational decision maker carefully assesses the potential consequences on each of the identified criteria of selecting each of the alternative solutions.

6. Compute the optimal decision. Ideally, after all of the first five steps have been completed, the process of computing the optimal decision consists of (a) multiplying the ratings in step 5 by the weight of each criterion, (b) adding up the weighted ratings across all of the criteria for each alternative, and (c) choosing the solution with the highest sum of weighted ratings.

7. Hamond and Raiffa 8 steps of decision

- 1. Work on the right problem.***
- 2. Identify all criteria.***
- 3. Create imaginative alternatives.***
- 4. Understand the consequences.***
- 5. Grapple with your tradeoffs.***
- 6. Clarify your uncertainties.***
- 7. Think hard about your risk tolerance.***
- 8. Consider linked decisions.***

8. Decision Journal Template

Whenever you're making a consequential decision, either individually or as part of a group, you take a moment and write down:

1. The situation or context.
2. The problem statement or frame.
3. The variables that govern the situation.
4. The complications or complexity as you see it.
5. Alternatives that were seriously considered and why they were not chosen (think: the work required to have an opinion).
6. A paragraph explaining the range of outcomes.
7. A paragraph explaining what you expect to happen and the reasoning and actual probabilities you assign to each projected outcome (The degree of confidence matters, a lot.)
8. The time of day you're making the decision and how you feel physically and mentally (If you're tired, for example, write it down.)

You have to make this part your own. I've seen others include:

- What's the primary thesis.
- What is the expected outcome(s).
- What are the second and third-order consequences.
- What is the worst-case scenario and why that's ok.
- What is the potential upside beyond the core thesis.
- What emotions am I experiencing.
- What is the opportunity cost (by doing this what am I not doing).
- What unique advantages or insights do I have in this situation.
- Who is the best person to make this decision.
- What does this look like in 5 weeks, 5 months, 5 years?

9. Charles Munger Two Steps

A simple and easy approach to decision making that prevents us from being manipulated.

1. Understand the forces at play.
2. Understand how your subconscious might be leading you astray.

While most of us make decisions daily, few of us have a useful framework for thinking that protects us when making decisions.

We're going to explore Munger's two-step process for making effective decisions and reducing human misjudgment.

In A Lesson on Elementary Worldly Wisdom, Charlie Munger offers a simple two-step filter for making effective decisions:

Personally, I've gotten so that I now use a kind of two-track analysis. First, what are the factors that really govern the interests involved, rationally considered? And second, what are the subconscious influences where the brain at a subconscious level is automatically doing these things-which by and large are useful, but which often malfunction.

One approach is rationality-the way you'd work out a bridge problem: by evaluating the real interests, the real probabilities and so forth. And the other is to evaluate the psychological factors that cause subconscious conclusions-many of which are wrong.

Let's take a closer look.

1. The Forces at Play

The key to the first step is knowing what you know and what you don't know. You need to understand your circle of competence. It's just as important to know what you don't know as it is to know what you know.

If you know what you don't know, you might still have to make a decision, but your approaches for making that decision will change. For example, if you're forced to make a decision in an area that you know is well outside your circle of competence, one tool you can use is inversion.

While there are millions of factors that go into decisions, there will always be a few variables and factors that will carry the bulk of the weight. If you're operating within your circle of competence, it should be relatively easy to figure out the relevant variables and forces at play.

I can't tell you the relevant variables. There is no magic formula. To make consistently good decisions, you need to develop a deep fluency in the area in which you are making

decisions, and you need to pull in the big ideas from multiple disciplines to make sure you're exercising good judgment.

2. The Psychological Factors

There are many causes of human misjudgment, including over-confidence. These are the subtle ways that your mind might be leading you astray at a subconscious level. Your subconscious mind is larger than your conscious mind, and yet we rarely pay attention to how we might be tricking ourselves. One way to mislead yourself, for instance, is to make decisions based on a small sample size and extrapolate the results to a larger population. Another way we fool ourselves is to remain committed to something we've said in the past. We might rely on an authority figure or default to what everyone else is doing. You get the idea.

Usually, when we have extreme success or failure, there are four or five factors working in the same direction. The same goes for psychology. The more human misjudgment factors there are working against us, the more likely we are to make an ill-informed decision.

11. Environment where you can make decisions

The Modern Office is Terrible for Thinking

No one understands how your environment shapes your ability to make decisions more than Warren Buffett and Charlie Munger. While they're gifted with intellect, they make sure they get the most out of it by structuring their environment to help them make good decisions.

Most of us make decisions in an environment where it is very hard for us to behave rationally.

You can't design a worse environment for good decisions than the modern office. When you first arrive at work, you immediately start to answer the critical emails from your swelling inbox. The inner voice in your head tells you don't worry; you'll get to the rest later. Suddenly, the phone rings, it's your boss wanting to know if you have time to chat on the 15-page proposal she was supposed to read for the meeting in 30 minutes. But you haven't read the proposal either. So you glance at the executive summary and, like anyone that has learned to survive in an office, you confidently act like you know what's going on. You haven't done the work to have an opinion. But that's the game. Everyone else did the same thing. When you finally lift your head up, your email box is swelling again, you have missed calls, and it's almost time to pick up the kids from school. Where did the day go?

This isn't an abnormal day. This is every day. From the moment you arrive until the moment you leave, you make an inch of progress on twenty things rather than ten feet of progress on one thing.

The unwritten rule is that you have to do these things to justify your job. If you're not pushing paper, firing up hundreds of emails, calling and attending meetings, and chasing something down ... just what the heck are you doing?

The cultural environment is typically about politics and signalling, not about putting people in a position to succeed. The physical environment is about busyness and distraction, not focus and thinking. Neither of these environments line up with the good decision making.

Contrast this to Warren Buffett. He has no computer in his office. He's not distracted every few minutes by that annoying little ding that signals a new email has arrived. His day isn't full of meetings. He doesn't have an annoying boss that comes around and asks him for something tangible that's he's working on. He just reads and thinks. No wonder he's so good at it.

If you want to think for yourself, you can't have someone always whispering in your ear. If you want space to think, you need quiet and calm not a bunch of smart people throwing

out new ideas. That's why Buffett moved from New York to Omaha. "In some places, it's easy to lose perspective. But I think it's very easy to keep perspective in a place like Omaha," Buffett says. He continues:

It's very easy to think clearly here. You're undisturbed by irrelevant factors and the noise generally of business investments. If you can't think clearly in Omaha, you're not going to think clearly anywhere.

Putting Buffett in a modern office is like giving Superman kryptonite. His superpowers would disappear. He wouldn't be able to think and concentrate. Luckily, he intentionally set up his environment in a way that makes it easier to behave rationally.

The (Super) Power of Environment

We influence our environments, but we forget they influence us too.

We like to believe that we are in charge that our brains are only influenced by our conscious thoughts. That sounds amazing, but it's wrong. Our conscious brain is much smaller than our subconscious brain. And yet when it comes to getting better at thinking and making decisions, we place all the emphasis on the conscious brain, learning mental models and methods of thinking that improve outcomes. In so doing, we improve the raw horsepower of our brain. Yet, there is no point having a 400 horsepower engine if you can only get 25 horsepower out of it.

Designing an Effective Environment

There is no environment that works for everyone. We all respond differently to different stimuli. A corner office on the 100th floor in New York might provide inspiration to some and distraction to others. What works for me might not work for you.

Here are three things we've found work for a lot of different people in a lot of different situations.

First, structure your day to maximize your energy. Most people do the tasks requiring the least amount of thought (answering emails, checking voicemails, catching up with people) in the morning when they are most productive. Meetings and decisions get pushed to the afternoon when our brains are not working as well. Switch your day around. Do the most important thing first.

Second, use chunks of time and be conscious when interrupting other people. Block chunks of time in your calendar for your own projects. I don't mean like 20 minutes, I mean like hours. I have every morning blocked off from 9-12. It's not easy to get into a state of flow, but once you're there, you're focused on one thing. It could be thinking about a problem in a three dimensional way or refining a report that you're writing for work. If you interrupt this time, it's expensive to get back to where you were, often taking 25 minutes or more to recover. Keep that in mind when you interrupt others.

Third, make effective behaviors easy. If there is chocolate in our office, you can be sure I'll eat it. That's why I lock the good stuff in a safe. Literally. This makes it harder to get to, and I eat less of it. OK, you probably want a better example than chocolate. Here's one I used to use at work. On the first page of my notebook at the intelligence agency, I listed some general thinking tools that I could fall back on for tough decisions. This prompted me to think through problems in a structured way and saved me from more than one mess. (Update: These are now a book).

Your Environment Matters More Than You Think.

We intuitively know that the physical and cultural environment matters.

You don't control everything in your environment, but you control enough to make a huge difference. Think about what you control and how you can change it to get more horsepower out of your brain.

12. SWOT Analysis.

- **Strength.**
- **Weakness.**
- **Opportunity.**
- **Threat.**

13. PESTLE Analysis.

- **Political.**
- **Economic.**
- **Social.**
- **Technological.**
- **Legal.**
- **Environmental.**

14. Stakeholder analysis

- **High power, highly interested people (Manage Closely):** you must fully engage these people, and make the greatest efforts to satisfy them.
- **High power, less interested people (Keep Satisfied):** put enough work in with these people to keep them satisfied, but not so much that they become bored with your message.
- **Low power, highly interested people (Keep Informed):** adequately inform these people, and talk to them to ensure that no major issues are arising. People in this category can often be very helpful with the detail of your project.
- **Low power, less interested people (Monitor):** again, monitor these people, but don't bore them with excessive communication.

15. Strategic Map (Check Online).

16. Decision Matrix.

- **Step 1-**List all of your options as the row labels on the table, and list the factors that you need to consider as the column headings. For example, if you were buying a new laptop, factors to consider might be cost, dimensions, and hard disk size.
- **Step 2-**Next, work your way down the columns of your table, scoring each option for each of the factors in your decision. Score each option from 0 (poor) to 5 (very good). Note that you do not have to have a different score for each option – if none of them are good for a particular factor in your decision, then all options should score 0.
- **Step 3-**The next step is to work out the relative importance of the factors in your decision. Show these as numbers from, say, 0 to 5, where 0 means that the factor is absolutely unimportant in the final decision, and 5 means that it is very important. (It's perfectly acceptable to have factors with the same importance.).
- **Step 4-**Now multiply each of your scores from step 2 by the values for relative importance of the factor that you calculated in step 3. This will give you weighted scores for each option/factor combination.

- **Step 5-Finally, add up these weighted scores for each of your options. The option that scores the highest wins!**

17. Pareto Analysis

Pareto analysis is premised on the idea that 80% of a project's benefit can be achieved by doing 20% of the work—or, conversely, 80% of problems can be traced to 20% of the causes. Pareto analysis is a powerful quality and decision-making tool.

Steps of Pareto Analysis

By applying the 80-20 rule, problems can be sorted based on whether they affect profits, customer complaints, technical issues, product defects, or delays and backlogs from missed deadlines. Each of these issues is given a rating based on the amount of revenue or sales, and time lost, or the number of complaints received. Here is a basic breakdown of the steps of Pareto analysis:

- Identify the problem or problems
- List or identify the cause of the issues or problems, noting that there could be multiple causes
- Score the problems by assigning a number to each one that prioritizes the problem based on the level of negative impact on the company
- Organize the problems into groups, such as [customer service](#) or system issues
- Develop and implement an action plan, focusing on the higher scored problems first, in order to solve the problems

Not all problems will have a high score, and some smaller problems may not be worth pursuing initially. By allocating resources to high-impact issues or higher scores, companies can solve problems more efficiently by targeting the issues that have a major impact on profits, sales, or customers.

How To Create a Pareto Chart

A common part of Pareto analysis is to graphically depict the occurrence of each variable being tracked. This depiction is called a Pareto chart, and it organises and displays information to show the relative importance of various problems or causes of problems. It is similar to a vertical bar graph in that it puts items in order (from the highest to the lowest) relative to some measurable effect of interest: frequency, cost, or time. Here is the process of making a Pareto chart.

- Develop a list of problems to be compared.
- Develop a standard measure for comparing the items. For example, how often it occurs: frequency (e.g., utilisation, complications, errors); how long it takes (time); how many resources it uses (cost).
- Choose a timeframe for collecting the data.
- For each item, tally how often it occurred (or cost or total time). Then, add these amounts to determine the grand total for all items.
- Find the percent of each item in the grand total by taking the sum of the item, dividing it by the grand total, and multiplying by 100.
- List the items being compared in decreasing order of the measure of comparison: e.g., the most frequent to the least frequent. The cumulative percent for an item is the sum of that item's percent of the total and that of all the other items that come before it in the ordering by rank.
- List the items on the horizontal axis of a graph from highest to lowest. Label the left vertical axis with the numbers (frequency, time, or cost).
- Label the right vertical axis with the cumulative percentages (the cumulative total should equal 100%).
- Draw in the bars for each item.
- Draw a line graph of the cumulative percentages. The first point on the line graph should line up with the top of the first bar.

The final step is analysis. You can now analyze a Pareto chart by identifying those items that appear to account for most of the difficulty. In the example below, the Institute for Healthcare Improvement identified three vital types of errors discovered during surgical set-up.

18. Cause and Effect

The diagram is called fishbone as its final look is in the form of a fishbone. It was initially used for quality improvement but it can also be helpful in analyzing business processes through the identification of its causes and hindrances, as well as on ways to improve it.

The cause and effect analysis basically involves two key steps which are looking backward and looking forward.

- In looking backward, the analysis focuses on identifying areas in which mistakes were made or money was lost. It looks into what had happened before. In identifying where the issues are, you are able to work towards avoiding the problem in the future. Another advantage of this is that, you'll be able to replicate a positive outcome.
- Looking into the future and planning for it, the analysis seeks to find workable solutions that are to be implemented in the future and build on the future success of the business. This analysis enables you to determine your future outcome by planning what to do now to achieve it.

This method is unique in that it encourages creative thinking as well as brainstorming in the process of breaking down issues and aligning them in the process of finding its solutions. Among the key advantages of this method is that it ensures that you don't seek out to solve the wrong problems, it also ensures that you solve the problem well enough for it to go away.

Step 1: Problem Identification

The way to use this tool is very simple. You first need to identify the problem area that needs analysis. A good way to do this is by giving a brief description of the current business situation and the consequences as well as the reasons for why they occurred.

Here you can replace the problem with a goal that you want to achieve. For instance, high profitability. You need to be very specific about the problem that you're facing as this forms the basis of your analysis. If the identification is wrong, then the analysis also tends to be wrong.

You should also identify the people involved as well as what the exact problem is and how it occurs. For example, low productivity due to absenteeism especially in the production department, which includes production personnel and the line manager, for the period from January to November 2017.

Step 2: Main Problem Causes

The next step is identifying the main causes of the problem, for example, the people, the procedures your business utilized as well as the materials or equipment. Here, you will need to do a lot of brainstorming to come up as many reasons as you possibly can.

You can use various models to help you **identify as many problems** as you can in a clear manner. For example, the McKinsey 7S Framework which includes, Strategy, Systems, the business Structures, Shared values of the business, Staff, Skills, and Style.

Step 3: Identify Plausible Sub-causes of the Main Causes

Thereafter, you can narrow down to further plausible causes of the main problems that you've listed. This is important for the problem-solving stage of analyzing the diagram, as you will know what to do exactly to rectify the situation. This can include issues like wrong norms and values that could be as a result of poor training of employees.

Step 4: Analyze the Diagram

By now, your diagram should be showing all the main and minor causes that you've thought of.

Depending on how complex the information is, you can do a much deeper investigation on the causes. This can be by conducting a survey as well as drawing up questionnaires.

For example, you can ask your employees to fill in a survey on how much they understand the products you sell in your business. The information you get from this will help you build upon areas of training in order to address the problem of lack or insufficient knowledge. From here, a corresponding step is developing an action plan with clear priorities that can be implemented immediately. This is made simple as the plans can comprise of actions to solve the subproblem causes.

For the action plan to be effective, it needs to be clear and to be executed aggressively. For example, a sub cause like lack of staff morale can be turned into an action plan, which will be giving incentives for **staff motivation**, hence, improved productivity and in turn higher profitability which was the main goal.

19. Force Field Analysis

How to Conduct a Force Field Analysis.

The analysis is best carried out in small groups of 5 to 9 people who are directly involved in the change implementation process.

It's important that everyone else who is also likely to be affected by the change is kept in the loop. To gain their commitment and support for the deployment of the project, they should be kept informed about and involved in planning, development and decision-making from the very beginning.

For a more productive discussion, have a force field analysis worksheet ready at the beginning of the meeting.

The worksheet can be paper-based, or you can use the following Creately template to start right away. Simply add the email addresses of the other group members to the document to give them edit/ review access. This way everyone can collaborate on populating the worksheet.

Step 1: Assess the current situation

You need to start the session by discussing the current situation of the organization in terms of the issue at hand with the key stakeholders.

This may include determining where you are at, the challenges you are facing due to the issue you are trying to solve, the reaction of the employees, etc.

It's also important to clarify where you want to go or the desired state you want to achieve with the initiative. At the same time, consider what will take place if you fail to take action to change the current situation.

Here you can do a quick [SWOT analysis](#) to understand what strengths you can use to overcome the existing threats and see how you can work on overcoming weaknesses and take advantage of the presented opportunities.

Step 2: Define the objective

The next step is to identify the expected outcome of the change initiative. Once you have clearly defined the goal(s), write them inside the box in the middle of the template provided above.

Step 3: Identify the driving forces

Driving forces are the factors that are in favor of the proposed change or the ones that support the achievement of the defined goal.

These are considered positive and usually includes factors like advancing technology, changing industry trends, increasing competition, opinions of customers or shareholders, incentives, etc.

In this step, your task is to brainstorm as many driving forces as possible with the team and list them in the relevant field of the worksheet.

Of course, you can turn to people outside the team (interview them), people who are specialised in the subject area to find the information you need during this step.

Step 4: Identify the restraining forces

These are the factors that will block your path to achieving your goal. They tend to restrict the impact of the driving forces. For example, these may include the fear of the individuals, organizational structures and negative attitudes of employees, etc.

The list of forces that are against change should be listed on the right-hand field of the worksheet.

One thing you need to keep in mind is not to be subjective when deciding which forces to add to the force field analysis and which ones to leave out.

Step 5: Evaluate the forces

You can evaluate the influence of each force by assigning them scores.

Using a numerical scale (10 being extremely strong and 1 being extremely weak), assign each force a score based on the impact they have on the change initiative.

You can also assess the forces by focusing on the impact each of them may have. This way you can ditch assigning each force a score.

Based on the effect they have, you can decide whether the proposed change is viable. Accordingly, you can discuss how you can influence the forces in favor of change: you can weaken the restricting forces by strengthening the driving forces.

Step 6: Create an action plan

Based on how you want to go about strengthening driving forces and weakening restraining forces, you can create a quick action plan.

This can help you clarify what needs to be done, who is responsible, the resources needed, and the due dates you need to be concerned about, etc.

20. Break Even Analysis.

The formula for break even analysis is as follows:

$$\text{Break Even Quantity} = \text{Fixed Costs} / (\text{Sales Price per Unit} - \text{Variable Cost Per Unit}).$$

Where:

- **Fixed Costs** are costs that do not change with varying output (e.g., salary, rent, building machinery).
- **Sales Price per Unit** is the selling price (unit selling price) per unit.
- **Variable Cost per Unit** is the variable costs incurred to create a unit.

It is also helpful to note that sales price per unit minus variable cost per unit is the **contribution margin** per unit. For example, if a book's selling price is \$100 and its variable costs are \$5 to make the book, \$95 is the contribution margin per unit and contributes to offsetting the fixed costs.

Example of Break Even Analysis

Colin is the managerial accountant in charge of Company A, which sells water bottles. He previously determined that the fixed costs of Company A consist of property taxes, a lease, and executive salaries, which add up to \$100,000. The **variable cost** associated with producing one water bottle is \$2 per unit. The water bottle is sold at a premium price of \$12. To determine the break even point of Company A's premium water bottle:

$$\text{Break Even Quantity} = \$100,000 / (\$12 - \$2) = 10,000$$

Therefore, given the fixed costs, variable costs, and selling price of the water bottles, Company A would need to sell 10,000 units of water bottles to break even.

21. Ratio Analysis.

22. Paired Comparison Analysis.

Paired Comparison Analysis is an activity for evaluating a small range of options by comparing them against each other. It is a useful and easy technique for rating and ranking alternatives where the evaluation criteria are subjective by nature. This is practically helpful when priorities are not clear enough, when alternatives are completely different from one another, or when there is little objective data to base our decision on.

Paired comparison is often used to choose the most compelling problem to solve, or to select the alternative that will be the most effective. It is useful in a wide range of applications, from selecting the concept design for a new product before it goes into production, to deciding the skills and qualifications when hiring people for a new position. Decisions like these are more difficult to make than comparing which investment to take or which vendor to select (we will select the vendor who will give us the highest quality with the best price and the fastest delivery).

Paired comparison analysis is often performed with the aid of a matrix. This matrix should be made in a way that avoids comparing an option with itself or duplicating any comparison. Two additional rows can be added to the end of the table to represent:

- The number of times each option has been selected.
- The ranking of all options based on their count.

Implementing a Paired Comparison Analysis

1. With your team, identify the options to be evaluated.
2. Identify the evaluation criterion to help you make the decision (e.g. the most important, the most interesting, or the easiest to implement).
3. List all the options on the left hand column and on the top row of the matrix.
4. In each blank cell, compare the option in the row with the option in the column, then write in the cell the option that better meets the evaluation criterion.
5. Repeat the process until all possible pairs are evaluated.
6. Count the number of times each option has been chosen.
7. Rank the options based on their count.
8. Consider the options with the highest ranking.

23. Action Priority matrix.

- 1. Quick wins (high impact, low effort)-These are tasks requiring little effort but which have a high impact. As such, they are very attractive because they have high returns for a small outlay of energy. Completing quick wins should be your highest priority, and you should concentrate on these tasks as much as you can.
- 2. Major projects (high impact, high effort)-These are tasks that can give you significant results (impact), but unlike quick wins, they require you to invest a lot of time into them. These types of tasks should be your next priority after quick wins. You'll need to invest a lot of time into these projects to get them done but be careful not to let these tasks consume all of your time.
- 3. Fill-ins (low impact, low effort)-These are tasks that require a low effort for you to perform, but they also have little impact on your results. As hinted at by the name, you use these tasks to fill in your time. You should only perform these tasks if you have the time available after working on your quick wins and major projects. Consider delegating these tasks if you have that as an option. Alternatively, consider dropping these tasks altogether if possible.
- 4. Thankless tasks (low impact, high effort)-These are tasks which have a low impact but which still require a high effort. You should aim to completely eliminate these tasks, as they are not worth your time to complete.
- To use the model, follow these four steps:

1. Make a complete list of all of your tasks.
2. Score your tasks for effort and impact. You can use any scale you like to do this, but a simple 1-10 scale works well, where one is very low, and ten is very high.
3. Place each activity in the matrix according to its effort and impact scores.
4. Prioritize your activities:
5. Give quick wins the highest priority.
6. Spend the remaining time on your major projects. You should spend the majority of your time on these tasks.
7. If you have any remaining time, do your fill-in activities. Otherwise, delegate or drop these tasks.
8. Eliminate thankless tasks. Spend absolutely zero time performing these tasks.

24. Boston Matrix

The four categories can be described as follows:

- **Stars** are **high growth products** competing in markets where they are strong compared with the competition. Often Stars need heavy investment to sustain growth. Eventually growth will slow and, assuming they keep their market share, Stars will become Cash Cows.
- **Cash cows** are **low-growth products** with a high market share. These are mature, successful products with relatively little need for investment. They need to be managed for continued profit - so that they continue to generate the strong cash flows that the company needs for its Stars.
- **Question marks** are products with low market share operating in high growth markets. This suggests that they have potential, but may need substantial investment to grow market share at the expense of larger competitors. Management have to think hard about "Question Marks" - which ones should they invest in? Which ones should they allow to fail or shrink?
- **Unsurprisingly, the term "dogs"** refers to products that have a low market share in unattractive, low-growth markets. Dogs may generate enough cash to break-even, but they are rarely, if ever, worth investing in. Dogs are usually sold or closed.

25. Dice Model.

26. Decision Grid.

27. Advantage Disadvantage.

28. Decision forecast.

29. Decision Flow.

30. Compare and contrast.

31. Vroom Yetton Jago.

32. Eisenhower Matrix

33. 5 forces

34. TOWS

35. SFA Matric

36. ANSOFF Matrix

37. Strategy Map

38. Ooda Loop

How the OODA Loop works: The Four Steps.

Similar to other problem-solving methods, the OODA loop is an interactive, iterative process that entails repeating the cycle, observing and measuring results, reviewing and revising the initial decision and advancing to the next step. While the process is not always simple or linear, the four separate steps involved are:

1. **Observe:** The first step is to identify the problem or threat and gain an overall understanding of the internal and external environment. In the corporate world, this can be equated to data gathering, where all of the information regarding the current organizational state, any competitors and the market is collected. The key point about the observe step is recognizing that the world is complex. All data is a snapshot in time and must be treated as such. Therefore, entities must gather whatever information is available as quickly as possible in order to be prepared to make decisions based on it.
2. **Orient:** The orientation phase involves reflecting on what has been found during observations and considering what should be done next. It requires a significant level of situational awareness and understanding in order to make a conscious decision. Since some decisions are unconscious, or instinctual, this step involves considering what and why decisions are made prior to choosing a course of action. When applied on an individual level, the orientation step can be done by creating mental models or mental rehearsal drills to place information into narratives that shape judgement. In organizational applications, situational models can be created with machine learning ([ML](#)) tools to identify potential outcomes while removing any bias.
3. **Decide:** The decision phase makes suggestions towards an action or response plan, taking into consideration all of the potential outcomes. This can be accomplished through meetings or discussions that are focused around creating a roadmap for the entire organisation.
4. **Act:** Action pertains to carrying out the decision and related changes that need to be made in response to the decision. This step may also include any testing that is required before officially carrying out an action, such as compatibility.

33. Risk Assessment Decision Tree.

34. Game theory

A. Ask: if i take action what are the consequences and how do i respond and reaction. Prisoner dilemma

35. Worst case scenario Analysis - Can you live with the worst outcome of the decision.

36. The decision does not match your values and principles. Value and Principles - Analyse if the decision aligns with your life values and principles.

37. Go get great counsel. Person should be neutral, reasonable and not emotional on topic.

38. What are your alternatives.

39. Decision fatigue. Never make massive decision when you are fatigued

40. Stick with your decision. Big decision have slow process but fast movement.

41. Taking emotions out of decisions is one key to success.

42. Benjamin Franklin Method. What works for me in terms of having an alternative is to write down the pros and cons of the decision. It's called the Benjamin Franklin method of making decisions. If the pros is greater than the cons then I will execute it. If the cons are greater then I will pass.

43. Decision Making Tools.

A. Listen, Use and Apply Critical Thinking by Richard Paul For Decision Making.

B. Listen, Use and Apply Decisive by Chip Heath For Decision Making.

C. Listen, Use and Apply The Decision Book By Mikael Krogerus For Decision Making.

D. Listen, Use and Apply The Thinking Manager's Toolbox By William Altier For Decision Making.

E. Handbook of Decision Making.

F. Business Analytics_ Data Analysis & Decision Making.

0. All Models Are Wrong

How is your journey towards understanding Farnam Street's latticework of mental models going? Is it proving useful? Changing your view of the world? If the answer is that it's going well that's good. There's just one tiny hitch.

All models are wrong.

Yep. It's the truth. However, there is another part to that statement:

All models are wrong; some are useful.

Those words come from the British statistician, George Box. In a groundbreaking 1976 paper, Box revealed the fallacy of our desire to categorize and organize the world. We create models (a term with many applications), once to confuse them for reality.

Box also stated:

Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful.

What Exactly Is A Model?

First, we should understand precisely what a model is.

The dictionary definition states a model is 'a representation, generally in miniature, to show the construction or appearance of something' or 'a simplified description, especially a mathematical one, of a system or process, to assist calculations and predictions.'

For our purposes here, we are better served by the second definition. A model is a simplification which fosters understanding.

Think of an architectural model. These are typically a small scale model of a building, made before it's built. Its purpose is to show what the building will look like and to help people working on the project to develop a clear picture of the overall feel. In the iconic scene from Zoolander, Derek (played by Ben Stiller) looks at the architectural model of his proposed 'school for kids who can't read good' and shouts "What is this? A center for ants??"

That scene illustrates the wrong way to understand models: Too literally.

Why We Use Models- And Why They Work

At Farnam Street, we believe in using models for the purpose of building a massive, but finite amount of fundamental, invariant knowledge about how the world really works.

Applying this knowledge is the key to making good decisions and avoiding stupidity.

"Scientists generally agree that no theory is 100 percent correct. Thus, the real test of knowledge is not truth, but utility. Science gives us power. The more useful that power, the better the science."

— Yuval Noah Harari

Time-tested models allow us to understand how things work in the real world. And understanding how things work prepares us to make better decisions without expending too much mental energy in the process.

Instead of relying on fickle and specialized facts, we can learn versatile concepts.

The mental models we cover are intended to be widely applicable.

It's crucial for us to understand as many mental models as possible. As the adage goes, a little knowledge can be dangerous and creates more problems than total ignorance. No single model is universally applicable – we find exceptions for nearly everything. Even hardcore physics has not been totally solved.

"The basic trouble, you see, is that people think that "right" and "wrong" are absolute; that everything that isn't perfectly and completely right is totally and equally wrong."

— Isaac Asimov

Take a look at almost any comment section on the internet and you are guaranteed to find at least one pedant raging about a minor perceived inaccuracy, throwing out the good with

the bad. While ignorance and misinformation are certainly not laudable, neither is an obsession with perfection.

Like heuristics, models work as a consequence of the fact they are usually helpful in most situations, not because they are always helpful in a small number of situations.

Models can assist us in making predictions and forecasting the future. Forecasts are never guaranteed, yet they provide us with a degree of preparedness and comprehension of the future. For example, a weather forecast which claims it will rain today may get that wrong. Still, it's correct often enough to enable us to plan appropriately and bring an umbrella.

Mental Models and Minimum Viable Products

Think of mental models as minimum viable products.

Sure, all of them can be improved. But the only way that can happen is if we try them out, educate ourselves and collectively refine them.

We can apply one of our mental models, Occam's razor, to this. Occam's razor states that the simplest solution is usually correct. In the same way, our simplest mental models tend to be the most useful. This is because there is minimal room for errors and misapplication. *"The world doesn't have the luxury of waiting for complete answers before it takes action."*

— Daniel Gilbert

Your kitchen knives are not as sharp as they could be. Does that matter as long as they still cut vegetables? Your bed is not as comfortable as it could be. Does that matter if you can still get a good night's sleep in it? Your internet is not as fast as it could be. Does that matter as long as you can load this article? Arguably not. Our world runs on the functional, not the perfect. This is what a mental model is – a functional tool. A tool which maybe could be a bit sharper or easier to use, but still does the job.

The statistician David Hand made the following statement in 2014;

In general, when building statistical models, we must not forget that the aim is to understand something about the real world. Or predict, choose an action, make a decision, summarize evidence, and so on, but always about the real world, not an abstract mathematical world: our models are not the reality.

For example, in 1960, Georg Rasch said the following:

When you construct a model you leave out all the details which you, with the knowledge at your disposal, consider inessential.... Models should not be true, but it is important that they are applicable, and whether they are applicable for any given purpose must, of course, be investigated. This also means that a model is never accepted finally, only on trial.

Imagine a world where physics like precision is prized over usefulness.

We would lack medical care because a medicine or procedure can never be perfect. In a world like this, we would possess little scientific knowledge, because research can never be 100% accurate. We would have no art because a work can never be completed. We would have no technology because there are always little flaws which can be ironed out.

"A model is a simplification or approximation of reality and hence will not reflect all of reality ... While a model can never be "truth," a model might be ranked from very useful, to useful, to somewhat useful to, finally, essentially useless."

— Ken Burnham and David Anderson

In short, we would have nothing. Everything around us is imperfect and uncertain. Some things are more imperfect than others, but issues are always there. Over time, incremental improvements happen through unending experimentation and research.

The Map is Not the Territory

As we know, the map is not the territory. A map can be seen as a symbol or index of a place, not an icon.

When we look at a map of Paris, we know it is a representation of the actual city. There are bound to be flaws; streets which have been renamed, demolished buildings, perhaps a new Metro line. Even so, the map will help us find our way. It is far more useful to have a map showing the way from Notre Dame to Gare du Nord (a tool) than to know how many meters they are apart (a piece of trivia.)

Someone who has spent a lot of time studying a map will be able to use it with greater ease, just like a mental model. Someone who lives in Paris will find the map easier to understand than a tourist, just as someone who uses a mental model in their day to day life will apply it better than a novice. As long as there are no major errors, we can consider the map useful, even if it is by no means a reflection of reality. Gregory Bateson writes in Steps to an Ecology of Mind that the purpose of a map is not to be true, but to have a structure which represents truth within the current context.

“A map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness.”

— Alfred Korzybski

Physical maps generally become more accurate as time passes. Not long ago, they often included countries which didn't exist, omitted some which did, portrayed the world as flat or fudged distances. Nowadays, our maps have come a long way.

The same goes for mental models – they are always evolving, being revised – never really achieving perfection. Certainly, over time, the best models are revised only slightly, but we must never consider our knowledge “set”.

Another factor to consider in using models is to take into account what they're used for. Many mental models (e.g. entropy, critical mass and activation energy) are based upon scientific and mathematical concepts. A person who works in those areas will obviously need a deeper understanding of it than someone who want to learn to think better when making investment decisions. They will need a different map and a more detailed one showing elements which the rest of us have no need for.

“A model which took account of all the variation of reality would be of no more use than a map at the scale of one to one.”

— Joan Robinson

In his essay *Partial Enchantments of the Quixote*, Jorge Luis Borges provides an even more interesting analysis of the confusion between models and reality:

Let us imagine that a portion of the soil of England has been leveled off perfectly and that on it a cartographer traces a map of England. The job is perfect; there is no detail of the soil of England, no matter how minute that is not registered on the map; everything has there its correspondence. This map, in such a case, should contain a map of the map, which should contain a map of the map of the map, and so on to infinity. Why does it disturb us that the map be included in the map and the thousand and one nights in the book of the Thousand and One Nights? Why does it disturb us that Don Quixote be a reader of the Quixote and Hamlet a spectator of Hamlet? I believe I have found the reason: these inversions suggest that if the characters of a fictional work can be readers or spectators, we, its readers or spectators, can be fictions.

How Do We Know If A Model Is Useful?

This is a tricky question to answer. When looking at any model, it is helpful to ask some of the following questions:

- How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile.

Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.

- Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
- Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
- How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
- Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
- Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to require extensive knowledge of a particular topic, and have minimal real-world application.

When using any mental model, we must avoid becoming too rigid. There are exceptions to all of them, and situations in which they are not applicable.

Think of the latticework as a toolkit. That's why it pays to do the work up front to put so many of them in your toolbox at a deep, deep level. If you only have one or two, you're likely to attempt to use them in places that don't make sense. If you've absorbed them only lightly, you will not be able to use them when the time is at hand.

If on the other hand, you have a toolbox full of them and they're sunk in deep, you're more likely to pull out the best ones for the job exactly when they are needed.

Too many people are caught up wasting time on physics-like precision in areas of practical life that do not have such precision available. A better approach is to ask "Is it useful?" and, if yes, "To what extent?"

Mental models are a way of thinking about the world that prepares us to make good decisions in the first place.

0B. Mental Models (Use mental models).

1. The Anatomy of a Decision: An Introduction to Decision Making

“The only proven way to raise your odds of making a good decision is to learn to use a good decision-making process—one that can get you the best solution with a minimal loss of time, energy, money, and composure.”

— John Hammond

This is an introduction to decision making.

A good decision-making process can literally change the world.

Consider the following example from Predictable Surprises: In 1962, when spy planes spotted Soviet missiles in Cuba, U.S. military leaders urged President Kennedy to authorize an immediate attack. Fresh from the bruising failure of the Bay of Pigs, Kennedy instead set up a structured decision-making process to evaluate his options. In a precursor of the Devil's Advocacy method, Kennedy established two groups each including government officials and outside experts, to develop and evaluate the two main options—attack Cuba or set up a blockade to prevent more missiles from reaching its shores. Based on the groups' analysis and debate, Kennedy decided to establish a blockade. The Soviets backed down, and nuclear war was averted. Recently available documents suggest that if the United States had invaded Cuba, the consequences would have been catastrophic: Soviet missiles that had not been located by U.S. Intelligence could still have struck several U.S. cities.

The concept of a decision-making process can be found in the early history of thinking.

Decisions should be the result of rational and deliberate reasoning.

Plato argues that human knowledge can be derived based on reason alone using deduction and self-evident propositions. Aristotle formalized logic with logical proofs where someone could reasonably determine if a conclusion was true or false.

However, as we will discover, not all decisions are perfectly rational. Often, we let our system one thinking—intuition—make decisions for us. Our intuition is based on long-term memory that has been primarily acquired over the years through learning and allows our mind to process and judge without conscious awareness. System one thinking, however, does not always lead to optimal solutions and often tricks our mind to thinking that consequences and second-order effects are either non-existent or less probable than reality would indicate.

In Predictable Surprises Max Bazerman writes:

Rigorous decision analysis combines a systematic assessment of the probabilities of future events with a hard-headed evaluation of the costs and benefits of particular outcomes. As such, it can be an invaluable tool in helping organizations overcome the biases that hinder them in estimating the likelihood of unpleasant events. Decision analysis begins with a clear definition of the decision to be made, followed by an explicit statement of objectives and explicit criteria for assessing the “goodness” of alternative courses of action, by which we mean the net cost or benefit as perceived by the decision-maker. The next steps involve identifying potential courses of action and their consequences. Because these elements often are laid out visually in a decision tree, this technique is known as “decision tree analysis.” Finally, the technique instructs decision-makers to explicitly assess and make trade-offs based on the potential costs and benefits of different courses of action.

To conduct a proper decision analysis, leaders must carefully quantify costs and benefits, their tolerance for accepting risk, and the extent of uncertainty associated with different potential outcomes. These assumptions are inherently subjective, but the process of quantification is nonetheless extremely valuable' it forces participants to express their

assumptions and beliefs, thereby making them transparent and subject to challenge and improvement.

From Judgment in Management Decision Making by Max Bazerman:

The term judgment refers to the cognitive aspects of the decision-making process. To fully understand judgment, we must first identify the components of the decision-making process that require it.

Let's look at six steps you should take, either implicitly or explicitly, when applying a "rational" decision-making process to each scenario.

1. Define the problem. (M)anagers often act without a thorough understanding of the problem to be solved, leading them to solve the wrong problem. Accurate judgment is required to identify and define the problem. Managers often err by (a) defining the problem in terms of a proposed solution, (b) missing a bigger problem, or (c) diagnosing the problem in terms of its symptoms. Your goal should be to solve the problem not just eliminate its temporary symptoms.

2. Identify the criteria. Most decisions require you to accomplish more than one objective. When buying a car, you may want to maximize fuel economy, minimize cost, maximize comfort, and so on. The rational decision maker will identify all relevant criteria in the decision-making process.

3. Weight the criteria. Different criteria will vary in importance to a decision maker. Rational decision makers will know the relative value they place on each of the criteria identified. The value may be specified in dollars, points, or whatever scoring system makes sense.

4. Generate alternatives. The fourth step in the decision-making process requires identification of possible courses of action. Decision makers often spend an inappropriate amount of search time seeking alternatives, thus creating a barrier to effective decision making. An optimal search continues only until the cost of the search outweighs the value of added information.

5. Rate each alternative on each criterion. How well will each of the alternative solutions achieve each of the defined criteria? This is often the most difficult stage of the decision-making process, as it typically requires us to forecast future events. The rational decision maker carefully assesses the potential consequences on each of the identified criteria of selecting each of the alternative solutions.

6. Compute the optimal decision. Ideally, after all of the first five steps have been completed, the process of computing the optimal decision consists of (a) multiplying the ratings in step 5 by the weight of each criterion, (b) adding up the weighted ratings across all of the criteria for each alternative, and (c) choosing the solution with the highest sum of weighted ratings.

Hammond, Keeney, and Raiffa suggest 8 steps in their book Smart Choices:

- 1. Work on the right problem.*
- 2. Identify all criteria.*
- 3. Create imaginative alternatives.*
- 4. Understand the consequences.*
- 5. Grapple with your tradeoffs.*
- 6. Clarify your uncertainties.*
- 7. Think hard about your risk tolerance.*
- 8. Consider linked decisions.*

* * *

People, however, are not always entirely logical machines. In Judgment in Managerial Decision Making, the distinction between System One and System Two thinking becomes clear:

System 1 thinking refers to our intuitive system, which is typically fast, automatic, effortless, implicit, and emotional. We make most decisions in life using System 1 thinking. For instance, we usually decide how to interpret verbal language or visual information

automatically and unconsciously. By contrast, System 2 refers to reasoning that is slower, conscious, effortful, explicit, and logical. System 2 thinking can be broken down into (1) define the problem; (2) identify the criteria; (3) weigh the criteria; (4) generate alternatives; (5) rate each alternative on each criterion; (6) compute the optimal decision. In most situations, our system 1 thinking is quite sufficient; it would be impractical, for example, to logically reason through every choice we make while shopping for groceries. But System 2 logic should preferably influence our most important decisions.

* * *

When making a decision, we are psychologically influenced either consciously or unconsciously. By exploring these biases and other elementary, worldly wisdom, we hope to make you a better decision-maker.

Following a rational decision process can help us focus on outcomes that are low in probability but high in potential costs. Without easily quantifiable costs, we often dismiss low probability events or fall prey to biases. We don't want to be the fragilista.

Even rational decision-making processes like the one presented above make several assumptions. The first assumption is that a rational decision-maker is completely informed which means they know about all the possible options and outcomes. The second major assumption is that the decision-maker does not fall prey to any biases that might impact the rational decision.

In researching decision-making processes, it struck us as odd that few people question the information upon which criteria are measured. For instance, if you are purchasing a car and use fuel efficiency as the sole criterion for decision making, you would need to make sure that the cars under consideration were all tested and measured fuel consumption in the same way. This second order of thinking can help you make better decisions.

If you want to make better decisions, you should read Judgment in Managerial Decision Making. That is the best book I've come across on decision making. If you know of a better one, please send me an email.

Stanovich's book, What Intelligence Tests Miss: The Psychology of Rational Thought, proposes a whole range of cognitive abilities and dispositions independent of intelligence that have at least as much to do with whether we think and behave rationally.

2. The Psychology of Pirates: How to Choose a Ransom

Reading The Invisible Hook really got me *hooked* on learning more about pirates.

How do pirates decide what ransom to ask for?

The answer, from an interview with an actual pirate, might surprise you. Despite what many think, they are very smart and intuitively grasp governance, incentives, and other aspects of human nature. This interview touches on incentives, reinforcement, moral hazard, and anchoring.

How do you pirates decide on what ransom to ask for?

Once you have a ship, it's a win-win situation. We attack many ships everyday, but only a few are ever profitable. No one will come to the rescue of a third-world ship with an Indian or African crew, so we release them immediately. But if the ship is from Western country or with valuable cargo like oil, weapons or then its like winning a lottery jackpot. We begin asking a high price and then go down until we agree on a price.

How do you know a ship in far away coast in the first place and its flagship?

Often we know about a ship's cargo, owners and port of origin before we even board it. That way we can price our demands based on its load. For those with very valuable cargo on board then we contact the media and publicize the capture and put pressure on the companies to negotiate for its release.

From what I've seen, initial demands tend to be about 10 times the previous publicized ransom, is this a rule of thumb?

We know that we won't get our initial demands, but we use it as a starting point and negotiate downwards to our eventual target. But as a rule, yes, that's about right.

Does the length of a hijacking change the ransom that pirates are willing to accept?

Yes. Armed men are expensive as are the laborers, accountants, cooks and khat suppliers on land. During long negotiations our men get tired and we need to rotate them out three times a week. Add to that the risk from navies attacking us and we can be convinced to lower our demands.

What are the key factors to making a successful attack on a ship?

The key to our success is that we are willing to die, and the crews are not. Beyond that, in my case deploy a boat with six men to get close to the ship and leave another in reserve near the coast just in case we need backup. We use sophisticated equipment that allows us to spot our targets from a distance. We always have to be close to the main sea lane and keep in touch with each other using talkie phones.

How much does it cost to outfit a pirate mission?

A single mission with 12 armed men and boats costs a little over \$30,000. But a successful investor has to dispatch at least three or four missions to get lucky once.

How are the pirates organized? (Are there pirate leaders, financiers, and specialists?)

The financiers are the most important since they organize and plan the big shot operations and are able to pay running cost[s]. Financiers always need to forge deals with traders, land cruiser owners, translators, business people to keep the supplies flowing during operations and manage the logistics. There is a long supply chain involved in every hijacking.

Are there internal conflicts within the pirate gangs?

No. In piracy, everyones' life depends on everyone else's. There is some professional competition between groups, but we cooperate with information and logistics when it's required. We won't fight amongst ourselves as long as the money is paid as promised. We have never had any conflicts within my group.

3. The Principles of Comparative Advantage: Why Tiger Woods Shouldn't Mow Your Lawn

In economics, comparative advantage refers to the ability of a person or nation to produce a good or service at a lower opportunity cost than another person (or nation). This is why trade can create value for both parties—because each person can concentrate on the activity for which they have the lower opportunity cost. It also explains why Tiger Woods shouldn't mow your lawn.

The term “comparative advantage” is usually attributed to David Ricardo. In his 1817 book On The Principles Of Political Economy And Taxation, Ricardo used the example of trade between England and Portugal.

Portugal could produce both wine and cloth with less labor than it would have taken to produce the same output in England. However, the relative costs are different (currencies have different values). From Ricardo's point of view, England had difficulty producing wine and very little difficulty producing cloth. Portugal, however, could easily produce both wine and cloth. Ricardo concluded that while it was cheaper to produce cloth in Portugal than England, it is cheaper still for Portugal to produce excess wine and trade this for English cloth. England would benefit from this trade because its cost of producing cloth has not changed but it can now get wine at a lower price. Thus, each country can gain by specializing in the good that has a comparative advantage.

One of the drawbacks of trade in this way is that it creates increasing interdependence among people or nations. In Ricardo's example, England and Portugal relied on each other for certain goods. This is possible as long as it is in the self-interest of each nation and there are no disruptions.

In the leading economics textbook, Principles of Microeconomics, Greg Mankiw offers the following:

Differences in opportunity cost and comparative advantage create the gains from trade. When each person specializes in producing the good for which he or she has a comparative advantage, total production in the economy rises, and this increase in the size of the economic pie can be used to make everyone better off. In other words, as long as two people have different opportunity costs, each can benefit from trade by obtaining a good at a lower price than his or her opportunity cost of that good.

Real Life Examples

Should Tiger Woods Mow His Own Lawn?

Tiger is a great athlete. One of the best golfers to have ever lived. Most likely he is better at other activities too. Tiger is probably in better shape than most: He can run faster, lift more, and work quicker. For example, Tiger can probably mow his lawn faster than anyone else. But just because he can mow his lawn fast, does this mean he should?

To answer this question we can use the concepts of opportunity cost and comparative advantage. Let's say that Tiger can mow his lawn in 2 hours. In the same two hours he could film a television commercial for golf clubs and earn \$100,000. By contrast, Joe, the kid next door can mow Tiger's lawn in 4 hours. In that same 4 hours he could work at McDonald's and earn \$24.

In this example, Tiger's opportunity cost is \$100,000 and Joe's is \$24. Tiger has an absolute advantage in mowing lawns because he can do the work in less time. Yet Joe has a comparative advantage because he has the lower opportunity cost. The gains in trade from this example are tremendous. Rather than mowing his own lawn, Tiger should make the commercial and hire Joe to mow his lawn. As long as Tiger pays Joe more than \$24 and less than \$100,000, both of them are better off.

(Another example, this one from wikipedia)

Two men live alone on an isolated island. To survive they must undertake a few basic economic activities like water carrying, fishing, cooking and shelter construction and maintenance. The first man is young, strong, and educated. He is also, faster, better, more productive at everything. He has an absolute advantage in all activities. The second man is old, weak, and uneducated. He has an absolute disadvantage in all economic activities. In some activities the difference between the two is great; in others it is small. Despite the fact that the younger man has absolute advantage in all activities, it is not in the interest of either of them to work in isolation since they both can benefit from specialization and exchange. If the two men divide the work according to comparative advantage then the young man will specialize in tasks at which he is most productive, while the older man will concentrate on tasks where his productivity is only a little less than that of a young man. Such an arrangement will increase total production for a given amount of labor supplied by both men and it will make both of them richer.

4. Social Dilemmas: When to Defect and When to Cooperate

Social dilemmas arise when an individual receives a higher payoff for defecting than cooperating when everyone else cooperates. When everyone defects they are worse off. That is, each member has a clear and unambiguous incentive to make a choice, which if made by all members provides a worse outcome.

A great example of a social dilemma is to imagine yourself out with a group of your friends for dinner. Before the meal, you all agree to share the cost equally. Looking at the menu you see a lot of items that appeal to you but are outside of your budget.

Pondering on this, you realize that you're only on the hook for $1/(\text{number of friends at the dinner})$ of the bill. Now you can enjoy yourself without having to pay the full cost.

But what if everyone at the table realized the same thing? My guess is you'd all be stunned by the bill, even the tragedy of the commons.

This is a very simple example but you can map this to the business world by thinking about healthcare and insurance.

If that sounds a lot like game theory, you're on the right track.

I came across an excellent paper[1] by Robyn Dawes and David Messick, which takes a closer look at social dilemmas.

A Psychological Analysis of Social Dilemmas

In the case of the public good, one strategy that has been employed is to create a moral sense of duty to support it—for instance, the public television station that one watches.

The attempt is to reframe the decision as doing one's duty rather than making a difference—again, in the wellbeing of the station watched. The injection of a moral element changes the calculation from “Will I make a difference” to “I must pay for the benefit I get.”

The final illustration, the shared meal and its more serious counterparts, requires yet another approach. Here there is no hierarchy, as in the organizational example, that can be relied upon to solve the problem. With the shared meal, all the diners need to be aware of the temptation that they have and there need to be mutually agreed-upon limits to constrain the diners. Alternatively, the rule needs to be changed so that everyone pays for what they ordered. The latter arrangement creates responsibility in that all know that they will pay for what they order. Such voluntary arrangements may be difficult to arrange in some cases. With the medical insurance, the insurance company may recognize the risk and insist on a principle of co-payments for medical services. This is a step in the direction of paying for one's own meal, but it allows part of the “meal” to be shared and part of it to be paid for by the one who ordered it.

The fishing version is more difficult. To make those harvesting the fish pay for some of the costs of the catch would require some sort of taxation to deter the unbridled exploitation of the fishery. Taxation, however, leads to tax avoidance or evasion. But those who harvest the fish would have no incentive to report their catches accurately or at all, especially if they were particularly successful, which simultaneously means particularly successfully—compared to others at least—in contributing to the problem of a subsequently reduced yield. Voluntary self-restraint would be punished as those with less of that personal quality would thrive while those with more would suffer. Conscience, as Hardin (1968) noted, would be self-eliminating. ...

Relatively minor changes in the social environment can induce major changes in decision making because these minor changes can change the perceived appropriateness of a situation. One variable that has been shown to make such a difference is whether the decision maker sees herself as an individual or as a part of a group.

5. Warren Buffett and the Power of Nontransitive Dice

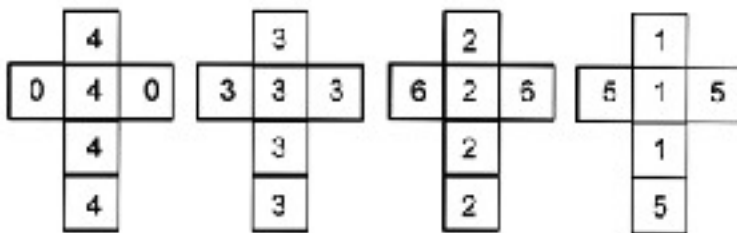
In a terrific book by William Poundstone, Fortune's Formula: The Untold Story of the Scientific Betting System that Beat the Casinos and Wall Street, is the story of a 1968 dinner meeting between mathematician Edward Thorp and fund manager Warren Buffett. Poundstone casually mentions that Buffett and Thorpe discussed their shared interest in nontransitive dice.

"These are," writes Poundstone, "a mathematical curiosity, a type of 'trick' dice that confound most people's ideas about probability."

Ivars Peterson describes nontransitive dice on the Mathematical Association of America's website:

The game involves four specially numbered dice. You let your opponent pick any one of the four dice. You choose one of the remaining three dice. Each player tosses his or her die, and the higher number wins the throw. Amazingly, in a game involving 10 or more throws, you will nearly always have more wins.

Here's what the dice look like:



The trick is to always let your opponent pick first, and then you pick the die to the left of his selection (if he picks the die with the four 4s, then circle round to the die with the three ones). It's just like playing Rock, Paper, Scissors — only you get to see what the other guy picks in advance.

With these dice, you always have a $2/3$ probability of winning — what a great sucker's bet!

6. Three Questions to Remove Ego from Decision Making

Here are three questions leaders can ask to help make better decisions.

1. How will this decision make things better for the organization?

Consider how the decision will affect the organization's ability to fulfill its mission.

Managers who push their teams to achieve "stretch goals" without providing adequate support and resources may be seeking to get noticed by their bosses rather than helping the company serve its customers. Such behavior will have another side effect — talent will exit. The answer to this question must enhance the organization, not simply the resume of the manager.

2. How will this decision affect employees?

The business case for your decision should factor in the people quotient and affects on headcount, training, and development. Employees must execute what leaders decide, so if employees perceive that their boss is only doing something to make himself look good, they'll be reluctant to embrace the change. They may comply, but they may never commit unless they determine the benefit for themselves.

3. How will this decision affect me?

When you are involved in a project, it is easy to entangle ego with outcome. Healthy ego is necessary, but when too much ego makes a you blind to obvious problems such as lack of resources, customer disinterest, and employee morale, problems arise. As we have seen with corporate executives in the financial sector, it isn't positive when personal interest comes before corporate and public interest. So if the answer to this question is more in favor of you rather than the company, the issue may be over-personalized and need more deliberation.

7. The Famous Game Show Problem

Ahh, the famous game show problem (also known as The Monty Hall Problem).

This is a probability puzzle you've heard of:

Suppose you're on a game show, and you're given the choice of three doors. Behind one door is a car, behind the others, goats. You pick a door, say #1, and the host, who knows what's behind the doors, opens another door, say #3, which has a goat. He says to you, "Do you want to pick door #2?" Is it to your advantage to switch your choice of doors?

Marilyn Vos Savant, one of the "smartest" people in the world, offers her answer:

When you switch, you win 2/3 of the time and lose 1/3, but when you don't switch, you only win 1/3 of the time and lose 2/3. You can try it yourself and see.....

The winning odds of 1/3 on the first choice can't go up to 1/2 just because the host opens a losing door. To illustrate this, let's say we play a shell game. You look away, and I put a pea under one of three shells. Then I ask you to put your finger on a shell. The odds that your choice contains a pea are 1/3, agreed? Then I simply lift up an empty shell from the remaining other two. As I can (and will) do this regardless of what you've chosen, we've learned nothing to allow us to revise the odds on the shell under your finger.

The benefits of switching are readily proven by playing through the six games that exhaust all the possibilities. For the first three games, you choose #1 and "switch" each time, for the second three games, you choose #1 and "stay" each time, and the host always opens a loser.

8. In The Arena: Citizenship In A Republic

It is not the critic who counts: not the man who points out how the strong man stumbles or where the doer of deeds could have done better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood, who strives valiantly, who errs and comes up short again and again, because there is no effort without error or shortcoming, but who knows the great enthusiasms, the great devotions, who spends himself for a worthy cause; who, at the best, knows, in the end, the triumph of high achievement, and who, at the worst, if he fails, at least he fails while daring greatly, so that his place shall never be with those cold and timid souls who knew neither victory nor defeat.

Theodore Roosevelt

I grew up thinking that avoiding criticism was good. Perhaps you did too. But as an adult, I know that's not really what I want.

Every day we make a choice. We can either sit in the stands with the crowd shouting at the people on the field doing the work, or we can jump down from the stand and onto the field.

Sitting in the stands is safe. We rarely look like a fool in the comfort of the masses. The cost of this comfort is that we never really do anything. Choosing to run onto the field and play means we might look like a fool in front of thousands but offers us the chance to do something worthwhile. Surely you want to be on the field. I do. Sure, it's not always fun or comfortable. But given the choices, it's obvious which is better.

So much advantage in life comes from being willing to look like an idiot over the short term.

In *Rising Strong*, Brene Brown comments on Roosevelt's speech, focusing on one particular part: "*The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood.*" She writes —

We're facedown in the arena. Maybe the crowd has gone silent, the way it does at football games or my daughter's field hockey matches when the players on the field take a knee because someone is hurt. Or maybe people have started booing and jeering. Or maybe you have tunnel vision and all you can hear is your parent screaming, "Get up! Shake it off!"

Our "facedown" moments can be big ones like getting fired or finding out about an affair, or they can be small ones like learning a child has lied about her report card or experiencing a disappointment at work. Arenas always conjure up grandeur, but an arena is any moment when or place where we have risked showing up and being seen. Risking being awkward and goofy at a new exercise class is an arena. Leading a team at work is an arena. A tough parenting moment puts us in the arena. Being in love is definitely an arena. [...]

On a cultural level, I think the absence of honest conversation about the hard work that takes us from lying facedown in the arena to rising strong has led to two dangerous outcomes: the propensity to gold-plate grit and a badassery deficit.

My first year playing football in high school, I was forced to sit on the bench. It killed me to watch my teammates battle it out while I was on the sideline. Most parents would shout at the people on the field, telling them how they were messing up and what they couldn't see. I remember listening to them one game and wanting them to yell at me. If they were yelling at me, it meant I was playing. I was getting dirty and battling it out. I'd rather be exhausted, face down in the mud at the end of a game we lost, than sit with a clean jersey on the sidelines with no responsibility.

Once you develop that mindset, it stays with you forever.

After University, I joined a three-letter intelligence agency and wanted to be in operations. I wanted to be the one making the call. I didn't want to absolve myself of responsibility or accountability. I wanted the weight on my shoulders. I didn't want to helplessly watch someone else carrying it.

Not much has changed since then. As an entrepreneur, I'm the arena building every day. When you have millions of readers, people are going to shout. When you start a new business, which I'm about to do for the fourth time, people will laugh when you stumble. I'd be more upset if there was silence. If no one is criticizing you, it means you're not doing anything worth doing.

That's not to say you should ignore all criticism. That's too simplistic. Turn down the volume on the people who haven't done what you're trying to do or aren't in the arena with you. Turn up the volume on the people who've done it before.

9. Seth Klarman: The Forgotten Lessons of 2008

In this excerpt from his annual letter, investing great Seth Klarman describes 20 lessons from the financial crisis which, he says, “were either never learned or else were immediately forgotten by most market participants.”

* * *

The Forgotten Lessons of 2008

One might have expected that the near-death experience of most investors in 2008 would generate valuable lessons for the future. We all know about the “depression mentality” of our parents and grandparents who lived through the Great Depression. Memories of tough times colored their behavior for more than a generation, leading to limited risk taking and a sustainable base for healthy growth. Yet one year after the 2008 collapse, investors have returned to shockingly speculative behavior. One state investment board recently adopted a plan to leverage its portfolio – specifically its government and high-grade bond holdings – in an amount that could grow to 20% of its assets over the next three years. No one who was paying attention in 2008 would possibly think this is a good idea.

Below, we highlight the lessons that we believe could and should have been learned from the turmoil of 2008. Some of them are unique to the 2008 melt- down; others, which could have been drawn from general market observation over the past several decades, were certainly reinforced last year. Shockingly, virtually all of these lessons were either never learned or else were immediately forgotten by most market participants.

Twenty Investment Lessons of 2008

1. Things that have never happened before are bound to occur with some regularity. You must always be prepared for the unexpected, including sudden, sharp downward swings in markets and the economy. Whatever adverse scenario you can contemplate, reality can be far worse.
2. When excesses such as lax lending standards become widespread and persist for some time, people are lulled into a false sense of security, creating an even more dangerous situation. In some cases, excesses migrate beyond regional or national borders, raising the ante for investors and governments. These excesses will eventually end, triggering a crisis at least in proportion to the degree of the excesses. Correlations between asset classes may be surprisingly high when leverage rapidly unwinds.
3. Nowhere does it say that investors should strive to make every last dollar of potential profit; consideration of risk must never take a backseat to return. Conservative positioning entering a crisis is crucial: it enables one to maintain long-term oriented, clear thinking, and to focus on new opportunities while others are distracted or even forced to sell. Portfolio hedges must be in place before a crisis hits. One cannot reliably or affordably increase or replace hedges that are rolling off during a financial crisis.
4. Risk is not inherent in an investment; it is always relative to the price paid. Uncertainty is not the same as risk. Indeed, when great uncertainty – such as in the fall of 2008 – drives securities prices to especially low levels, they often become less risky investments.
5. Do not trust financial market risk models. Reality is always too complex to be accurately modeled. Attention to risk must be a 24/7/365 obsession, with people – not computers – assessing and reassessing the risk environment in real time. Despite the predilection of some analysts to model the financial markets using sophisticated mathematics, the markets are governed by behavioral science, not physical science.
6. Do not accept principal risk while investing short-term cash: the greedy effort to earn a few extra basis points of yield inevitably leads to the incurrence of greater

risk, which increases the likelihood of losses and severe illiquidity at precisely the moment when cash is needed to cover expenses, to meet commitments, or to make compelling long-term investments.

7. The latest trade of a security creates a dangerous illusion that its market price approximates its true value. This mirage is especially dangerous during periods of market exuberance. The concept of “private market value” as an anchor to the proper valuation of a business can also be greatly skewed during ebullient times and should always be considered with a healthy degree of skepticism.
8. A broad and flexible investment approach is essential during a crisis. Opportunities can be vast, ephemeral, and dispersed through various sectors and markets. Rigid silos can be an enormous disadvantage at such times.
9. You must buy on the way down. There is far more volume on the way down than on the way back up, and far less competition among buyers. It is almost always better to be too early than too late, but you must be prepared for price markdowns on what you buy.
10. Financial innovation can be highly dangerous, though almost no one will tell you this. New financial products are typically created for sunny days and are almost never stress-tested for stormy weather. Securitization is an area that almost perfectly fits this description; markets for securitized assets such as subprime mortgages completely collapsed in 2008 and have not fully recovered. Ironically, the government is eager to restore the securitization markets back to their pre-collapse stature.
11. Ratings agencies are highly conflicted, unimaginative dupes. They are blissfully unaware of adverse selection and moral hazard. Investors should never trust them.
12. Be sure that you are well compensated for illiquidity – especially illiquidity without control – because it can create particularly high opportunity costs.
13. At equal returns, public investments are generally superior to private investments not only because they are more liquid but also because amidst distress, public markets are more likely than private ones to offer attractive opportunities to average down.
14. Beware leverage in all its forms. Borrowers – individual, corporate, or government – should always match fund their liabilities against the duration of their assets. Borrowers must always remember that capital markets can be extremely fickle, and that it is never safe to assume a maturing loan can be rolled over. Even if you are unleveraged, the leverage employed by others can drive dramatic price and valuation swings; sudden unavailability of leverage in the economy may trigger an economic downturn.
15. Many LBOs are man-made disasters. When the price paid is excessive, the equity portion of an LBO is really an out-of-the-money call option. Many fiduciaries placed large amounts of the capital under their stewardship into such options in 2006 and 2007.
16. Financial stocks are particularly risky. Banking, in particular, is a highly leveraged, extremely competitive, and challenging business. A major European bank recently announced the goal of achieving a 20% return on equity (ROE) within several years. Unfortunately, ROE is highly dependent on absolute yields, yield spreads, maintaining adequate loan loss reserves, and the amount of leverage used. What is the bank’s management to do if it cannot readily get to 20%? Leverage up? Hold riskier assets? Ignore the risk of loss? In some ways, for a major financial institution even to have a ROE goal is to court disaster.
17. Having clients with a long-term orientation is crucial. Nothing else is as important to the success of an investment firm.
18. When a government official says a problem has been “contained,” pay no attention.

19. The government – the ultimate short- term-oriented player – cannot with- stand much pain in the economy or the financial markets. Bailouts and rescues are likely to occur, though not with sufficient predictability for investors to comfortably take advantage. The government will take enormous risks in such interventions, especially if the expenses can be conveniently deferred to the future. Some of the price-tag is in the form of back- stops and guarantees, whose cost is almost impossible to determine.
20. Almost no one will accept responsibility for his or her role in precipitating a crisis: not leveraged speculators, not willfully blind leaders of financial institutions, and certainly not regulators, government officials, ratings agencies or politicians.

Below, we itemize some of the quite different lessons investors seem to have learned as of late 2009 – false lessons, we believe. To not only learn but also effectively implement investment lessons requires a disciplined, often contrary, and long-term-oriented investment approach. It requires a resolute focus on risk aversion rather than maximizing immediate returns, as well as an understanding of history, a sense of financial market cycles, and, at times, extraordinary patience.

False Lessons

1. There are no long-term lessons – ever.
2. Bad things happen, but really bad things do not. Do buy the dips, especially the lowest quality securities when they come under pressure, because declines will quickly be reversed.
3. There is no amount of bad news that the markets cannot see past.
4. If you've just stared into the abyss, quickly forget it: the lessons of history can only hold you back.
5. Excess capacity in people, machines, or property will be quickly absorbed.
6. Markets need not be in sync with one another. Simultaneously, the bond market can be priced for sustained tough times, the equity market for a strong recovery, and gold for high inflation. Such an apparent disconnect is indefinitely sustainable.
7. In a crisis, stocks of financial companies are great investments, because the tide is bound to turn. Massive losses on bad loans and soured investments are irrelevant to value; improving trends and future prospects are what matter, regardless of whether profits will have to be used to cover loan losses and equity shortfalls for years to come.
8. The government can reasonably rely on debt ratings when it forms programs to lend money to buyers of otherwise unattractive debt instruments.
9. The government can indefinitely control both short-term and long-term interest rates.
10. The government can always rescue the markets or interfere with contract law whenever it deems convenient with little or no apparent cost. (Investors believe this now and, worse still, the government believes it as well. We are probably doomed to a lasting legacy of government tampering with financial markets and the economy, which is likely to create the mother of all moral hazards. The government is blissfully unaware of the wisdom of Friedrich Hayek: "The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design.")

10. Can one person successfully play different roles that require different, and often competing, perspectives?

No, according to research by Max Bazerman, author of the best book on decision making I've ever read: *Judgment in Managerial Decision Making*.

Contrary to F. Scott Fitzgerald's famous quote, "the test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function," evidence suggests that even the most intelligent find it difficult to sustain opposing beliefs without the two influencing each other.

Why?

One reason is a bias from incentives. Another is bounded awareness. The auditor who desperately wants to retain a client's business may have trouble adopting the perspective of a dispassionate referee when it comes time to prepare a formal evaluation of the client's accounting practices.

* * * * *

In many situations, professionals are called upon to play dual roles that require different perspectives. For example, attorneys embroiled in pretrial negotiations may exaggerate their chances of winning in court to extract concessions from the other side. But when it comes time to advise the client on whether to accept a settlement offer, the client needs objective advice.

Professors, likewise, have to evaluate the performance of graduate students and provide them with both encouragement and criticism. But public criticism is less helpful when faculty serve as their students' advocates in the job market. And, although auditors have a legal responsibility to judge the accuracy of their clients' financial accounting, the way to win a client's business is not by stressing one's legal obligation to independence, but by emphasizing the helpfulness and accommodation one can provide.

Are these dual roles psychologically feasible?; that is, can one person successfully play different roles that require different, and often competing, perspectives? No.

Abstract

This paper explores the psychology of conflict of interest by investigating how conflicting interests affect both public statements and private judgments. The results suggest that judgments are easily influenced by affiliation with interested partisans, and that this influence extends to judgments made with clear incentives for objectivity. The consistency we observe between public and private judgments indicates that participants believed their biased assessments. Our results suggest that the psychology of conflict of interest is at odds with the way economists and policy makers routinely think about the problem. We conclude by exploring implications of this finding for professional conduct and public policy.

11. Hiring and the Mismatch Problem

“We want to cling to these incredibly outdated and simplistic measures of ability.”

— Malcolm Gladwell

Hiring is difficult and we tend to fall back on antiquated tools that give us a number (something, anything) to help us evaluate potential employees. This creates what Malcolm Gladwell calls “mismatch problems” — when the criteria for evaluating job candidates is out of step with the reality of the job demands.

Of course, we never think our criteria is out of step.

The mismatch problem shows itself all over the sports world. Although the study below was released in 2008, Gladwell has long illustrated the point that sports combines (events professional sports leagues hold for scouts to evaluate potential draftees based on a battery of ‘tests’) don’t work.

Gladwell’s results echo what Michael Lewis talks about in Moneyball: Combines are a poor predictor of determining ultimate success. Mismatch problems transcend the sports world. Teachers are another example. While we tend to evaluate teachers based on high test scores, the number of degrees and other credentials, that makes little difference in how well people actually teach.

Some companies, like Google, are trying to attack this problem. Google tried to find correlations between ‘great’ existing employees. When they find correlations, say like most people who score 9/10 on performance reviews, own a dog, they try to work that into their hiring. By constantly evaluating the actual results of their hiring, rethinking how they hire, and removing questions and evaluations that show no bearing on actual performance they are taking steps to try to eliminate the mismatch problem.

Google also knows hiring lacks certainty; they are just trying to continuously improve and refine the process. Interestingly, very few workforces are so evidence-based. Rather the argument becomes hiring works because it has always ‘worked’...

So why do mismatch problems exist?

Because we desire certainty. We want to impose certainty on something that is not, by nature, certain. The increase in complexity doesn’t help either.

Charlie Munger”“The craving for that physics-style precision does nothing but get you in terrible trouble.

12. Youngme Moon: On Business Competition and Escaping the Competitive Herd

There are many ways companies compete with one another. Unfortunately, a lot of those ways seem like nothing more than an expensive route to commoditization.

Companies are relentless in their pursuit of finding their weaknesses. They hire consultants, create branding maps, and solicit customer feedback. In our hyper-competitive world, this feedback tells us what we're missing—our weaknesses.

Companies, like people, fall into the habit of thinking the way to be better is to become more like everyone else.

- Jane's company just introduced a new line of green worms? We need green worms too preferably caffeine enhanced green worms.
- Bob decided to offer a new service? We need a new service too!
- When you ask your customers what they want they respond with what you're missing.
- When consultants compare your products to others they tell you what the competition offers that you don't.

"A funny thing happens when you begin to capture competitive differences on paper", says Harvard Professor Youngme Moon in her book Different: Escaping the Competitive Herd, "there is a natural inclination for folks in the competitive set to focus on eliminating differences rather than accentuating them."

Eliminating Differences

Our brains have been wired since birth to eliminate our differences.

We've all received school report cards. If you're like most people, at some point or another, you discovered you were below the class average in something. We all knew our parents would pick up on that weakness right away.

I cringed before coming home if I was even a hair below average in anything. After a mother saw that report card, it didn't matter how awesome you were in physics and math. The only thing that mattered was the fact that you were below average in art.

If your mother was like my mother, you wouldn't hear the end of it until you were once again average in art.

As adults, the only thing that has changed is who gives the report card.

Managers across the country hand out performance reviews that highlight your strengths and weaknesses. Of course, your boss wants you to address those weaknesses. He wants you to be more like everyone else. And since keeping your job is a pretty big incentive, you eagerly put your head down and do what you've done your whole life: rather than accentuate the differences you address your weaknesses and, in the process, become more average and indistinguishable from everyone else.

In the process, you move increasingly towards becoming a commodity.

Competition

It's like we're back in school all over; competitors and customers are telling us what we don't have—where we're below average. Only now this isn't grade school. The stakes are higher. It's winner take all and our competitive spirits take over. Except, increasingly, there is no winner.

Consumers can't tell company Y from Company X. Shelves in grocery stores are full of products that are all essentially the same. Companies think that the way to improve their laundry detergent is simply to add a new, previously unknown, fragrance. Being more of the same is, according to Moon, making brand loyalty harder to find.

Of course, if consumers pay close attention, these products have minute differences. But most of these differences are essentially meaningless.

Competing by eliminating our differences seems like nothing more than an expensive route to commoditization.

- When one airline introduced frequent flier miles the rest soon followed and the industry offerings were, once again, almost indistinguishable.
- When the Westin started offering the Heavenly Bed as a way to differentiate itself from the competition, almost immediately most other hotels at the same price point upgraded their mattresses too. The only problem was that room rates didn't increase to make up for the new investment. When everyone can offer essentially the same bed it becomes hard to differentiate yourself and raise prices in the process.

Ultimately, all of the advantages flow to the customers (and the mattress companies). According to Moon, "The more generous the baseline value proposition becomes within the category, the easier it becomes for consumers to become indifferent and the more expensive it becomes for businesses to compete." Investing in differentiation without the ability to increase prices or market share only reduces returns.

In the race to become more like everyone else, companies often don't think through the whole problem.

They "don't do the second step of the analysis which is to determine how much is going stay home and how much is just going to flow through to the customer," says longtime investor Charlie Munger.

I've never seen a single projection incorporating that second step in my life. And I see them all the time. Rather, they always read: This capital outlay will save you so much money that it will pay for itself in three years. So you keep buying things that will pay for themselves in three years. And after 20 years of doing it, somehow you've earned a return of only about 4% per annum.

If this sounds vaguely familiar it should. It's a variation of the prisoners' dilemma; the best choice for all companies is not the best choice for each individual company.

I'm not saying that all competition based on product augmentation (either through new sub-categories or new features) is a flawed strategy. Under the right circumstances, some of these investments can, and will, pan out. I am saying that if your business is pursuing one of these strategies as a means of differentiating yourself from competition, you need to critically think through this strategy.

13. Solution By Recognition

In his autobiography, legendary scientist Herber Simon attempts to explain the difference between experienced decision-makers and novices.

What is it that the expert has that the novice lacks? Simon argues the answer is not judgment or intuition but rather a repository of possible actions to take in a given circumstance.

One can train a man so that he has at his disposal a list or repertoire of the possible actions that could be taken under the circumstances...A person who is new at the game does not have immediately at his disposal a set of possible actions to consider, but has to construct them on the spot – a time- consuming and difficult mental task.

The decision maker of experience has at his disposal a checklist of things to watch out for before finally accepting a decision. A large part of the difference between the experienced decision maker and the novice in these situations is not any particular intangible like “judgment” or “intuition.” If one could open the lid, so to speak, and see what was in the head of the experienced decision-maker, one would find that he had at his disposal repertoires of possible actions; that he had checklists of things to think about before he acted; and that he had mechanisms in his mind to evoke these, and bring these to his conscious attention when the situations for decisions arose.

Most of what we do is to get people ready to act in situations of encounter consists of drilling in these lists into them sufficiently deeply so that they will be evoked quickly at the time of the decision.

Simon points out three advantages of the experts: (1) a repository of actions, (2) A checklist of things to think about before acting, and (3) making the process conscious. Let's briefly explore these three.

A repository of actions — If you're just starting out, copying others will quickly get you average results. You need not limit yourself to copying the living. You can build a repository of possible actions from the greats of history as well: Rockefeller, Mellon, Carnegie, etc.

A checklist of things to think about — Consider all of your decisions through a two-step process. First, what are the variables that govern the situation? For this, you can use your specific understanding and general knowledge of the world. Second, consider how you trick yourself.

Making the process conscious — It's easy to use your intuition. It takes a lot of work and effort to use a repeatable process for decisions that you can use to look for mistakes.

In the end, the novice spends a lot of time considering a possible course of action, whereas the expert spends much of their time thinking about where a particular action leaves him. The novice spends time searching for what they could do? The expert, already filled with a repository of possible actions, asks what happens if they take a particular action.

14. Choice Under Uncertainty

We use heuristics – rules of thumb – to make judgments. These can lead to certain predictable biases.

These can lead to certain predictable biases. For instance, we classify situations based on their representativeness. We judge the frequency of events based on the availability of examples in our minds. We interpret problems based on how they are framed. These heuristics have important implications for individuals and society as a whole.

Here are some common heuristics and how they can lead us astray.

Insensitivity to Base Rates

In statistics, a base rate is how probable something is in the absence of other information. When we receive information about the base rate of something, followed by some additional information, we tend to ignore the former. We disregard the base rate in favor of irrelevant information. For instance, if you tell study participants that 70% of the people in a room are lawyers and the rest are engineers, then ask them to guess the profession of a random, simply described person. People will guess they are a lawyer only half of the time, even though the probability is 70%.

Insensitivity to Sample Size

A sample size is the number of things observed in a statistical study, such as the number of people who answer a survey.

We often misjudge probabilities when we fail to consider the influence of sample size. For example, if you ask people to estimate the probability that more than 60% of the babies born in a hospital during a given week are male, people do not adjust their estimates based on the total number of babies. This is despite the fact that a percentage above 50% is more likely in smaller samples due to randomness.

Availability

The 'availability' of something refers to how easily it comes to mind. We tend to think things which are more available are more common than those which are harder to recall. In one experiment, subjects heard a list of names of both male and female people. They were then asked to judge whether there were more men or women named. In one list, the men were more famous, in the other the women were. Participants judged that there were more men when the names were famous and vice versa. The names were more available in their minds.

Framing and Loss Aversion

The way in which an uncertain possibility is presented may have a substantial effect on how people respond to it. When asked whether they would choose surgery in a hypothetical medical emergency, many more people said that they would when the chance of survival was given as 80 percent than when the chance of death was given as 20 percent.

15. Ethical Breakdowns: Why Good People often Let Bad Things Happen

When Charlie Munger recommended reading Max Bazerman's *Judgment in Managerial Decision Making* I had never heard of the HBS professor. A lot of reading later and I'm a huge fan.

In the HBR article below Bazerman covers some of the ground from his new book *Blind Spots* (see my [notes](#)).

These days, many of us are instructed to make decisions from a business perspective (thereby reducing or eliminating the ethical implications of our decisions). The Ford Pinto example below is very telling:

Consider an infamous case that, when it broke, had all the earmarks of conscious top-down corruption. The Ford Pinto, a compact car produced during the 1970s, became notorious for its tendency in rear-end collisions to leak fuel and explode into flames. More than two dozen people were killed or injured in Pinto fires before the company issued a recall to correct the problem. Scrutiny of the decision process behind the model's launch revealed that under intense competition from Volkswagen and other small-car manufacturers, Ford had rushed the Pinto into production. Engineers had discovered the potential danger of ruptured fuel tanks in preproduction crash tests, but the assembly line was ready to go, and the company's leaders decided to proceed. Many saw the decision as evidence of the callousness, greed, and mendacity of Ford's leaders—in short, their deep unethicity.

But looking at their decision through a modern lens—one that takes into account a growing understanding of how cognitive biases distort ethical decision making—we come to a different conclusion. We suspect that few if any of the executives involved in the Pinto decision believed that they were making an unethical choice. Why? Apparently because they thought of it as purely a business decision rather than an ethical one.

Taking an approach heralded as rational in most business school curricula, they conducted a formal cost-benefit analysis—putting dollar amounts on a redesign, potential lawsuits, and even lives—and determined that it would be cheaper to pay off lawsuits than to make the repair. That methodical process colored how they viewed and made their choice. The moral dimension was not part of the equation. Such “ethical fading,” a phenomenon first described by Ann Tenbrunsel and her colleague David Messick, takes ethics out of consideration and even increases unconscious unethical behavior.

16. The Art and Science of High-Stakes Decisions

How can anyone make rational decisions in a world where knowledge is limited, time is pressing, and deep thought is often unattainable?

Some decisions are more difficult than others. Yet we're often forced to make all of our decisions the way we make easy ones: on autopilot.

One particular difficulty we have is with making decisions that help us avoid threats which are low probability, but high stakes. We are least prepared to make the decisions that matter the most.

Sure we can pick the right brand of peanut butter with ease. But life offers few opportunities to prepare for the type of decisions which could have catastrophic consequences. The kinds of decisions which could wipe us out if we mess up.

Shortly after 9/11 some well-known academics got together to discuss¹ how people make choices involving low and ambiguous probability of a high-stakes loss.

High-stakes decisions involve two distinctive properties:

- 1) existence of a possible large loss (financial or emotional) and
- 2) the costs to reverse decisions once made are high.

More importantly, these professors wanted to determine if prescriptive guidelines for improving decision-making process could be created in an effort to help make better decisions.

Whether we're buying something at the grocery store or making a decision to purchase earthquake insurance, we operate in the same way. The possibility of catastrophic outcomes does little to reduce our reliance on heuristics (rules of thumb.) These serve us well most of the time, when the cost of an error is low. However, they can often be a poor technique for high-stakes decisions.

In order to make better high-stakes decisions, we need a better understanding of why we generally make poor decisions.

Here are several causes.

Poor understanding of probability.

Several studies show that people either utilize probability information insufficiently when it is made available to them or ignore it all together. In one study, 78% of subjects failed to seek out probability information when evaluating between several risky managerial decisions.

In the context of high-stakes decisions, the probability of an event causing loss may seem sufficiently low that organizations and individuals consider them not worth worry about. In doing so, they effectively treat the probability of something as zero or close to it.

An excessive focus on short time horizons.

Many high-stakes decisions are not obvious to the decision-maker. In part, this is because people tend to focus on the immediate consequences and not the long-term consequences.

A CEO near retirement has incentives to skimp on insurance to report slightly higher profits before leaving (shareholders are unaware of the increased risk and appreciate the increased profits). Governments tend to under-invest in less visible things like infrastructure because they have short election cycles. The long-term consequences of short-term thinking can be disastrous.

The focus on short-term decision making is one of the most widely-documented failings of human decision making. People have difficulty considering the future consequences of current actions over long periods of time. Garrett Hardin, the author of Filters against Folly, suggests we look at things through three filters (literacy, numeracy, and ecolacy). In ecolacy, the key question is "and then what?" And then what helps us avoid a focus solely on the short-term.

Excessive attention to what's available.

Decisions requiring difficult trade-offs between attributes or entailing ambiguity as to what a right answer looks like often leads people to resolve choices by focusing on the information most easily brought to mind. Sometimes things can be difficult to bring to mind. Constant exposure to low-risk events without realization leads to us being less concerned than we probably would warrant (it makes these events less available) and “proves” our past decisions to ignore low-risk events were right.

People refuse to buy flood insurance even when it is heavily subsidized and priced far below an actuarially fair value. Kunreuther et. al. (1993) suggests underreaction to threats of flooding may arise from *“the inability of individuals to conceptualize floods that have never occurred... Men on flood plains appear to be very much prisoners of their experience... Recently experienced floods appear to set an upward bound to the size of loss with which managers believe they ought to be concerned.”* Paradoxically, we feel more secure even as the “risk” may have increased.

Distortions under stress.

Most high-stakes decisions will be made under perceived (or real) stress. A large number of empirical studies find that stress focuses decision-makers on a selective set of cues when evaluating options and leads to greater reliance on simplifying heuristics. When we’re stressed, we’re less likely to think things through.

Over-reliance on social norms.

Most individuals have little experience with high-stakes decisions and are highly uncertain about how to resolve them (procedural uncertainty). In such cases—and combined with stress—the natural course of action is to mimic the behavior of others or follow established social norms. This is based on the psychological desire to fail conventionally.

The tendency to prefer the status-quo.

What happens when people are presented with difficult choices and no obvious right answer? We tend to prefer making no decision at all, we choose the norm.

In high-stakes decisions many options are better than the status-quo and we must make trade-offs. Yet, when faced with decisions that involve life-and-death trade-offs, people frequently remark “I’d rather not think about it.”

Failures to learn.

Although individuals and organizations are eager to derive intelligence from experience, the inferences stemming from that eagerness are often misguided. The problems lie partly in errors in how people think, but even more so in properties of experience that confound learning from it. Experience may possibly be the best teacher, but it is not a particularly good teacher.

As an illustration, one study finds that participants in an earthquake simulation tended to over-invest in mitigation that was normatively ineffective but under-invest when it is normatively effective. The reason was a misinterpretation of feedback; when mitigation was ineffective, respondents attributed the persistence of damage to the fact that they had not invested enough. by contract, when it was effective, they attributed the absence of damage to a belief that earthquakes posted limited damage risk.

Gresham’s Law of Decision making.

Over time, bad decisions will tend to drive out good decisions in an organization.

Improving.

What can you do to improve your decision-making?

A few things:

- 1) learn more about judgment and decision making;
- 2) encourage decision makers to see events through alternative frames, such as gains versus losses and changes in the status-quo;
- 3) adjust the time frame of decisions—while the probability of an earthquake at your plant may be 1/100 in any given year, the probability over the 25 year life of the plant will be 1/5; and

4) read Farnam Street!

17. Problem Solving Tools

When you're faced with problems, do you have the right tools to handle them? I didn't use to. My approach consisted mostly of guesswork and dumb luck. It worked sometimes. But I wanted to improve my ability to make good decisions. So I bought a lot of books on the topic, deciding to invest my time in finding tools that would improve my ability to solve problems.

The book with the most problem solving tools is one that I didn't think I'd enjoy at all: Problem Solving 101 by Ken Wantanabe.

This book offered a simple way to deal with problems that I can still recall today: (1) understand the current situation; (2) identify the root cause of the problem; (3) develop an effective action plan; and (4) execute until the problem is solved.

While simple—and remarkably effective—the process is not easy to execute.

If you've ever found yourself in the middle of a problem solving meeting you know that our bias towards action causes us to want to skip steps 1 and 2. We're prone to action. We want to shoot first and ask questions later.

This bias makes the simple four step approach above almost painful. If we think we understand the problem our minds naturally see steps 1 and 2 as a waste. The next time you find yourself in an unfortunate problem solving meeting ask yourself a few questions – are we addressing a problem or a symptom. If you're addressing a problem, does everyone in the room agree on the problem? How will we know we've solved the problem? Think about how doctors diagnose patients.

When you visit a doctor they first ask you questions about your symptoms and then take your temperature. They might run a blood test or two. Maybe order an X-Ray. They collect information that can be used to identify the root cause of your illness. After they've determined, and hopefully confirmed, a diagnosis they decide what to prescribe. While the process isn't the most efficient, it leads to good outcomes more often than not.

If you want to learn to solve problems better, you should buy problem solving 101. If you're really motivated, check out judgment and managerial decision making too. Exercising your brain is time well spent.

18. Albert Bernstein on the Dinosaur Brain and How To Make Bad Decisions

I enjoyed reading Dinosaur Brains: Dealing with All Those Impossible People at Work by Albert Bernstein.

Near the end of the book, Bernstein playfully illuminates how too many decisions get made.

1. *Take an idea from some authority figure, maybe your boss, or an author;*
2. *Tell everyone this idea is the basis for all the change you're going to make;*
3. *Do things the way you've always done them;*
4. *If something changes, take credit for it. If something bad happens, point out that this just goes to show that the old way of doing things was better.*

Sound familiar? It should.

Another approach, let's call it the more rational approach, might look something like:

1. Understand the problem, or set a goal;
2. Establish criteria (how will you know the problem is solved or you've reached your goal);
3. Generate alternatives;
4. Measure alternatives versus criteria and try a few of them;
5. Evaluate;
6. Choose the best solution.

This approach probably won't get you promoted, but it will *increase the odds* of making better decisions.

19. Suppressing Volatility: Making the World Less Predictable and More Dangerous

Nassim Taleb's article, The Black Swan of Cario, ([PDF](#)) on suppressing volatility is worth a read.

It's the ultimate example of iatrogenics by the fragilista.

Here are my notes.

- Complex systems that have artificially suppressed volatility tend to become extremely fragile, while at the same time exhibiting not visible risks.
- Seeking to restrict variability seems to be good policy (who does not prefer stability to chaos?), so it is with very good intentions that policymakers unwittingly increase the risk of major blowups.
- Because policymakers believed it was better to do something than to do nothing, they felt obligated to heal the economy rather than wait and see if it healed on its own.
- Those who seek to prevent volatility on the grounds that any and all bumps in the road must be avoided paradoxically increase the probability that a tail risk will cause a major explosion. Consider as a thought experiment a man placed in artificially sterilized environment for a decade and then invited to take a ride on a crowded subway; he would be expected to die quickly.
- But although these controls might work in some rare situations, in the long-term effect of any such system is an eventual and extremely costly blowup whose cleanup costs can far exceed the benefits accrued.
- ... Government interventions are laden with unintended—and unforeseen—consequences, particularly in complex systems, so humans must work with nature by tolerating systems that absorb human imperfections rather than seek to change them.
- Although it is morally satisfying, the film (inside job) naively overlooks the fact that humans have always been dishonest and regulators have always been behind the curve.
- Humans must try to resist the illusion of control: just as foreign policy should be intelligence-proof (it should minimize its reliance on the competence of information-gathering organizations and the predictions of “experts” in what are inherently unpredictable domains), the economy should be regulator-proof, given that some regulations simply make the system itself more fragile.
- The “turkey problem” occurs when a naive analysis of stability is derived from the absence of past variations.
- Imagine someone who keep adding sand to a sand pile without any visible consequence, until suddenly the entire pile crumbles. It would be foolish to blame the collapse on the last grain of sand rather than the structure of the pile, but that is what people do consistently, and that is the policy error.
- As with a crumbling sand pile, it would be foolish to attribute the collapse of a fragile bridge to the last truck that crossed it, and even more foolish to try to predict in advance which truck might bring it down.
- Obama's mistake illustrates the illusion of local causal chains—that is, confusing catalysts for causes and assuming that one can know which catalyst will produce which effect.
- Governments are wasting billions of dollars on attempting to predict events that are produced by interdependent systems and are therefore not statistically understandable at the individual level.

- Most explanations being offered for the current turmoil in the Middle East follow the “catalysts as causes” confusion. The riots in Tunisia and Egypt were initially attributed to rising commodity prices, not to stifling and unpopular dictatorships.
- Again, the focus is wrong even if the logic is comforting. It is the system and its fragility, not events, that must be studied—what physicists call “percolation theory,” in which the properties of the terrain are studied rather than those of a single element of the terrain.
- Humans fear randomness—a healthy ancestral trait inherited from a different environment. Whereas in the past, which was a more linear world, this trait enhanced, fitness and increased changes of survival, it can have the reverse effect in today’s complex world, making volatility take the shape of nasty Black Swans hiding behind deceptive periods of “great moderation.”
- But alongside the “catalysts as causes” confusion sit two mental biases: the illusion of control and the action bias (the illusion that doing something is always better than doing nothing.) This leads to the desire to impose man-made solutions. Greenspan’s actions were harmful, but it would have been hard to justify inaction in a democracy where the incentive is to always promise a better outcome than the other guy, regardless of the actual delayed cost.
- As Seneca wrote in De clementia, “repeated punishment, while it crushes the hatred of a few, stirs the hatred of all ... just as trees that have been trimmed throw out again countless branches.”
- The Romans were wise enough to know that only a free man under Roman law could be trusted to engage in a contract; by extension, only a free people can be trusted to abide by a treaty.
- As Jean-Jacques Rousseau put it, “A little bit of agitation gives motivation to the soul, and what really makes the species prosper is not peace so much as freedom.” With freedom comes some unpredictable fluctuation. This is one of life’s packages: there is no freedom without noise—and no stability without volatility.

20. Just for you: How Scarcity Factors Into Decisions

Rather than invest the time and effort necessary to ponder the pluses and minuses of most decisions, we tend to rely on quick heuristics to make most decisions. These rules of thumb help us save cognitive processing and navigate a world full of choices. Our tendency to make near-automatic decisions exposes us to exploitation by individuals who understand how heuristics work.

In the study below the authors were interested in what role the scarcity principle—the notion that the less available an opportunity appears, the more valuable it becomes—plays in decision compliance and heuristics.

Previously, there were two main ways that we thought scarcity played a role in compliance situations.

First, something, a product for example, can be described as being in short supply (or a limited edition. This is why sales often say “while supplies last” which leaves the reader with a slight nudge to purchase right now before missing out. Second, scarcity affects compliance when an opportunity is available for a limited time (e.g., “This weekend only.”) While these principles don’t ensure that someone will purchase a product, they do increase the odds of a purchase.

The authors wanted to test another way that scarcity might factor into our decisions. They hypothesized that we naturally rely on a rule of thumb (heuristic) that says one should take advantage of a unique opportunity. Specifically, “the rule says that we should take advantage of opportunities that few others have access to. For example, if I believe I can purchase tickets to a play at a low price that is unavailable to most people, I am more likely to buy the tickets than if I believe many people have access to this same price.”

We’ve all seen examples of this type of marketing already through “friends and family” and “not available to the public” events. But do they work?

The authors certainly think so:

individuals are more likely to comply with a request when they believe the request represents a unique opportunity not available to most people. The effect appears to operate independently of a limited supply effect and is not the result of a perceived need to help the requester. Moreover, the effect is found even when the opportunity is determined purely by chance, suggesting that individuals are not responding to a sense that they have somehow earned the opportunity. Rather, the unique opportunity effect appears to be the result of heuristic processing, i.e., people relying on a rule of thumb that says they should grab an opportunity available to few others.

Source: Burger, J. M. & Caldwell, D.C., When opportunity knocks: The effect of a perceived unique opportunity on compliance. *Group Processes and Intergroup Relations*

Abstract:

Four studies examined the effect of a perceived unique opportunity on compliance. In all four studies, participants who believed they had an opportunity available to few others were more likely to agree with a request than participants who believed the opportunity was widely available or participants who received no opportunity information. We attribute the effect to a widely held heuristic that one should take advantage of unique opportunities. Study results demonstrated that people respond to a perceived unique opportunity even when supplies are not limited and when the opportunity is the result of pure chance. The results of a mediation analysis supported the interpretation that the perceived uniqueness of the opportunity underlies the effect.

21. A Simple Checklist to Improve Decisions

We owe thanks to the publishing industry. Their ability to take a concept and fill an entire category with a shotgun approach is the reason that more people are talking about biases. Unfortunately, talk alone will not eliminate them but it is possible to take steps to counteract them. Reducing biases can make a huge difference in the quality of any decision and it is easier than you think.

In a recent article for Harvard Business Review, Daniel Kahneman (and others) describe a simple way to detect bias and minimize its effects in the most common type of decisions people make: determining whether to accept, reject, or pass on a recommendation. The Munger two-step process for making decisions is a more complete framework, but Kahneman's approach is a good way to help reduce biases in our decision-making. If you're short on time here is a simple checklist that will get you started on the path towards improving your decisions:

Preliminary Questions: Ask yourself

1. Check for Self-interested Biases

- Is there any reason to suspect the team making the recommendation of errors motivated by self-interest?
- Review the proposal with extra care, especially for overoptimism.

2. Check for the Affect Heuristic

- Has the team fallen in love with its proposal?
- Rigorously apply all the quality controls on the checklist.

3. Check for Groupthink

- Were there dissenting opinions within the team?
- Were they explored adequately?
- Solicit dissenting views, discreetly if necessary.
- Challenge Questions: Ask the recommenders

4. Check for Saliency Bias

- Could the diagnosis be overly influenced by an analogy to a memorable success?
- Ask for more analogies, and rigorously analyze their similarity to the current situation.

5. Check for Confirmation Bias

- Are credible alternatives included along with the recommendation?
- Request additional options.

6. Check for Availability Bias

- If you had to make this decision again in a year's time, what information would you want, and can you get more of it now?
- Use checklists of the data needed for each kind of decision.

7. Check for Anchoring Bias

- Do you know where the numbers came from? Can there be
- ...unsubstantiated numbers?
- ...extrapolation from history?
- ...a motivation to use a certain anchor?
- Reanchor with figures generated by other models or benchmarks, and request new analysis.

8. Check for Halo Effect

- Is the team assuming that a person, organization, or approach that is successful in one area will be just as successful in another?
- Eliminate false inferences, and ask the team to seek additional comparable examples.

9. Check for Sunk-Cost Fallacy, Endowment Effect

- Are the recommenders overly attached to a history of past decisions?

- Consider the issue as if you were a new CEO.
 - Evaluation Questions: Ask about the proposal
10. Check for Overconfidence, Planning Fallacy, Optimistic Biases, Competitor Neglect
- Is the base case overly optimistic?
 - Have the team build a case taking an outside view; use war games.
11. Check for Disaster Neglect
- Is the worst case bad enough?
 - Have the team conduct a premortem: Imagine that the worst has happened, and develop a story about the causes.
12. Check for Loss Aversion
- Is the recommending team overly cautious?
 - Realign incentives to share responsibility for the risk or to remove risk.

22. Promoting People In Organizations

In their 1978 paper Performance Sampling in Social Matches, researchers March and March discussed the implications of performance sampling for understanding careers in organizations. They came to some interesting conclusions with implications for those of us working in organizations.

Considerable evidence exists documenting that individuals confronted with problems requiring the estimation of proportions act as though sample size were substantially irrelevant to the reliability of their estimates. We do this in hiring all the time. Yet we know that sample size matters.

On how this cognitive bias affects hiring, March and March offer some good insights including the false record effect, the hero effect, the disappointment affect.

False Record Effect

A group of managers of identical (moderate) ability will show considerable variation in their performance records in the short run. Some will be found at one end of the distribution and will be viewed as outstanding; others will be at the other end and will be viewed as ineffective. The longer a manager stays in a job, the less the probable difference between the observed record of performance and actual ability. Time on the job increased the expected sample of observations, reduced expected sampling error, and thus reduced the chance that the manager (of moderate ability) will either be promoted or exit.

Hero Effect

Within a group of managers of varying abilities, the faster the rate of promotion, the less likely it is to be justified. Performance records are produced by a combination of underlying ability and sampling variation. Managers who have good records are more likely to have high ability than managers who have poor records, but the reliability of the differentiation is small when records are short.

Disappointment Effect

On the average, new managers will be a disappointment. The performance records by which managers are evaluated are subject to sampling error. Since a manager is promoted to a new job on the basis of a good previous record, the proportion of promoted managers whose past records are better than their abilities will be greater than the proportion whose past records are poorer. As a result, on the average, managers will do less well in their new jobs than they did in their old ones, and observers will come to believe that higher level jobs are more difficult than lower level ones, even if they are not.

...The present results reinforce the idea that indistinguishability among managers is a joint property of the individuals being evaluated and the process by which they are evaluated. Performance sampling models show how careers may be the consequences of erroneous interpretations of variations in performance produced by equivalent managers. But they also indicate that the same pattern of careers could be the consequence of unreliable evaluation of managers who do, in fact, differ, or of managers who do, in fact, learn over the course of their experience.

But hold on a second before you stop promoting new managers (who, by definition, have a limited sample size).

I'm not sure that sample size alone is the right way to think about this.

Consider two people: Manager A and Manager B who are up for promotion. Manager A has 10 years of experience and is an "all-star" (that is great performance with little variation in observations). Manager B, on the other hand, has only 5 years of experience but has shown a lot of variance in performance.

If you had to hire someone you'd likely pick A. But it's important not to misinterpret the results of March and March and dig a little deeper.

What if we add one more variable to our two managers.

Manager A's job has been "easy" whereas Manager B took a very "tough" assignment.

With this in mind, it seems reasonable to conclude that Manager B's variance in performance could be explained by the difficulty of their task. This could also explain the lack of variance in Manager A's performance.

Some jobs are tougher than others.

If you don't factor in degree-of-difficulty you're missing something big and sending a message to your workforce that discourages people from taking difficult assignments.

The importance of measuring performance over a meaningful sample size is the key to distinguishing between luck and skill. When in doubt go with the person that's excelled with more variance in difficulty.

23. Intervention Bias: When to Step in and When To Leave Things Alone

When we want to improve a situation, our first instinct is often to change something. Try something new. Make adjustments. Anything other than what we're already doing. But this approach is frequently misguided. Sometimes doing nothing at all or removing inputs is the better approach.

Nassim Taleb, author of many books—The Black Swan, Fooled By Randomness, and The Bed of Procrustes—also wrote a book on fragility called Antifragile (antifragile defined).

One of the core ideas of Antifragile is around our tendency to intervene in situations *regardless* of whether that benefit is a net positive. There is a term for this, *iatrogenics*. Why do we do this? I can think of three good reasons: 1) we struggle to think in systems, 2) we believe that systems would benefit from our intervention and guidance, and 3) we believe that we know how to fix things to make them better.

The first reason is that we are unable to think in terms of second, third, and nth order consequences. More importantly, we are unaware that we need to. The second reason is that we see systems operating and see a flaw in the system that we could do better. Usually, it's minor. This combines with the third reason, which is we think we are the very person that needs to fix the system.

Here's Taleb expanding on this idea:

There is a mental defect psychologists call illusion of control that lead to a default to action rather than inaction, even when the benefits of inaction might be greater than those of action. So the intervention bias" (do something seems better than doing nothing, which is fine except that there are cases in which it gets us in trouble). The illusion of control was meant to show how "irrational" (according to some norm of behavior) we humans can be by giving ourselves the illusion to manage the uncontrollable around us: for instance gamblers cannot resist the pressure to do something in order to improve the outcome, such as throw the die with violence when they need a high number, or throw it softly in order to get a low one. Traders cannot resist wearing the same "lucky" shirt (often unwashed) to improve their day and feel they need to find similar way to take control of their destiny. This mental bias leads to all manner of patently "irrational" actions such as belief in paranormal, alternative medicine and many such actions often put under the umbrella magical thinking. Now the irony is that while this bias was devised to expose patently nonscientific fields, it largely affects many things you learn in college, particularly in social science. Many matters we deem scientific are just the fruit of that very illusion of control masquerading as science with, of course, actions to "improve" mankind.

Why is the scientific illusion of control worse than that of the pedestrian version? Because, tout simplement, these gamblers superstitions are benign, not much worse than doing nothing—they may be even beneficial in hidden ways, and in the right environment. But a doctor tinkering with your system or an army playing with a complex system with opaque causal links, say by invading Iraq, giving chemicals to kids and threatening their brain balance, or intervening in the environment, is far worse than nothing.

This variant of the illusion of control leads to the denigration of acts of omission (not doing something, letting things run their own course, leaving nature or the human body alone) as compared to doing something (such as operating on a patient or prescribing medication). This, we will see is the reason medicine used, until recent history, to kill more patients than it saved (and did not even get close to realizing it), and economists of the sophisticated equation-carrying variety, I will hope to convince you, have been particularly harmful to the economic health of societies—central bankers, and finance ministers, by tinkering with economic life, have caused massive instability.

24. Why is it so Hard to Kill a Cockroach with your Shoe?

The Cockroach Papers by Richard Schwied is an interesting book if you are looking to learn more about biology or evolution. Cockroaches are built for survival no matter what the world throws at them. Their ability to adapt is just amazing.

Here are some of my notes from the book.

Food and Water

German cockroaches, *Blattella germanica*, the most common domestic roach in the United States, have been observed to live 45 days without food, and more than two weeks with neither food nor water.

Cockroaches will eat almost anything including glue, feces, hair, decayed leaves, paper, leather, banana skins, other cockroaches, and dead or alive humans. They will not, however, eat cucumbers. They are particularly fond of dried milk around a baby's mouth. The roaches are not confined to any particular environment and live in a tremendous variety of places, from underneath woodpiles in Alaska to high in the jungle canopy in the tropics of Costa Rica. They are even found in the caves of Borneo and under the thorn bushes in arid stretches of Kenya. Wherever they live, they are masters at surviving. They are, Schwied writes, "undeniably one of the pinnacles of evolution on this planet."

Why is it so hard to kill a cockroach with your shoe?

Schweid observes that "when a cockroach feels a breeze stirring the hairs on its cerci, it does not wait around to see what is going to happen next, but leaves off whatever it is doing and goes immediately into escape mode in something remarkably close to instantaneous fashion." Studies show that a cockroach can respond in about 1/20th of a second, so "by the time a light comes on and human sight can register it, much less react by reaching for and hoisting something with which to squash it, a roach is already locomoting towards safety."

Blood

Cockroach blood is a pigments, clear substance circulating through the interior of its body, and what usually spurts out of a roach when its hard, , outer shell—its exoskeleton—is penetrated or squashed is a cream-colored substance resembling nothing so much as pus or smegma.

Brains

Cockroaches have two brains—one inside their skulls, and a second, more primitive brain that is back near their abdomen.

Copulation

Schweid says "Pheromones, chemical signals of sexual readiness, operate between a male and female cockroach to initiate courtship and copulation. A sexually receptive female assumes a posture with her abdomen lowered and her wings raised and gives off a pheromone that attracts males." If he finds a virgin female, a male cockroach after some antenna rubbing foreplay will turn away from the female and raise his wings, "an invitation to her to mount." Copulation frequently lasts an hour. After sex, female cockroaches store the sperm and use them as needed. The sperm may last her a lifetime.

"The evolutionary strategy employed by cockroaches to reproduce is considerably more efficient than that employed by humans." Oddly, there are certain species of cockroaches that can, at least for a generation or two, reproduce without any sperm. Schweid says "the females unfertilized eggs will develop and hatch—always producing new females."

Partying

Betty Faber, the former staff entomologist for the New York Natural History Museum, says "Females go to bed—by which I mean disappear back to the harborage—at night earlier than males."

Socialness

Schweid writes, "cockroaches, while not social insects in the entomological sense of bees

or ants with clearly assigned tasks that benefit the whole community, do clearly take pleasure in the company of other roaches, and the aggression pheromones draw them together, eliciting their effects regardless of the sex or age.” Cockroaches reared singly develop more slowly and take longer between molts than do those reared in a group. Although those groups can be too big “just as development is delayed in young cockroaches if they are isolated, over-crowding also extends the time between molts. So there is yet another kind of pheromone, called a “dispersal pheromone,” and it serves as the chemical signal that it is time to look for a new, slightly roomier harborage. This chemical is found in the insects’ saliva, and has just the opposite effect of the aggression attractant, in that it repulses cockroaches and causes them to look elsewhere for harborage.”

Radiation

In case you’re thinking we can just nuke the little critters you should know that cockroaches survived the atomic bombs test blast at Bikini. “There is such a thing as a lethal dose of radiation for a cockroach, but it is a lot higher than our own.”

Predators

“While few humans may eat them, the roach has both external and internal predators and parasites. There are centipedes that have a primary diet of cockroaches. Mantises, ants, and scorpions will eat them, as will a variety of larger animals including toads, frogs, possums, hedgehogs, armadillos, mongooses, monkeys, lizards, spiders, mice, cats, and birds”

Sleeping

Roaches are nocturnal and pass their days sleeping.

Male aggression

“Cockroaches, like so many other species including our own, have male aggression rituals. They have their own inventory of aggressive behaviors, a scale of conflict that begins with threatening postures. Beyond that they graduate to antenna lashing—a form of which is also present in male/female encounters to determine if a female is sexually receptive—and biting. Sex and territory seem to be the primary motivations for fighting between male cockroaches: These clashes never end in death, but always in the retreat of one fighter.”

Trapping a cockroach

“Stale white bread moistened with warm, slightly soured beer” is the most reliable and effective. “This is typically placed at the bottom of a small jar—a Gerber’s baby food jar, say—around the interior rim of which a petroleum jelly like Vaseline has been applied. The cockroach can climb in from the outside but can’t climb back out.”

What should you do if you get a cockroach stuck in your ear?

“It is, according to all accounts, painful and horrifying, although a little mineral oil or lidocaine sprayed into the ear is usually enough to dislodge the intruder.”

Exterminators

Exterminators primarily employ two methods to kill the cockroach: gas and gel. The gel is way more effective but many still rely on the spray. Why? “The major problem that exterminators have with the gel is that it has no immediate knockdown effect.”

John Wickham, an English pest control consultant defined knockdown as: “The inability of the insect to move in a sufficiently coordinated manner to right itself and progress normally.” When a roach eats gel bait—the safer of the two methods—it heads home before the active poison kills it.

“Customers who are paying \$75 an hour like to see these roaches struggling to get up, in agony and convulsions, and the sprays, with substantial knockdown effect, provide them that gratifying visual reassurance that the problem is being solved and that they are getting their money’s worth.

It’s unlikely this poison will have much long term impact. “Almost as soon as an effective poison goes into widespread use, cockroaches begin to develop Resistance. And,

typically, the most efficacious products developed, those that do the best job, turn out to be more detrimental to our own health than are the roaches.”

25. Too Many Decisions

The first thing you do in the morning is to make a decision. And those decisions pile up fast. Should I hit snooze? What clothes should I wear? What should I have for breakfast? What combination of choices from Starbucks will make my morning go smoother? You've already made more decisions than most of our ancestors would make in a day by the time you arrive at work. Unfortunately — at least as far as the quality of your decisions is concerned — your day is just getting started.

Decisions take a lot of mental effort. And that's a problem. Making choices reduces physical stamina, reduces persistence, reduces willpower, and even encourages procrastination.

John Tierney, adapted part of his upcoming book, *Willpower: Rediscovering the Greatest Human Strength*, for a New York Times Magazine article: Do You Suffer From Decision Fatigue?

Our brains are tired of making decisions. This has been coined as "Decision fatigue" and helps explain why, in the words of Tierney, "normally sensible people get angry at colleagues and families, splurge on clothes, buy junk food at the supermarket and can't resist the dealer's offer to rustproof their new car."

No matter how rational you are (or try to be), you can't make decision after decision without paying a mental price. "It's different", Tierney writes, "from ordinary physical fatigue — you're not consciously aware of being tired — but you're low on mental energy."

The more choices you make, the harder they become. To save energy your brain starts to look for shortcuts. One shortcut is to be reckless and act impulsively (rather than rationally). The other shortcut is to do nothing, which saves as much energy as possible (and often creates bigger problems in the long run).

It turns out that glucose is a vital part of willpower. Tierney writes, "Your brain does not stop working when glucose is low. It stops doing some things and starts doing others. It responds more strongly to immediate rewards and plays less attention to long-term prospects."

Glucose explains a lot. For instance, why people with phenomenally strong willpower in the rest of their lives struggle to lose weight. It also explains how someone can resist junk all day but gorge on a bag of chips right before bed. We start the day with a clean slate and the best intentions. It's fairly easy to resist fatty muffins at breakfast and skip the snickers bar fix after lunch. But each of these decisions—resistances—consumes glucose and lowers our willpower. Eventually, we need to replenish it. But that requires glucose, which creates a catch-22: We need willpower not to eat but in order to have willpower we need to eat.

Tierney continues, "when the brain's regulatory powers weaken, frustrations seem more irritating than usual. Impulses to eat, drink, spend and say stupid things feel more powerful (and alcohol causes self-control to decline further)...ego-depleted humans become more likely to get into needless fights over turf."

Although we have no way of knowing, it seems like a fairly safe bet that we make more decisions now than at any point in history. That is, we're under more decision making strain and we're starting to show cracks.

The internet and our ability to "multitask" isn't helping, argues Nicolas Carr, author of *The Shallows: What the Internet is Doing to Our Brain*: "A growing body of scientific evidence suggests that the Net, with its constant distractions and interruptions, is also turning us into scattered and superficial thinkers." Carr argues that our continuously connected, constantly distracted lives (read—constantly making decisions) rob us of the opportunity for deep thinking. The kind of thinking that we need to make a lot of decisions. By making thousands of trivial decisions every day, we rob ourselves of the ability to make more difficult contemplative decisions.

There are ways to improve our ability to make better decisions. Social psychologist Roy Baumeister has done research showing that people with the best self-control are the ones who structure their lives to conserve willpower. “They don’t,” Tierney suggests, “schedule endless back-to-back meetings. They avoid temptations like all-you-can-eat buffets, and they establish habits that eliminate the mental effort of making choices. Instead of deciding every morning whether or not to force themselves to exercise, they set up regular appointments to work out with a friend. Instead of counting on willpower to remain robust all day, they conserve it so that it’s available for emergencies and important decisions.” Wise advice we should all follow.

Organizations should start thinking carefully about how their employees actually end up spending their time and what they “waste” their precious mental energy on. If they’re filling out forms, trudging through a bureaucratic morass, or attending more than a few meetings a day, they’re likely using their mental energy on things that add little value to the organization.

26. Thomas Kuhn: The Structure of Scientific Revolutions

"The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgment leading to that decision involves the comparison of both paradigms with nature and with each other."

The progress of science is commonly perceived of as a continuous, incremental advance, where new discoveries add to the existing body of scientific knowledge. This view of scientific progress, however, is challenged by the physicist and philosopher of science Thomas Kuhn, in his book The Structure of Scientific Revolutions. Kuhn argues that the history of science tells a different story, one where science proceeds with a series of revolutions interrupting normal incremental progress.

"A prevailing theory or paradigm is not overthrown by the accumulation of contrary evidence," Richard Zeckhauser wrote, "but rather by a new paradigm that, for whatever reasons, begins to be accepted by scientists."

Between scientific revolutions, old ideas and beliefs persist. These form the barriers of resistance to alternative explanations.

Zeckhauser continues "In this view, scientific scholars are subject to status quo persistence. Far from being objective decoders of the empirical evidence, scientists have decided preferences about the scientific beliefs they hold. From a psychological perspective, this preference for beliefs can be seen as a reaction to the tensions caused by cognitive dissonance. "

* * *

Gary Taubes posted an excellent blog post discussing how paradigm shifts come about in science. He wrote:

...as Kuhn explained in The Structure of Scientific Revolutions, his seminal thesis on paradigm shifts, the people who invariably do manage to shift scientific paradigms are "either very young or very new to the field whose paradigm they change... for obviously these are the men [or women, of course] who, being little committed by prior practice to the traditional rules of normal science, are particularly likely to see that those rules no longer define a playable game and to conceive another set that can replace them."

So when a shift does happen, it's almost invariably the case that an outsider or a newcomer, at least, is going to be the one who pulls it off. This is one thing that makes this endeavor of figuring out who's right or what's right such a tricky one. Insiders are highly unlikely to shift a paradigm and history tells us they won't do it. And if outsiders or newcomers take on the task, they not only suffer from the charge that they lack credentials and so credibility, but their work de facto implies that they know something that the insiders don't – hence, the idiocy implication.

...This leads to a second major problem with making these assessments – who's right or what's right. As Kuhn explained, shifting a paradigm includes not just providing a solution to the outstanding problems in the field, but a rethinking of the questions that are asked, the observations that are considered and how those observations are interpreted, and even the technologies that are used to answer the questions. In fact, often the problems that the new paradigm solves, the questions it answers, are not the problems and the questions that practitioners living in the old paradigm would have recognized as useful.

"Paradigms provide scientists not only with a map but also with some of the direction essential for map-making," wrote Kuhn. "In learning a paradigm the scientist acquires theory, methods, and standards together, usually in an inextricable mixture. Therefore, when paradigms change, there are usually significant shifts in the criteria determining the legitimacy both of problems and of proposed solutions."

As a result, Kuhn said, researchers on different sides of conflicting paradigms can barely discuss their differences in any meaningful way: "They will inevitably talk through each other when debating the relative merits of their respective paradigms. In the partially

circular arguments that regularly result, each paradigm will be shown to satisfy more or less the criteria that it dictates for itself and to fall short of a few of those dictated by its opponent."

But Taubes' explanation wasn't enough to satisfy my curiosity.

The Structure of Scientific Revolutions

To learn more on how paradigm shifts happen, I purchased Kuhn's book, The Structure of Scientific Revolutions, and started to investigate.

Kuhn writes:

"The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgment leading to that decision involves the comparison of both paradigms with nature and with each other."

Anomalies are not all bad.

Yet any scientist who pauses to examine and refute every anomaly will seldom get any work done.

...during the sixty years after Newton's original computation, the predicted motion of the moon's perigee remained only half of that observed. As Europe's best mathematical physicists continued to wrestle unsuccessfully with the well-known discrepancy, there were occasional proposals for a modification of Newton's inverse square law. But no one took these proposals very seriously, and in practice this patience with a major anomaly proved justified. Clairaut in 1750 was able to show that only the mathematics of the application had been wrong and that Newtonian theory could stand as before. ... persistent and recognized anomaly does not always induce crisis. ... It follows that if an anomaly is to evoke crisis, it must usually be more than just an anomaly.

So what makes an anomaly worth the effort of investigation?

To that question Kuhn responds, "there is probably no fully general answer." Einstein knew how to sift the essential from the non-essential better than most.

When the anomaly comes to be recognized as more than another puzzle of science the transition, or revolution, has begun.

The anomaly itself now comes to be more generally recognized as such by the profession. More and more attention is devoted to it by more and more of the field's most eminent men. If it still continues to resist, as it usually does not, many of them may come to view its resolution as the subject matter of their discipline. ...

Early attacks on the anomaly will have followed the paradigm rules closely. As time passes and scrutiny increases, more of the attacks will start to diverge from the existing paradigm. It is "through this proliferation of divergent articulations," Kuhn argues, "the rules of normal science become increasingly blurred.

Though there still is a paradigm, few practitioners prove to be entirely agreed about what it is. Even formally standard solutions of solved problems are called into question."

Einstein explained this transition, which is the structure of scientific revolutions, best. He said: *"It was as if the ground had been pulled out from under one, with no firm foundation to be seen anywhere, upon which one could have built."*

All scientific crises begin with the blurring of a paradigm.

In this respect research during crisis very much resembles research during the pre-paradigm period, except that in the former the locus of difference is both smaller and more clearly defined. And all crises close in one of three ways. Sometimes normal science ultimately proves able to handle the crisis—provoking problem despite the despair of those who have seen it as the end of an existing paradigm. On other occasions the problem resists even apparently radical new approaches. Then scientists may conclude that no solution will be forthcoming in the present state of their field. The problem is labelled and set aside for a future generation with more developed tools. Or, finally, the case that will

most concern us here, a crisis may end up with the emergence of a new candidate for paradigm and with the ensuing battle over its acceptance.

But this isn't easy.

The transition from a paradigm in crisis to a new one from which a new tradition of normal science can emerge is far from a cumulative process, one achieved by an articulation or extension of the old paradigm. Rather it is a reconstruction of the field from new fundamentals, a reconstruction that changes some of the field's most elementary theoretical generalizations as well as many of its paradigm methods and applications.

Who solves these problems? Do the men and women who have invested a large portion of their lives in a field or theory suddenly confront evidence and change their mind? Sadly, no.

Almost always the men who achieve these fundamental inventions of a new paradigm have been either very young, or very new to the field whose paradigm they change. And perhaps that point need not have been made explicit, for obviously these are men who, being little committed by prior practice to the traditional rules of normal science, are particularly likely to see that those rules no longer define a playable game and to conceive another set that can replace them.

And

Therefore, when paradigms change, there are usually significant shifts in the criteria determining the legitimacy both of problems and of proposed solutions.

That observation returns us to the point from which this section began, for it provides our first explicit indication of why the choice between competing paradigms regularly raises questions that cannot be resolved by the criteria of normal science. To the extent, as significant as it is incomplete, that two scientific schools disagree about what is a problem and what is a solution, they will inevitably talk through each other when debating the relative merits of their respective paradigms. In the partially circular arguments that regularly result, each paradigm will be shown to satisfy more or less the criteria that it dictates for itself and to fall short of a few of those dictated by its opponent. There are other reasons, too, for the incompleteness of logical contact that consistently characterizes paradigm debates. For example, since no paradigm ever solves all the problems it defines and since no two paradigms leave all the same problems unsolved, paradigm debates always involve the question: Which problems is it more significant to have solved? Like the issue of competing standards, that questions of values can be answered only in terms of criteria that lie outside of normal science altogether.

Many years ago Max Planck offered this insight: "A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

27. The Decision-Making Flaw in Powerful People

The paper below finds a link between having a sense of power and ignoring the advice of others.

The authors argue that power increases confidence, which can lead to an excessive belief in one's own judgment.

In a sense, powerful people think they are right because of their place in the organization, not because of their knowledge.

This, of course, leads to flawed decisions.

From Strategy+Business:

Previous research has shown that the quality of decision making declines when people hew too much to their own beliefs and discount too readily the advice of others; outside information helps “average out” the distortions that can result when people give a great deal of weight to their own opinions and first impressions. This paper is among the first to examine whether power — defined as an individual’s “capacity to influence others, stemming in part from his or her control over resources, rewards, or punishments” — reduces or increases a person’s willingness to heed advice.

... In addition to confirming the previous experiments’ finding that more powerful people were less likely to take advice and were more likely to have high confidence in their answers, this final experiment showed that high-power participants were less accurate in their answers than low-power participants. By calculating the mean deviation between respondents’ initial estimates and the true answers, the researchers showed that low-power participants came significantly closer in their final estimates to the real tuition numbers because they “averaged” their initial guesses with the input from the advisors. The researchers propose that their findings have troubling implications for organizations — and that power could negatively affect not just advice taking, but also an individual’s approach to seeking help or accepting performance feedback. But because power and confidence are so interrelated, there are ways to mitigate the problem. By “directly addressing the inflated confidence levels of powerful individuals,” the researchers write, “organizations may be able to help people with power take (and/or seek) advice when it is valuable to do so.”

For one thing, organizations could formally include advice gathering at the earliest stages of the decision-making process, before powerful individuals have a chance to form their own opinions. Encouraging leaders to refrain from commenting on decisions publicly could also keep them from feeling wedded to a particular point of view.

Bottom Line:

Powerful people are less likely to take advice from others, in large part because they have high confidence in their own judgment and don’t feel the need to incorporate outside views. By not factoring in others’ advice, however, people in power risk making flawed decisions.

Abstract:

Incorporating input from others can enhance decision quality, yet often people do not effectively utilize advice. We propose that greater power increases the propensity to discount advice, and that a key mechanism explaining this effect is elevated confidence in one’s judgment. We investigate the relationships across four studies: a field survey where working professionals rated their own power and confidence and were rated by coworkers on their level of advice taking; an advice taking task where power and confidence were self-reported; and two advice taking experiments where power was manipulated. Results consistently showed a negative relationship between power and advice taking, and evidence of mediation through confidence. The fourth study also revealed that higher power participants were less accurate in their final judgments. Power can thus exacerbate

the tendency for people to overweight their own initial judgment, such that the most powerful decision makers can also be the least accurate.

Source: Kelly E. See, Elizabeth W. Morrison, Naomi B. Rothman, Jack B. Soll, The detrimental effects of power on confidence, advice taking, and accuracy, Organizational Behavior and Human Decision Processes

28. Gary Klein: Streetlights and Shadows

Gary Klein's book Streetlights and Shadows looks at commonly held maxims for decision-making and overturns them, revealing cases where these practices break down. The book is an impressive look at why these problems occur and how we can become more resilient decision makers.

Here are ten beliefs that we hold about systems and decision making along with a proposed replacement.

1. *Teaching people procedures helps them perform tasks more skillfully.*

Replacement: In complex situations people will need judgment skills to follow procedures effectively and go beyond them when necessary.

2. *Decision biases distort our thinking.*

Replacement: Decision biases reflect our thinking. Rather than discouraging people from using heuristics, we should help them build expertise so they can use their heuristics more effectively.

2(a). *Successful decision makers rely on logic and statistics instead of intuition.*

Replacement: We need to blend systemic analysis and intuition.

3. *To make a decision, generate several options and compare them to pick the best one.*

Replacement: Good decision makers use their experience to recognize effective options and evaluate them through mental simulation.

4. *We can reduce uncertainty by gathering more information. Too much information can get in our way.*

Replacement: In complex environments, what we need isn't the right information but the right way to understand the information we have.

5. *It's bad to jump to conclusions – wait to see the evidence.*

Replacement: Speculate, but test your speculations instead of committing to them.

6. *To get people to learn, give them feedback on the consequences of their actions.*

Replacement: We can't just give feedback; we have to find ways to make it understandable.

7. *To make sense of a situation, we draw inferences from the data.*

Replacement: We make sense of data by fitting them into stories and other frames, but the reverse also happens: our frames determine what counts as data.

8. *The starting point for any project is a clear description of the goal.*

Replacement: When facing wicked problems, we should redefine goals as we try to reach them.

9. *Our plans will succeed more often if we identify the biggest risks and then find ways to eliminate them.*

B: We should cope with risk in complex situations by relying on resilience engineering rather than attempting to identify and prevent risks.

10. *Leaders can create common ground by assigning roles and setting ground rules in advance.*

Replacement: All team members are responsible for continually monitoring common ground for breakdowns and repairing the breakdown when necessary.

29. The Noise Bottleneck: When More Information is Harmful

When consuming information, we strive for more signal and less noise. The problem is a cognitive illusion: we feel like the more information we consume the more signal we receive.

While this is probably true on an absolute basis, Nassim Taleb argues in this excerpt from Antifragile, that it is not true on a relative basis. He calls it the noise bottleneck. Taleb argues that as you consume more data and the ratio of noise to signal increases, the less you know about what's going on and the more inadvertent trouble you are likely to cause.

The Institutionalization Of Neuroticism

Imagine someone of the type we call neurotic in common parlance. He is wiry, looks contorted, and speaks with an uneven voice. His necks moves around when he tries to express himself. When he has a small pimple his first reaction is to assume that it is cancerous, that the cancer is of the lethal type, and that it has already spread. His hypochondria is not just in the medical department: he incurs a small setback in business and reacts as if bankruptcy were both near and certain. In the office, he is tuned to every single possible detail, systematically transforming every molehill into a mountain. The last thing you want in life is to be in the same car with him when stuck in traffic on your way to an important appointment. The expression overreact was designed with him in mind: he does not have reactions, just overreactions.

Compare him to someone with the opposite temperament, imperturbable, with the calm under fire that is considered necessary to become a leader, military commander or a mafia godfather. Usually unruffled and immune to small information—they can impress you with their self-control in difficult circumstances. For a sample of a composed, call and pondered voice, listen to interview of “Sammy the Bull” Salvatore Gravano who was involved in the murder of nineteen people (all competing mobsters). He speaks with minimal effort. In the rare situations when he is angry, unlike with the neurotic fellow, everyone knows it and takes it seriously.

The supply of information to which we are exposed under modernity is transforming humans from the equable second fellow to the neurotic first. For the purpose of our discussion, the second fellow only reacts to real information, the first largely to noise. The difference between the two fellows will show us the difference between noise and signal. Noise is what you are supposed to ignore; signal what you need to heed.

Indeed, we have been loosely mentioning “noise” earlier in the book; time to be precise about it. In science, noise is a generalization beyond the actual sound to describe random information that is totally useless for any purpose, and that you need to clean up to make sense of what you are listening to. Consider, for examples, elements in an encrypted message that have absolutely no meaning, just randomized letters to confuse the spies, or the hiss you hear on a telephone line and that you try to ignore in order to just focus on the voice of your interlocutor.

Noise and Signal

If you want to accelerate someone's death, give him a personal doctor.

One can see from the tonsillectomy story that access to data increases intervention—as with neuroticism. Rory Sutherland signaled to me that those with a personal doctor on staff should be particularly vulnerable to naive interventionism, hence iatrogenics; doctors need to justify their salaries and prove to themselves that they have some work ethics, something “doing nothing” doesn't satisfy (Editor's note: the same forces apply to leaders, managers, etc.). Indeed at the time of writing the personal doctor or the late singer Michael Jackson is being sued for something that is equivalent to overintervention-to-stifle-antifragility (but it will take the law courts a while before they become familiar with the

concept). Conceivably, the same happened to Elvis Presley. So with overmedicated politicians and heads of state.

Likewise those in corporations or in policymaking (like *Fragilista Greenspan*) endowed with a sophisticated statistics department and therefore getting a lot of “timely” data are capable of overreacting and mistaking noise for information —Greenspan kept an eye on such fluctuations as the sales of vacuum cleaners in Cleveland “to get a precise idea about where the economy is going”, and, of course micromanaged us into chaos.

In business and economic decision-making, data causes severe side effects —data is now plentiful thanks to connectivity; and the share of spuriousness in the data increases as one gets more immersed into it. A not well discussed property of data: it is toxic in large quantities —even in moderate quantities.

The previous two chapters showed how you can use and take advantage of noise and randomness; but noise and randomness can also use and take advantage of you, particularly when totally unnatural —the data you get on the web or thanks to the media. The more frequently you look at data, the more noise you are disproportionately likely to get (rather than the valuable part called the signal); hence the higher the noise to signal ratio. And there is a confusion, that is not psychological at all, but inherent in the data itself. Say you look at information on a yearly basis, for stock prices or the fertilizer sales of your father-in-law’s factory, or inflation numbers in Vladivostok. Assume further that for what you are observing, at the yearly frequency the ratio of signal to noise is about one to one (say half noise, half signal) —it means that about half of changes are real improvements or degradations, the other half comes from randomness. This ratio is what you get from yearly observations. But if you look at the very same data on a daily basis, the composition would change to 95% noise, 5% signal. And if you observe data on an hourly basis, as people immersed in the news and markets price variations do, the split becomes 99.5% noise to .5% signal. That is two hundred times more noise than signal —which is why anyone who listens to news (except when very, very significant events take place) is one step below sucker.

There is a biological story with information. I have been repeating that in a natural environment, a stressor is information. So too much information would be too much stress, exceeding the threshold of antifragility. In medicine, we are discovering the healing powers of fasting, as the avoidance of too much hormonal rushes that come with the ingestion of food. Hormones convey information to the different parts of our system and too much of it confuses our biology. Here again, as with the story of the news received at too high a frequency, too much information becomes harmful. And in Chapter x (on ethics) I will show how too much data (particularly when sterile) causes statistics to be completely meaningless.

Now let’s add the psychological to this: we are not made to understand the point, so we overreact emotionally to noise. The best solution is to only look at very large changes in data or conditions, never small ones.

Just as we are not likely to mistake a bear for a stone (but likely to mistake a stone for a bear), it is almost impossible for someone rational with a clear, uninfected mind, one who is not drowning in data, to mistake a vital signal, one that matters for his survival, for noise. Significant signals have a way to reach you. In the tonsillectomies, the best filter would have been to only consider the children who are very ill, those with periodically recurring throat inflammation.

There was even more noise coming from the media and its glorification of the anecdote. Thanks to it, we are living more and more in virtual reality, separated from the real world, a little bit more every day, while realizing it less and less. Consider that every day, 6,200 persons die in the United States, many of preventable causes. But the media only reports the most anecdotal and sensational cases (hurricanes, freak incidents, small plane crashes) giving us a more and more distorted map of real risks. In an ancestral

environment, the anecdote, the “interesting” is information; no longer today. Likewise, by presenting us with explanations and theories the media induces an illusion of understanding the world.

*And the understanding of events (and risks) on the part of members of the press is so retrospective that they would put the security checks after the plane ride, or what the ancients call *post bellum auxilium*, send troops after the battle. Owing to domain dependence, we forget the need to check our map of the world against reality. So we are living in a more and more fragile world, while thinking it is more and more understandable. To conclude, the best way to mitigate interventionism is to ration the supply of information, as naturalistically as possible. This is hard to accept in the age of the internet. It has been very hard for me to explain that the more data you get, the less you know what’s going on, and the more iatrogenics you will cause.*

The noise bottleneck is really a paradox. We think the more information we consume the more signal we’ll consume. Only the mind doesn’t work like that. When the volume of information increases, our ability to comprehend the relevant from the irrelevant becomes compromised. We place too much emphasis on irrelevant data and lose sight of what’s really important.

30. An Algorithm for Solving Problems

“He (Richard Feynman) was always searching for patterns, for connections, for a new way of looking at something, but I suspect his motivation was not so much to understand the world as it was to find new ideas to explain. The act of discovery was not complete for him until he had taught it to someone else.”— Daniel Hillis

The Feynman Algorithm, which is a simplification of Richard Feynman’s technique to learn anything, is a good all purpose algorithm for solving problems. Cal Newport explains:

1. *Simplify the problem down to an “essential puzzle.” Here’s how Danny Hillis explained Feynman’s use of simplicity: “He always started by asking very basic questions like, ‘What is the simplest example?’ or ‘How can you tell if the answer is right?’ He asked questions until he reduced the problem to some essential puzzle that he thought he would be able to solve. Then he would set to work.”*
2. *Continually master new techniques and then apply them to your library of unsolved puzzles to see if they help. As mathematician Gian Carlo-Rota explained when describing Feynman’s use of this strategy: “Every once in a while there will be a hit, and people will say: ‘How did he do it? He must be a genius!’”*

31. Can Waiting Help You Make Better Decisions?

Great article in the financial times with the subtitle: Watching the world's best tennis players at Wimbledon over the next fortnight can help us make better decisions.

Here is what I learnt from interviewing more than 100 experts in different fields and working through several hundred recent studies and experiments: given the fast pace of modern life, most of us tend to react too quickly. We don't, or can't, take enough time to think about the increasingly complex timing challenges we face. Technology surrounds us, speeding us up. We overreact to its crush every day, both at work and at home.

And

*One of the most surprising aspects of Lehman's collapse was that the firm's leaders had tried so hard to understand the problems associated with their own decision-making. In autumn 2005, Lehman's senior managers hired a group of experts to teach four dozen top executives how to make better decisions. Max H Bazerman, a chaired professor at Harvard Business School, reviewed cutting-edge decision research. Mahzarin Banaji, a Harvard psychologist, administered custom-designed tests to help the executives understand their biases. Malcolm Gladwell, who had just published *Blink*, a bestseller about the "first two seconds" of our reactions, gave the capstone lecture.*

These managers sat for a cutting-edge course on the timing of decisions. Then, they rushed back to their offices and made some of the worst decisions in the history of financial markets. Three years later, their firm was gone.

If Lehman had lived until today, its decision-making course would look radically different.

The core message of recent research is the opposite of the one Lehman's executives learnt in 2005: the longer we can wait, the better. And once we have a sense of how long a decision should take, we generally should delay the moment of decision until the last possible instant. If we have an hour, we should wait 59 minutes before responding. If we have a year, we should wait 364 days. Even if we have just half a second, we should wait as long as we possibly can. As the matches at Wimbledon will illustrate, even milliseconds matter.

Thinking about the role of delay is a profound and fundamental part of being human.

Questions about delay are existential: the amount of time we take to reflect on decisions will define who we are. Is our mission simply to be another animal, responding to whatever stimulations we encounter? Or are we here for something more?

Life might be a race against time but it is enriched when we rise above our instincts and stop the clock to process and understand what we are doing and why. A wise decision requires reflection, and reflection requires a pause.

If we are limited to just one word of wisdom about decision-making for children born a hundred years from now, people who will have all our advantages and limitations as human beings but will need to navigate an unimaginably faster-paced world than the one we confront now, there is no doubt what that word should be.

Wait.

32. “When we encounter pain, we are at an important juncture in our decision-making process.”

It is a fundamental law of nature that to evolve one has to push one's limits, which is painful, in order to gain strength—whether it's in the form of lifting weights, facing problems head-on, or in any other way. Nature gave us pain as a messaging device to tell us that we are approaching, or that we have exceeded, our limits in some way. At the same time, nature made the process of getting stronger require us to push our limits. Gaining strength is the adaptation process of the body and the mind to encountering one's limits, which is painful. In other words, both pain and strength typically result from encountering one's barriers. When we encounter pain, we are at an important juncture in our decision-making process.

Most people react to pain badly. They have “fight or flight” reactions to it: they either strike out at whatever brought them the pain or they try to run away from it. As a result, they don't learn to find ways around their barriers, so they encounter them over and over again and make little or no progress toward what they want.

33. Benjamin Franklin's Rule for Making Decisions

When Charles Darwin set out to marry, he employed a technique pioneered half a century earlier by Ben Franklin. Despite his importance, the prolific Franklin often gave his practical wisdom to many of those who asked.

In the summer of 1772, Franklin received a letter from his friend, the English scientist, Joseph Priestley. Priestley was torn between relinquishing his position as the minister of the fame Unitarian church Mill Hill Chapel in Leeds and accepting a lucrative position as the general assistant to the Earl of Shelburne.

Like many of us faced with such a choice, Priestley was torn and turned to a friend for advice. Rather than simply offering advice on this particular choice, Franklin taught him something much more valuable: how to choose. By giving Priestley the simple mathematics of decision making, Franklin created what is now known as the pros and cons framework.

Franklin writes:

In the Affair of so much Importance to you, wherein you ask my Advice, I cannot for want of sufficient Premises, advise you what to determine, but if you please I will tell you how. When these difficult Cases occur, they are difficult chiefly because while we have them under Consideration all the Reasons pro and con are not present to the Mind at the same time; but sometimes one Set present themselves, and at other times another, the first being out of Sight. Hence the various Purposes or Inclinations that alternately prevail, and the Uncertainty that perplexes us.

To get over this, my Way is, to divide half a Sheet of Paper by a Line into two Columns, writing over the one Pro, and over the other Con. Then during three or four Days Consideration I put down under the different Heads short Hints of the different Motives that at different Times occur to me for or against the Measure. When I have thus got them all together in one View, I endeavour to estimate their respective Weights; and where I find two, one on each side, that seem equal, I strike them both out: If I find a Reason pro equal to some two Reasons con, I strike out the three. If I judge some two Reasons con equal to some three Reasons pro, I strike out the five; and thus proceeding I find at length where the Ballance lies; and if after a Day or two of farther Consideration nothing new that is of Importance occurs on either side, I come to a Determination accordingly.

And tho' the Weight of Reasons cannot be taken with the Precision of Algebraic Quantities, yet when each is thus considered separately and comparatively, and the whole lies before me, I think I can judge better, and am less likely to take a rash Step; and in fact I have found great Advantage from this kind of Equation, in what may be called Moral or Prudential Algebra.

Priestley accepted the position and science never looked back.

34. Michael Mauboussin: Two Tips to Improve The Quality of Your Decisions

Michael Mauboussin, chief investment strategist at Legg Mason and our [first interview on the podcast](#), offers two simple techniques to improve the quality of your decision making: a decision journal and a checklist.

1. Create a [decision journal](#) and starting using it.

Many years ago when I first met Danny Kahneman, and Kahneman is one of the preeminent psychologists in the world who won a Nobel Prize for economics in 2002, even though he's never taught an economics class.

When I pose him the question, what is a single thing an investor can do to improve his or her performance, he said almost without hesitation, go down to a local drugstore and buy a very cheap [notebook](#) and start keeping track of your decisions. And the specific idea is whenever you're making a consequential decision, something going in or out of the portfolio, just take a moment to think, write down what you expect to happen, why you expect it to happen and then actually, and this is optional, but probably a great idea, is write down how you feel about the situation, both physically and even emotionally. Just, how do you feel? I feel tired. I feel good, or this stock is really draining me. Whatever you think.

The key to doing this is that it prevents something called hindsight bias, which is no matter what happens in the world. We tend to look back on our decision-making process, and we tilt it in a way that looks more favorable to us, right? So we have a bias to explain what has happened.

When you've got a decision-making journal, it gives you accurate and honest feedback of what you were thinking at that time. And so there can be situations, by the way, you buy a stock and it goes up, but it goes up for reasons very different than what you thought was going to happen. And having that feedback in a way to almost check yourself periodically is extremely valuable. So that's, I think, a very inexpensive; it's actually not super time consuming, but a very, very valuable way of giving yourself essential feedback because our minds won't do it normally.

2. Use a checklist.

Mauboussin: So the [best work on this I've seen is by Atul Gawande](#), who is a surgeon in Boston who wrote a book a couple of years ago called [The Checklist Manifesto](#), and one of the points he makes in there is that when you go from field to field, wherever checklists have been used correctly and with fidelity, they've been extremely effective in proving outcomes. So we all know none of us would step on an airplane today without the pilot having gone through the checklist. It's been a big move into medicine, especially for example, in surgery where checklists have really made substantial inroads in reducing infections, for example, and hence mortality, and other areas like construction elsewhere. So the question is, how do you become more systematic in applying what you know? And I'll just mention one other thing on this. There are two; Gawande talks about two kinds of checklists. By the way, this branch is right out of aviation. One is called a do-confirm checklist, a do-confirm, and that just basically says, Hey, just do your normal analysis the way you've always done it and been trained to do that, but stop periodically just to confirm that you've covered all the bases. So as an analyst that might say, hey, I'm going to do a really thorough evaluation work. I might look very carefully at return on capital trends. I might study the competitive strategy position. You are just going to do all that stuff, but you're going to stop every now and then, just to check to make sure you've done everything.

The second one is called, the second kind of checklist, is called a read-do checklist. This is when you get into a difficult situation, for example you're a pilot and one of your engines goes out, the redo will guide how you should approach that problem. So you don't have to

think about it so much, you just sort of go through it systematically. And so for an investor that might be hey, what happens when a company misses a quarter? What happens when they have a negative announcement or an executive departure? Sometimes that means sell the stock. Sometimes that means buy more. Sometimes it means do nothing, and a read-do checklist can help guide some of that thinking as well. So it's really a way to be structured and consistent in your analysis.

35. The Checklist Manifesto: How to Get Things Right

It's no secret that I'm a huge fan of Atul Gawande. A reader recently pointed out that I hadn't covered his most recent book, *The Checklist Manifesto: How to Get Things Right*. I had only covered an interesting subset of the book—why we fail.

The Checklist Manifesto

To put us in the proper context, we're smart. Not scary smart but smart enough. We have skills, and we generally put them in the most highly trained and hardworking people we can find. We have the most educated society in history. And we've accomplished a lot. Nevertheless, sometimes, success escapes us for avoidable reasons. Not only are these failures common—across everything from medicine to finance—but they are also frustrating. We should know better, but we don't. The reason we don't learn, Gawande argues, is evident:

the volume and complexity of what we know has exceeded our individual ability to deliver its benefits correctly, safely, or reliably. Knowledge has both saved us and burdened us.

To overcome this, we need a strategy. Something that “builds on experience and takes advantage of the knowledge people have but somehow also makes up for our inevitable human inadequacies.” We need a checklist.

In response to increasing complexity, we've become more specialized. We divide the problem up. It's not just the growing breadth and quantity of knowledge that makes things more complicated, although they certainly are significant contributors. It is also execution. In every field from medicine to construction, there are a slew of practical procedures, policies, and best practices. Gawande breaks this down for the modern medical case:

[Y]ou have a desperately sick patient and in order to have a chance of saving him you have to get the knowledge right and then you have to make sure that the 178 daily tasks that follow are done correctly—despite some monitor's alarm going off for God knows what reason, despite the patient in the next bed crashing, despite a nurse poking his head around the curtain to ask whether someone could help “get this lady's chest open.” There is complexity upon complexity. And even specialization has begun to seem inadequate. So what do you do?

The response of the medical profession, like most others, is to move from specialization to super-specialization. Gawande argues that these super-specialists have two advantages over ordinary specialists: greater knowledge of the things that matter and “a learned ability to handle the complexities of that particular job.” But even for these super specialists, avoiding mistakes is proving impossible.

Modern professions, like medicine, with their dazzling successes and spectacular failures, pose a significant challenge: “What do you do when expertise is not enough? What do you do when even the super-specialists fail?”

The origins of the checklist.

On October 30, 1935, at Wright Air Field in Dayton, Ohio, the U.S. Army Air Corps held a competition for airplane manufacturers vying to build the next-generation of the long-range bomber. Only it wasn't supposed to be much of a competition at all. The Boeing Corporation's gleaming aluminum-alloy Model 299 was expected to steal the show, its design far superior to those of the competition. In other words, it was just a formality. As the Model 299 test plane taxied onto the runway, a small group of army brass and manufacturing executives watched. The plane took off without a hitch. Then suddenly, at about 300 feet, it stalled, turned on one wing, and crashed killing two of the five crew members, including the pilot Major Hill.

Of course, everyone wanted to know what had happened. An investigation revealed that there was nothing to indicate any problems mechanically with the plane. It was a “pilot error.” The problem with the new plane, if there was one, was that it was substantially more complex than the previous aircraft. Among other things, there were 4 engines, each

with its own fuel-mix, wing flaps, trim that needed constant adjustment, and propellers requiring pitch adjustment. While trying to keep up with the increased complexity, Hill had forgotten to release a new locking mechanism on the rudder controls. The new plane was too much for anyone to fly. The unexpected winner was the smaller designed Douglas. Here is where it really gets interesting. The army, convinced of the technical superiority of the plane, ordered a few anyway. If you're thinking they'd just put the pilots through more training to fly the plane, you'd be wrong. Major Hill, the chief of flight testing, was an experienced pilot, so longer training was unlikely to result in improvement. Instead, they created a pilot's checklist.

The pilots made the list simple and short. It fit on an index card with step-by-step instructions for takeoff, flying, landing, and taxiing. It was as if someone all of a sudden gave an experienced automobile driver a checklist of things that would be obvious to them. There was nothing on the checklist they didn't know. Stuff like, check that the instruments are set, the door closed. Basics. That checklist changed the course of history and quite possibly the war. The pilots went on to fly the Model 299 a "total of 1.8 million miles" without a single accident and as a result the army ordered over 13,000 of them.

In *The Checklist Manifesto*, Gawande argues that most of today's work has entered a checklist phase.

Substantial parts of what software designers, financial managers, firefighters, police officers, lawyers, and most certainly clinicians do are now too complex for them to carry out reliably from memory alone.

Yet, no one wants to use a checklist. We believe "our jobs are too complicated to reduce to a checklist." After all, we don't work at McDonald's, right?

In a complex environment, experts are up against two main difficulties. The first is the fallibility of human memory and attention, especially when it comes to mundane, routine matters that are easily overlooked under the strain of more pressing events. (When you've got a patient throwing up and an upset family member asking you what's going on, it can be easy to forget that you have not checked her pulse.) Faulty memory and distraction are a particular danger in what engineers call all-or-none processes: whether running to the store to buy ingredients for a cake, preparing an airplane for takeoff, or evaluating a sick person in the hospital, if you miss just one key thing, you might as well not have made the effort at all.

A further difficulty, just as insidious, is that people can lull themselves into skipping steps even when they remember them. In complex processes, after all, certain steps don't always matter. ... "This has never been a problem before," people say. Until one day it is. Checklists seem to provide protection against such failures. They remind us of the minimum necessary steps and make them explicit. They not only offer the possibility of verification but also instill a kind of discipline of higher performance.

In news that would shock bureaucracies and governments alike, the strategy a lot of industries use to get things right in complex environments is to give employees power. Most authorities, in response to risk, tend to centralize power and decision making. Sometimes that's even the point of a checklist—to make sure the people below you are doing things in the manner in which you want. These checklists, the McDonald's type checklists, spell out the tiniest detail of every critical step. These serve their purpose, but they also create a group of employees no longer able to adapt. When things change, as they always do, you're now faced with a non-routine problem. "The philosophy," writes Gawande, "is that you push the power of decision making out to the periphery and away from the center. You give people the room to adapt, based on their experience and expertise. All you ask is that they talk to one another and take responsibility. That is what works."

...the real lesson is that under conditions of true complexity—where the knowledge required exceeds that of any individual and unpredictability reigns—efforts to dictate every

step from the center will fail. People need room to act and adapt. Yet they cannot succeed as isolated individuals, either—that is anarchy. Instead, they require a seemingly contradictory mix of freedom and expectation—expectation to coordinate, for example, and also to measure progress toward common goals.

This was the understanding people in the skyscraper-building industry had grasped. More remarkably, they had learned to codify that understanding into simple checklists. They had made the reliable management of complexity a routine.

That routine requires balancing a number of virtues: freedom and discipline, craft and protocol, specialized ability and group collaboration. And for checklists to help achieve that balance, they have to take two almost opposing forms. They supply a set of checks to ensure the stupid but critical stuff is not overlooked, and they supply another set of checks to ensure people talk and coordinate and accept responsibility while nonetheless being left the power to manage the nuances and unpredictabilities the best they know how.

I came away from Katrina and the builders with a kind of theory: under conditions of complexity, not only are checklists a help, they are required for success. There must always be room for judgment, but judgment aided—and even enhanced—by procedure.

36. The Two Types of Knowledge: The Max Planck/Chauffeur Test

Charlie Munger, the billionaire business partner of Warren Buffett, frequently tells the story below to illustrate how to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

At the 2007 Commencement to the USC Law School, Munger explained it this way:

I frequently tell the apocryphal story about how Max Planck, after he won the Nobel Prize, went around Germany giving the same standard lecture on the new quantum mechanics. Over time, his chauffeur memorized the lecture and said, "Would you mind, Professor Planck, because it's so boring to stay in our routine. [What if] I gave the lecture in Munich and you just sat in front wearing my chauffeur's hat?" Planck said, "Why not?" And the chauffeur got up and gave this long lecture on quantum mechanics. After which a physics professor stood up and asked a perfectly ghastly question. The speaker said, "Well I'm surprised that in an advanced city like Munich I get such an elementary question. I'm going to ask my chauffeur to reply."

The point of the story is not the quick-wittedness of the protagonist, but rather — to echo Richard Feynman — it's about making a distinction between knowing the name of something and knowing something.

Two Types of Knowledge

The first type of knowledge is real. It can't be bought. It can't be copied. If you want real knowledge you need to earn it. The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work.

Munger continues:

In this world we have two kinds of knowledge. One is Planck knowledge, the people who really know. They've paid the dues, they have the aptitude. And then we've got chauffeur knowledge. They've learned the talk. They may have a big head of hair, they may have fine temper in the voice, they'll make a hell of an impression.

But in the end, all they have is chauffeur knowledge. I think I've just described practically every politician in the United States.

And you are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge.

And there are huge forces working against you. My generation has failed you a bit... but you wouldn't like it to be too easy now would you?

Real knowledge comes when people do the work. On the other hand, we have the people who don't do the work — they pretend. While they've learned to put on a good show, they lack understanding. They can't answer questions that don't rely on memorization. They can't explain things without using jargon or vague terms. They have no idea how things interact. They can't predict the consequences.

"Any fool can know. The point is to understand."

— Albert Einstein

The problem is that it's difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.

In The Art of Thinking Clearly, Rolf Dobelli offers some commentary on distinguishing fake from real knowledge:

With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the

tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and — often as compensation for their patchy knowledge— snarky and self-satisfied in tone. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case.

One way to guard against this is to understand your circle of competence.

Dobelli concludes with some advice worth taking to heart.

Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

Sorting through the people with real knowledge from those that do not is so important that Elon Musk tries to tease it out in interviews.

37. Why Bad Things Happen to Good Decisions

Good decisions don't always have a good outcome, just as bad decisions don't always have bad outcomes. Sometimes bad outcomes happen to good decisions. And sometimes good things happen to bad decisions. Learning to distinguish between when you're brilliant and lucky is the key to rapid improvement.

When other people make decisions with bad outcomes, we tend to focus on the people behind the decision. We can't seem to shake the belief that good people make good decisions and bad people make bad decisions. It's easy to think that we would have made a better decision.

When our decisions have bad outcomes, we know the outcomes is not all there is to see. Our thoughts and intentions come into play. We can't see the thoughts and intentions of others—we only see their actions through a biased lens. We can, however, see our thoughts and intentions. Our bad outcomes happen because we were unlucky.

The Decision Outcome Matrix

Consider this simple two-by-two decision outcome matrix.

	Good Outcome	Bad Outcome
Good Process	What we are aiming for.	We are not omniscient. We need courage to weather this. Your system will not work every time, and it is easy to abandon the system the first time it fails.
Bad Process	Gambling and winning. Feeds the halo effect.	Gambling and losing. My bad luck, your poor skill.

We want to deserve success. Everyone wants to be in the upper left box — a good process that results in a good outcome. The problem is the world doesn't always comply with our wishes. Following a good process can lead to a bad outcome because of uncertainty.

A good process with a bad outcome requires that we remember nothing is for sure. Bad outcomes from a bad process require a choice. If we are delusional and let our ego dominate, we mistakenly see this as bad luck. While we are aware that we had a negative outcome, we are unaware that it resulted from a bad process. In this case, we learn nothing. We are doomed to repeat our mistakes. More self-reflective people see bad

outcomes resulting from bad process as an opportunity to learn as much as we can to avoid repeat failures.

Perhaps the worst quadrant to be in is the lower left — a bad process leads to a good outcome. Ignoring the fact that this isn't repeatable, we convince ourselves that we deserved success.

If you can't recognize when you've had 'dumb luck,' you'll never be in a position to correct the way you're making decisions. Eventually, your luck runs out.

Of course, it's easier to place others into the matrix than ourselves. When it comes to others, we see more of reality because we're a disconnected observer. When it comes to ourselves, however, we default to ego protection.

One of the ways to calibrate your decisions is to use a decision journal. A good decision is known *before* the outcome. It involves a mental representation of the facts known at the time as well as applied judgment. Good decisions are valuable, but they are more valuable if they are part of a good decision process because a good process allows for feedback about where you can improve. This feedback, in turn, allows you to constantly get better at making decisions.

Article Summary:

- Good decisions don't always have a good outcome. Bad decisions don't always have bad outcomes.
- Bad outcomes can happen to good decisions.
- When other people have a bad outcome, we tend to think they made a bad decision. When we have a bad outcome, we tend to focus on intentions.
- There is a simple 2*2 matrix to help you see what happened. On one axis is Good/Bad Process, on the other is good/bad outcome.
- A bad process with a good outcome is gambling and winning. This is the most dangerous quadrant.
- A bad process with a bad outcome is gambling and losing.
- A good process with a bad outcome needs to be put into perspective.
- You can calibrate your decisions using a decision journal.

38. Mental Model: Game Theory

From Game Theory, by Morton Davis:

The theory of games is a theory of decision making. It considers how one should make decisions and to a lesser extent, how one does make them. You make a number of decisions every day. Some involve deep thought, while others are almost automatic. Your decisions are linked to your goals—if you know the consequences of each of your options, the solution is easy. Decide where you want to be and choose the path that takes you there. When you enter an elevator with a particular floor in mind (your goal), you push the button (one of your choices) that corresponds to your floor. Building a bridge involves more complex decisions but, to a competent engineer, is no different in principle. The engineer calculates the greatest load the bridge is expected to bear and designs a bridge to withstand it. When chance plays a role, however, decisions are harder to make. ... Game theory was designed as a decision-making tool to be used in more complex situations, situations in which chance and your choice are not the only factors operating. ... (Game theory problems) differ from the problems described earlier—building a bridge and installing telephones—in one essential respect: While decision makers are trying to manipulate their environment, their environment is trying to manipulate them. A store owner who lowers her price to gain a larger share of the market must know that her competitors will react in kind. ... Because everyone's strategy affects the outcome, a player must worry about what everyone else does and knows that everyone else is worrying about him or her.

What is a game? From Game Theory and Strategy:

Game theory is the logical analysis of situations of conflict and cooperation. More specifically, a game is defined to be any situation in which:

- 1. There are at least two players. A player may be an individual, but it may also be a more general entity like a company, a nation, or even a biological species.*
- 2. Each player has a number of possible strategies, courses of action which he or she may choose to follow.*
- 3. The strategies chosen by each player determine the outcome of the game.*
- 4. Associated to each possible outcome of the game is a collection of numerical payoffs, one to each player. These payoffs represent the value of the outcome to the different players.*

...Game theory is the study of how players should rationally play games. Each player would like the game to end in an outcome which gives him as large a payoff as possible.

From Greg Mankiw's Economics textbook:

Game theory is the study of how people behave in strategic situations. By 'strategic' we mean a situation in which each person, when deciding what actions to take, must consider how others might respond to that action. Because the number of firms in an oligopolistic market is small, each firm must act strategically. Each firm knows that its profit depends not only on how much it produces but also on how much the other firms produce. In making its production decision, each firm in an oligopoly should consider how its decision might affect the production decisions of all other firms.

Game theory is not necessary for understanding competitive or monopoly markets. In a competitive market, each firm is so small compared to the market that strategic interactions with other firms are not important. In a monopolized market, strategic interactions are absent because the market has only one firm. But, as we will see, game theory is quite useful for understanding the behavior of oligopolies.

A particularly important 'game' is called the prisoners' dilemma.

Markets with only a few sellers

Because an oligopolistic market has only a small group of sellers, a key feature of oligopoly is the tension between cooperation and self-interest. The oligopolists are best off when they cooperate and act like a monopolist – producing a small quantity of output and charging a price above marginal cost. Yet because each oligopolist cares only about its own profit, there are powerful incentives at work that hinder a group of firms from maintaining the cooperative outcome.

Avinash Dixit and Barry Nalebuff, in their book “Thinking Strategically” offer:

Everyone’s best choice depends on what others are going to do, whether it’s going to war or maneuvering in a traffic jam.

These situations, in which people’s choices depend on the behavior or the choices of other people, are the ones that usually don’t permit any simple summation. Rather we have to look at the system of interaction.

Michael J. Mauboussin relates game theory to firm interaction

How a firm interacts with other firms plays an important role in shaping sustainable value creation. Here we not only consider how many companies interact with their competitors, but how companies can co-evolve.

Game Theory is one of the best tools to understand interaction. Game Theory forces managers to put themselves in the shoes of other players rather than viewing games solely from their own perspective.

The classic two-player example of game theory is the prisoners’ dilemma.

38. Blindness to the Benefits of Ambiguity

“Decision makers,” write Stefan Trautmann and Richard Zeckhauser in their paper Blindness to the Benefits of Ambiguity, “often prove to be blind to the learning opportunities offered by ambiguous probabilities. Such decision makers violate rational decision making and forgo significant expected payoffs.”

Trautmann and Zeckhauser argue that we often don’t recognize the benefits in commonly occurring ambiguous situations. In part this is because we often treated repeated decisions involving ambiguity as one-shot decisions. In doing so, we ignore the opportunity for learning when we encounter ambiguity in decisions that offer repeat choices.

To put this in context, the authors offer the following example:

A patient is prescribed a drug for high cholesterol. It is successful, lowering her total cholesterol from 230 to 190, and her only side effect is a mild case of sweaty palms. The physician is likely to keep the patient on this drug as long as her cholesterol stays low. Yet, there are many medications for treating cholesterol. Another might lower her cholesterol even more effectively or impose no side effects. Trying an alternative would seem to make sense, since the patient is likely to be on a cholesterol medication for the rest of her life.

In situations of ambiguity with repeated choices we often gravitate towards the first decision that offers a positive payoff. Once we’ve found a positive payoff we’re likely to stick with that decision when given the opportunity to make the same choice again rather than experiment in an attempt to optimize payoffs. We ignore the opportunity for learning and favor the status quo. Another way to think of this is uncertainty avoidance (or ambiguity aversion).

Few individuals recognize that ambiguity offers the opportunity for learning. If a choice situation is to be repeated, ambiguity brings benefits, since one can change one’s choice if one learns the ambiguous choice is superior.

“We observe,” they offer, “that people’s lack of a clear understanding of learning under ambiguity leads them to adopt non-Bayesian rules.”

Another example of how this manifests itself in the real world:

In the summer of 2010, the consensus estimate is that there are five applicants for every job opening, yet major employers who expect to hire significant numbers of workers once the economy turns up are sitting by the sidelines and having current workers do overtime. The favorability of the hiring situation is unprecedented in recent years. Thus, it would seem to make sense to hire a few workers, see how they perform relative to the norm. If the finding is much better, suggesting that the ability to select in a very tough labor market and among five applicants is a big advantage, then hire many more. This situation, where the payoff to the first-round decision is highly ambiguous, but perhaps well worthwhile once learning is taken into account, is a real world exemplar of the laboratory situations investigated in this paper.

...

According to Tolstoi, happy families are all alike, while every unhappy family is unhappy in its own way. A similar observation seems to hold true for situations involving ambiguity: There is only one way to capitalize correctly on learning opportunities under ambiguity, but there are many ways to violate reasonable learning strategies.

From an evolutionary perspective, why would learning avoidance persist if the benefits from learning are large?

Psychological findings suggest that negative experiences are crucial to learning, while good experiences have virtually no pedagogic power. In the current setting, ambiguous options would need to be sampled repeatedly in order to obtain sufficient information on whether to switch from the status quo. Both bad and good outcomes would be experienced along the way, but only good ones could trigger switching. Bad outcomes would also weigh much more heavily, leading people to require too much positive evidence

before shifting to ambiguous options. In individual decision situations, losses often weigh 2 to 3 times as much as gains.

In addition, if one does not know what returns would have come from an ambiguous alternative, one cannot feel remorse from not having chosen it. Blame from others also plays an important role. In principal-agent relationships, bad outcomes often lead to criticism, and possibly legal consequences because of responsibility and accountability. Therefore, agents, such as financial advisors or medical practitioners may experience an even higher asymmetry from bad and good payoffs. Most people, for that reason, have had many fewer positive learning experiences with ambiguity than rational sampling would provide.

It might be a good idea to try a new brand the next time you're at the store rather than just making the same choice over and over. Who knows, you might discover you like it better.

39. Insensitivity To Base Rates: An Introduction

In statistics, a base rate refers to the percentage of a population (e.g. grasshoppers, people who live in New York, newborn babies) which have a characteristic. Given a random individual and no additional information, the base rate tells us the likelihood of them exhibiting that characteristic. For instance, around 10% of people are left-handed. If you selected a random person and had no information related to their handedness, you could safely guess there to be a 1 in 10 chance of them being left-handed.

When we make estimations, we often fail to consider the influence of base rates. This is a common psychological bias and is related to the representativeness heuristic.

From Smart Choices: A Practical Guide to Making Better Decisions:

Donald Jones is either a librarian or a salesman. His personality can best be described as retiring. What are the odds that he is a librarian?

When we use this little problem in seminars, the typical response goes something like this: "Oh, it's pretty clear that he's a librarian. It's much more likely that a librarian will be retiring; salesmen usually have outgoing personalities. The odds that he's a librarian must be at least 90 percent." Sounds good, but it's totally wrong.

The trouble with this logic is that it neglects to consider that there are far more salesmen than male librarians. In fact, in the United States, salesmen outnumber male librarians 100 to 1. Before you even considered the fact that Donald Jones is "retiring," therefore, you should have assigned only a 1 percent chance that Jones is a librarian. That is the base rate.

Now, consider the characteristic "retiring." Suppose half of all male librarians are retiring, whereas only 5 percent of salesmen are. That works out to 10 retiring salesmen for every retiring librarian — making the odds that Jones is a librarian closer to 10 percent than to 90 percent. Ignoring the base rate can lead you wildly astray.

* * *

Charlie Munger, instructs us how to think about base rates with an example of an employee who got caught for stealing, claiming she's never done it before and will never do it again:

You find an isolated example of a little old lady in the See's Candy Company, one of our subsidiaries, getting into the till. And what does she say? "I never did it before, I'll never do it again. This is going to ruin my life. Please help me." And you know her children and her friends, and she'd been around 30 years and standing behind the candy counter with swollen ankles. When you're an old lady it isn't that glorious a life. And you're rich and powerful and there she is: "I never did it before, I'll never do it again." Well how likely is it that she never did it before? If you're going to catch 10 embezzlements a year, what are the chances that any one of them — applying what Tversky and Kahneman called base rate information — will be somebody who only did it this once? And the people who have done it before and are going to do it again, what are they all going to say? Well in the history of the See's Candy Company they always say, "I never did it before, and I'm never going to do it again." And we cashier them. It would be evil not to, because terrible behavior spreads (Greshams law).

* * *

Max Bazerman, in Judgment in Managerial Decision Making, writes:

(Our tendency to ignore base rates) is even stronger when the specific information is vivid and compelling, as Kahneman and Tversky illustrated in one study from 1972. Participants were given a brief description of a person who enjoyed puzzles and was both mathematically inclined and introverted. Some participants were told that this description was selected from a set of seventy engineers and thirty lawyers. Others were told that the description came from a list of thirty engineers and seventy lawyers. Next, participants were asked to estimate the probability that the person described was an engineer. Even

though people admitted that the brief description did not offer a foolproof means of distinguishing lawyers from engineers, most tended to believe the description was of an engineer. Their assessments were relatively impervious to differences in base rates of engineers (70 percent versus 30 percent of the sample group.)

Participants do use base-rate data correctly when no other information is provided. In the absence of a personal description, people use the base rates sensibly and believe that a person picked at random from a group made up mostly of lawyers is most likely to be a lawyer. Thus, people understand the relevance of base-rate information, but tend to disregard such data when individuating data are also available.

Ignoring base rates has many unfortunate implications. ... Similarly, unnecessary emotional distress is caused in the divorce process because of the failure of couples to create prenuptial agreements that facilitate the peaceful resolution of a marriage. The suggestion of a prenuptial agreement is often viewed as a sign of bad faith. However, in far too many cases, the failure to create prenuptial agreements occurs when individuals approach marriage with the false belief that the high base rate for divorce does not apply to them.

** * **

Of course, this applies to investing as well. This conversation with Sanjay Bakshi speaks to this:

One of the great lessons from studying history is to do with “base rates”. “Base rate” is a technical term of describing odds in terms of prior probabilities. The base rate of having a drunken-driving accident is higher than those of having accidents in a sober state.

So, what’s the base rate of investing in IPOs? When you buy a stock in an IPO, and if you flip it, you make money if it’s a hot IPO. If it’s not a hot IPO, you lose money. But what’s the base rate – the averaged out experience – the prior probability of the activity of subscribing for IPOs – in the long run?

If you do that calculation, you’ll find that the base rate of IPO investing (in fact, it’s not even investing ... it’s speculating) sucks! [T]hat’s the case, not just in India, but in every market, in different time periods.

[...]

When you evaluate whether smoking is good for you or not, if you look at the average experience of 1,000 smokers and compare them with a 1,000 non-smokers, you’ll see what happens.

People don’t do that. They get influenced by individual stories like a smoker who lived till he was 95. Such a smoker will force many people to ignore base rates, and to focus on his story, to fool themselves into believing that smoking can’t be all that bad for them.

What is the base rate of investing in leveraged companies in bull markets?

[...]

This is what you learn by studying history. You know that the base rate of investing in an airline business sucks. There’s this famous joke about how to become a millionaire. You start with a billion, and then you buy an airline. That applies very well in this business. It applies in so many other businesses.

Take the paper industry as an example. Averaged out returns on capital for paper industry are bad for pretty good reasons. You are selling a commodity. It’s an extremely capital intensive business. There’s a lot of over-capacity. And if you understand microeconomics, you really are a price taker. There’s no pricing power for you. Extreme competition in such an environment is going to cause your returns on capital to be below what you would want to have.

It’s not hard to figure this out (although I took a while to figure it out myself). Look at the track record of paper companies around the world, and the airline companies around the world, or the IPOs around the world, or the textile companies around the world. Sure, there’ll be exceptions. But we need to focus on the average experience and not the

exceptional ones. The metaphor I like to use here is that of a pond. You are the fisherman. If you want to catch a lot of fish, then you must go to a pond where there's a lot of fish. You don't want to go to fish in a pond where there's very little fish. You may be a great fisherman, but unless you go to a pond where there's a lot of fish, you are not going to find a lot of fish.

[...]

So one of the great lessons from studying history is to see what has really worked well and what has turned out to be a disaster – and to learn from both.

40. An Ancient Lesson on Taking Responsibility For Decisions

"A decision is responsible," wrote Charles Frankel, "when the man or group that makes it has to answer for it to those who are directly or indirectly affected by it."

Think about that for a second.

How often does that happen today? Not very often.

In most organizations people don't make decisions — committees do. Responsibility is diffused to a group, not the individual. Everyone is insulated from their mistakes. Everyone takes credit for success.

The ancients had a way around this. Consider Hammurabi's Code:

If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the death of the owner of the house, that builder shall be put to death.

While extreme, that is the best risk-management rule ever. If you have the upside, you have to keep the downside.

The Roman System

The Romans had a similar system.

The guy who created the arch stood under it as the scaffolding was removed. And to some extent, we do the same thing today. No one packs your parachute for you.

Charlie Munger, the partner of Warren Buffett at Berkshire Hathaway, puts it another way:

Another thing that is never discussed any more is my idea of one of the great philosophers of America who was Charlie Frankel. He was mugged to death in due course because, after all, he lived in Manhattan in a different time. Before he was mugged to death, he created this philosophy of responsibility. He said the system is responsible in proportion to the degree that the people who make the decisions bear the consequences.

So to Charlie Frankel, you don't create a loan system where all the people who make the loans promptly dump them on somebody else through lies and twaddle, and they don't bear the responsibility when the loans are good or bad. To Frankel, that is amoral, that is an irresponsible system. That is like selling an automobile with bad brakes and you know the brakes are bad. You shouldn't do it.

We've gotten away from responsibility for our decisions, which allows people to get all the upside and none of the downside. Is it any wonder why things go wrong?

How can we implement better decisions in organizations? Make people stand under their own arches. One effective way to implement this is to make the person responsible for a decision sign their name to the decision. Simple and effective but not easy to implement.

41. Making Smart Choices: 8 Keys to Making Effective Decisions

Making decisions is a fundamental life skill. Expecting to make perfect decisions all of the time is unreasonable. When even an ounce of luck is involved, good decisions can have bad outcomes. So our goal should be to raise the odds of making a good decision. The best way to do that is to use a good decision-making process.

Smart Choices: A Practical Guide to Making Better Decisions contains an interesting decision-making framework: PrOACT.

We have found that even the most complex decision can be analysed and resolved by considering a set of eight elements. The first five—

Problem, Objectives, Alternatives, Consequences, and Tradeoffs—constitute the core of our approach and are applicable to virtually any decision. The acronym for these—PrOACT—serves as a reminder that the best approach to decision situations is a proactive one. ... The three remaining elements—uncertainty, risk tolerance, and linked decisions—help clarify decisions in volatile or evolving environments.

This framework can help you make better decisions. Of course, sometimes good decisions go wrong. A good decision, however, increases the odds of success.

There are eight keys to effective decision making.

Work on the right decision problem. ... The way you frame your decision at the outset can make all the difference. To choose well, you need to state your decision problems carefully, acknowledging their complexity and avoiding unwarranted assumptions and option-limiting prejudices. ...

Specify your objectives. ... A decision is a means to an end. Ask yourself what you most want to accomplish and which of your interests, values, concerns, fears, and aspirations are most relevant to achieving your goal. ... Decisions with multiple objectives cannot be resolved by focusing on any one objective.

Create imaginative alternatives. ... Remember: your decision can be no better than your best alternative. ...

Understand the consequences. ... Assessing frankly the consequences of each alternative will help you to identify those that best meet your objectives—all your objectives. ...

Grapple with your tradeoffs. Because objectives frequently conflict with one another, you'll need to strike a balance. Some of this must sometimes be sacrifices in favor of some of that. ...

Clarify your uncertainties. What could happen in the future and how likely is it that it will? ...

Think hard about your risk tolerance. When decisions involve uncertainties, the desired consequence may not be the one that actually results. A much-deliberated bone marrow transplant may or may not halt cancer. ...

Consider linked decisions. What you decide today could influence your choices tomorrow, and your goals for tomorrow should influence your choices today. Thus many important decisions are linked over time. ...

Harvard Professor Max Bazerman, who has written extensively human misjudgment, suggests something very similar to this approach in his book Judgment in Management Decision Making when he explains the anatomy of decisions. Before we can fully understand judgment, we have to identify the components of the decision-making process that require it. Here are the six steps that Bazerman argues you should take, either implicitly or explicitly, when applying a rational decision-making process.

42. Cognitive Dissonance and Change Blindness

“Their judgment was based more on wishful thinking than on a sound calculation of probabilities; for the usual thing among men is that when they want something they will, without any reflection, leave that to hope, while they will employ the full force of reason in rejecting what they find unpalatable.”

— Thucydides, in History of the Peloponnesian War

From Stalking the Black Swan: Research and Decision Making in a World of Extreme Volatility

When new information conflicts with our preexisting hypotheses, we have a problem that needs to be resolved. Cognitive dissonance refers to the state of tension that occurs when a person holds two ideas, beliefs, attitudes, or opinions that are psychologically inconsistent. This conflict manifests itself as a state of mental tension or dissonance, the intensity of which is visible in magnetic resonance imaging studies of the brain. The theory was developed in 1957 by Leon Festinger, who observed in a series of experiments that people would change their attitudes to make them more consistent with actions they had just taken. In popular usage, cognitive dissonance refers to the tendency to ignore information that conflicts with preexisting views, to rationalize certain behaviors to make them seem more consistent with self-image, or to change attitudes to make them consistent with actions already taken. In some cases, it is the equivalent of telling ourselves “little white lies,” but in other cases it no doubt contributes to logical errors like the “confirmation trap,” where people deliberately search for data to confirm existing views rather than challenge them.

Two major sources of cognitive dissonance are self-image (when the image we hold of ourselves is threatened) and commitment (when we’ve said something, we don’t want to be criticized for changing our minds).

“Cognitive dissonance,” writes Ken Posner, “may manifest itself in a phenomenon known as change blindness. According to behavioral researches”:

change blindness is a situation where people fail to notice change because it takes place slowly and incrementally. It is also called the “boiling frog syndrome,” referring to the folk wisdom that if you throw a frog in boiling water it will jump out, but if you put it into cold water that is gradually heated, the frog will never notice the change. Most of the studies in this area focus on difficulties in perceiving change visually, but researchers think there is a parallel to decision making.

“Change blindness,” Posner continues, “happens when we filter out the implications of new information rather than assigning them even partial weight in our thinking.”

43. Michael Mauboussin: Untangling Skill and Luck in Business, Sports, and Investing

In *The Success Equation: Untangling Skill and Luck in Business, Sports, and Investing*, Michael Mauboussin goes beyond the general idea that luck is important to outcomes. He explains the type of interactions where luck is important and dives into why we have a difficult time comprehending the role of luck.

“The basic challenge,” he writes, “is that we love stories (narrative fallacy) and have a yearning to understand the relationship between cause and effect. As a result, statistical reasoning is hard, and we start to view the past as something that was inevitable.”

Mauboussin goes on to explain how we should untangle skill and luck so we can get a feel for where they fall on the luck-skill continuum. “Where an activity falls on that continuum,” he writes “provides a great deal of insight into how to deal with it.” Skill tends to follow an arc – improving, stagnating, and then ultimately going lower.

In activities where the results are independent of one another, simple models effectively explain what we see. But when a past result affects a future result, predicting winners becomes very difficult. The most skillful don't always win.

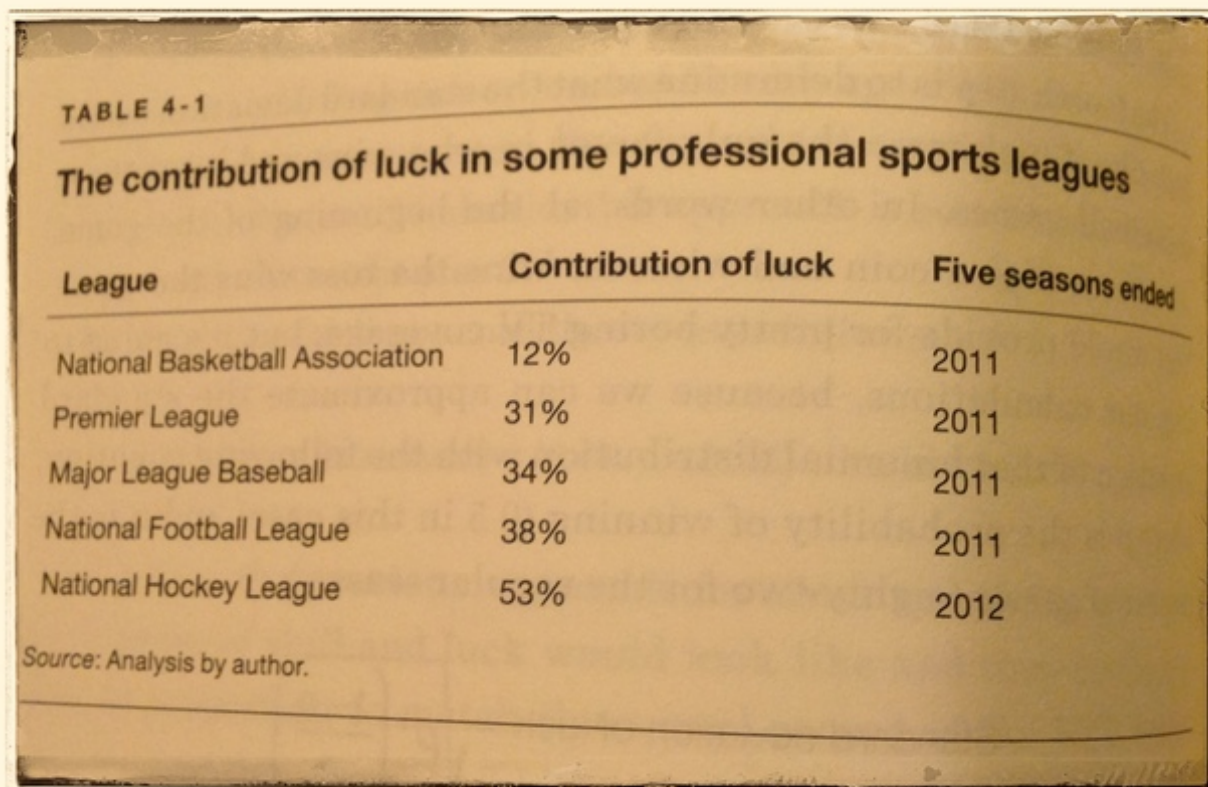


TABLE 4-1

The contribution of luck in some professional sports leagues

League	Contribution of luck	Five seasons ended
National Basketball Association	12%	2011
Premier League	31%	2011
Major League Baseball	34%	2011
National Football League	38%	2011
National Hockey League	53%	2012

Source: Analysis by author.

Source: The Success Equation

As a sports fan, I enjoyed the breakdown of the contribution of luck in some professional sports leagues:

And something to keep in mind, “the contribution of luck has been rising steadily over time in most sports, which means that the players are all converging on an equal level of skill.” Although, this doesn't apply to basketball.

On automatic decision making, Mauboussin writes:

The problem with this sort of automatic decision-making apparatus is that it only works under very specific circumstances. Intuition works when the environment is stable and an individual has the opportunity to spend a great deal of time learning about it. . . . Trouble arises when individuals rely too heavily on their experience in making automatic decisions. When we age, we tend to avoid exerting too much cognitive effort and deliberating

extensively over a decision that needs to be made. We gradually come to rely more on rule of thumb. This means that we make poorer choices in environments that are complex and unstable.

Organizations also lose skill with age.

Probably the best explanation for why companies decline is that they fall prey to organizational rigidities. Companies must balance exploiting profitable markets with exploring new markets. Exploiting known markets requires optimizing processes and executing effectively, and leads to reliable, near-term successes. Exploring unknown markets requires search and experimentation and offers none of the immediate benefits of exploitation.

Finding the best balance between exploration and exploitation depends on the rate of change in the environment. When change comes slowly, the balance can tilt toward exploitation. When it comes quickly, an organization must dedicate more resources to exploration, since profits are quickly exhausted. In general, companies tend to lean more on exploitation, which increases efficiency and profits in the short run but makes the company rigid, a state of affairs that only grows worse with age. Similar to aging individuals, companies rely on methods and rules of thumb that worked well in the past rather than embrace novelty. Companies, too, follow an arc of skill.

The book is full of tips. Deliberate practice helps develop differentiating skill when only a little luck is involved in the outcome. That is, the larger the impact of skill on the outcome, the more effective deliberate practice becomes. On the other hand, “where luck is rampant,” he writes, “we must think of skill in terms of a process because the results don’t provide clear feedback.”

Checklists, are also important because they guide behavior.

Sometimes, of course, you want to defend against luck. If you’re a heavy favorite, you want to neutralize the other teams luck, so your aim should be to simplify the game. When you’re the underdog you want to make the game as complex as possible. Effort and strategy can compensate for skill.

44. Richard Zeckhauser on Making Better Decisions

Richard Zeckhauser, aka Mr. Probability, is a champion Bridge player and the Frank Ramsey professor of political economy at Harvard University.

Speaking about Zeckhauser, Charlie Munger, the brilliant business partner of Warren Buffett, said, “The right way to think is the way Zeckhauser plays bridge. It’s just that simple.”

In an interview, Zeckhauser offers some insights on the craft of decision making about where to place your priorities and how to distinguish between various priorities.

When asked how companies can prevent overpaying for acquisition, Zeckhauser responded:

There is this tremendous optimism bias built into acquisitions. Synergies in my experience are frequently overstated. If I were looking at a large merger, I would hire a team in my corporation to present arguments to the board as to why we should not do it. The idea is to have a countervailing team to poke holes in the logic. Organizations have this tremendous tendency to get behind the boss and do what he thinks should be done, but you have to get away from that and motivate people to bring to the table something contrary to what is being said.

That bit of wisdom applies to more than just corporate acquisitions. The problem is that people often blindly follow the boss and what s/he thinks should be done. The Hippo Problem. — The Highest Paid Person’s Opinion carries the day even if they are wrong. They are, after all, the authority figure.

Stanley Milgram demonstrated our obedience to authority through a series of experiments. Milgram summarized his most famous experiment in a 1974 article, The Perils of Obedience, writing:

I set up a simple experiment at Yale University to test how much pain an ordinary citizen would inflict on another person simply because he was ordered to by an experimental scientist. Stark authority was pitted against the subjects’ [participants’] strongest moral imperatives against hurting others, and, with the subjects’ [participants’] ears ringing with the screams of the victims, authority won more often than not. The extreme willingness of adults to go to almost any lengths on the command of an authority constitutes the chief finding of the study and the fact most urgently demanding explanation.

Ordinary people, simply doing their jobs, and without any particular hostility on their part, can become agents in a terrible destructive process. Moreover, even when the destructive effects of their work become patently clear, and they are asked to carry out actions incompatible with fundamental standards of morality, relatively few people have the resources needed to resist authority

Zeckhauser also commented on how we can make better decisions?

One part of decision-making is about how to place your priorities. Let me tell you what I said to a group of investment professionals recently. They were making investments and were being introduced to five fund managers. I said, “You have \$50 million to invest and you have five potential managers; that does not mean you have to give \$10 million to each of these managers. If you really think that manager A is much better, you should probably give him \$25m and the others much smaller amounts.” Then, you improve your odds.

Here’s another example out of what I see in everyday life. You get 50 e-mails during the day and you answer 30 of them. On the one that you answer the most, you take 3 minutes. In all the others, you take 45 seconds. You should take 25 minutes to answer the one that is important, but you don’t. Once that is pointed out to you, you will say that is really obvious. In other words, you should decide what is really important and make your choices accordingly.

The other thing is about distinguishing between various probabilities. I think of making decisions the way I play tennis. I have taken many tennis lessons and my trainer always

tells me the same three or four things. Keep your eye on the ball, get into position, swing your racquet back and swing the ball. I pay him \$75 to tell me “keep your eye on the ball” and he tells me the same thing over and over again because the natural tendency when you are playing tennis is to take your eye off the ball. The natural tendency when you are thinking about probabilistic situations is to marginalise probabilities — treat 1%, 5%, 10% and 15% probabilities all as low probabilities. I think it is worth your while before you take a decision to figure out whether it is going to be 1%, 5%, 10% or 20%. And when it is worthwhile and when it is not. But most people don't bother to do that.

I am writing a paper today where we start off talking about President Obama's assessment of the likelihood that Osama bin Laden was in the hideout where we found him to be. He had a variety of assessments and he eventually concluded well it was 50% likely that we were going to go get him. Now, there is nothing magical about 50%. It might be that it is perfectly worthwhile to go and raid that compound if the probability is only 30%. And maybe it is not worthwhile even if it is 70%. Think about that. But people feel that 50% is magical and they don't like to do things where they don't have 50% odds. I know that is not a good idea, so I am willing to make some bets where you say it is 20% likely to work but you get a big pay-off if it works, and only has a small cost if it does not. I will take that gamble. Most successful investments in new companies are where the odds are against you but, if you succeed, you will succeed in a big way.

45. What Matters More in Decisions: Analysis or Process?

We all make decisions. Some of them are large and many of them are small. Few of us understand that the process we use to make those decisions is more important than the analysis we put into the decision.

Think of the last major decision you made.

Maybe it was an acquisition, a large purchase, or perhaps it was whether to launch a new product.

Odds are three things went into that decision: (1) It probably relied on the insights of a few key executives; (2) it involved some sort of fact gathering and analysis; and (3) it was likely enveloped in some sort of decision process—whether formal or informal—that translated the analysis into a decision.

Now how would you rate the *quality* of your organization's strategic decisions?

If you're like most executives, the answer wouldn't be positive:

In a recent McKinsey Quarterly survey of 2,207 executives, only 28 percent said that the quality of strategic decisions in their companies was generally good, 60 percent thought that bad decisions were about as frequent as good ones, and the remaining 12 percent thought good decisions were altogether infrequent.

How could it be otherwise? Product launches are frequently behind schedule and over budget. Strategic plans often ignore even the anticipated response of competitors.

Mergers routinely fail to live up to the promises made in press releases.

The persistence of problems across time and organizations, both large and small, indicates that we can make better decisions.

"I have no use whatsoever for projections or forecasts. They create an illusion of apparent precision. The more meticulous they are, the more concerned you should be. We never look at projections."

— Warren Buffett

The best place to start if we're trying to improve the quality of our decisions is to look at how organizations make decisions. One interesting thing about bureaucracies is that they develop processes to limit the damage the worst people can do at every level. That is they come up with mechanisms to reduce the impact the worst people can have. Yes, this also limits the positive impact that people can have as well. When it comes to decisions, organizations default to gathering data and analyzing decisions.

The widespread belief is that analysis reduces biases. But does it?

Is putting your faith in analysis any better than using your gut? What does the evidence say? Is there a better way?

Dan Lovallo and Olivier Sibony set to find out.

Lovallo is a professor at the University of Sydney and Olivier is a director at McKinsey & Company. Together they studied 1,048 "major" business decisions over five years. The results are surprising.

Most business decisions were not made on "gut calls" but rather rigorous analysis. And yet they were poor decisions. In short, most people did the all the legwork we think we're supposed to do: they delivered large quantities of detailed analysis.

Yet this wasn't enough. "Our research indicates that, contrary to what one might assume, good analysis in the hands of managers who have good judgment won't naturally yield good decisions."

[Projections] are put together by people who have an interest in a particular outcome, have a subconscious bias, and its apparent precision makes it fallacious. They remind me of Mark Twain's saying, 'A mine is a hole in the ground owned by a liar.' Projections in America are often a lie, although not an intentional one, but the worst kind because the forecaster often believes them himself."

Lovallo and Sibony didn't only look at the analysis, they also asked executives about the process used to make decisions.

Did they, for example, "explicitly explore and discuss major uncertainties or discuss viewpoints that contradicted the senior leader's?"

So what matters more, process or analysis? After comparing the results they determined that "process mattered more than analysis—by a factor of six."

This finding does not mean that analysis is unimportant, as a closer look at the data reveals: almost no decisions in our sample made through a very strong process were backed by very poor analysis. Why? Because one of the things an unbiased decision-making process will do is ferret out poor analysis. The reverse is not true; superb analysis is useless unless the decision process gives it a fair hearing.

To illustrate the weakness of how most organizations make decisions, Sibony used an interesting analogy: the legal system.

Imagine walking into a courtroom where the trial consists of a prosecutor presenting PowerPoint slides. In 20 pretty compelling charts, he demonstrates why the defendant is guilty. The judge then challenges some of the facts of the presentation, but the prosecutor has a good answer to every objection. So the judge decides, and the accused man is sentenced.

That wouldn't be due process, right? So if you would find this process shocking in a courtroom, why is it acceptable when you make an investment decision? Now of course, this is an oversimplification, but this process is essentially the one most companies follow to make a decision. They have a team arguing only one side of the case. The team has a choice of what points it wants to make and what way it wants to make them. And it falls to the final decision maker to be both the challenger and the ultimate judge. Building a good decision-making process is largely ensuring that these flaws don't happen.

Simply understanding our cognitive biases doesn't make you immune to them. It's not enough. A disciplined decision process is the best place to improve the quality of decisions and guard against common decision-making biases.

46. The Four Villains of Decision Making

You're probably not as effective at making decisions as you could be.

This article explores Chip and Dan Heath's new book, Decisive. It's going to help us make better decisions both as individuals and in groups.

But before we get to that, you should think about a tough decision you're grappling with right now. Having a decision working in your mind as you're reading this post will help make the advice in here tangible.

Ok, let's dig in.

"A remarkable aspect of your mental life is that you are rarely stumped ... The normal state of your mind is that you have intuitive feelings and opinions about almost everything that comes your way. You like or dislike people long before you know much about them; you trust or distrust strangers without knowing why; you feel that an enterprise is bound to succeed without analyzing it."

— Daniel Kahneman

We're quick to jump to conclusions because we give too much weight to the information in front of us and we fail to search for new information, which might disprove our thoughts.

Nobel Prize winning Psychologist Daniel Kahneman called this tendency "what you see is all there is." But that's not the only reason we don't make good decisions — there are many others.

We're overconfident. We look for information that fits our thoughts and ignore information that doesn't. We are overly influenced by authority. We choose the short-term over the long-term. Once we've made a decision we find it hard to change our mind. In short, our brains are flawed. I could go on.

Knowing about these and other biases isn't enough; it doesn't help us fix the problem. We need a framework for making decisions.

In Decisive, the Heaths introduce a four-step process designed to counteract many biases. In keeping with Kahneman's visual metaphor, the Heaths refer to the tendency to see only what's in front of us as a "spotlight" effect.

And that, in essence, is the core difficulty of decision making.

What's in the spotlight will rarely be everything we need to make good decisions, but we won't always remember to shift the light.

Most of us rarely use a process for thinking about things. If we do use one it's likely to be the pros-and-cons list. While better than nothing, this approach is still deeply flawed because it doesn't really account for biases.

The Four Villains of Decision Making

1. **Narrow Framing:** "... the tendency to define our choices too narrowly, to see them in binary terms. We ask, "Should I break up with my partner or not?" instead of "What are the ways I could make this relationship better?"
2. **Confirmation Bias:** "When people have the opportunity to collect information from the world, they are more likely to select information that supports their preexisting attitudes, beliefs, and actions." We pretend we want the truth, yet all we really want is reassurance.
3. **Short-term Emotion:** "When we've got a difficult decision to make, our feelings churn. We replay the same arguments in our head. We agonize about our circumstances. We change our minds from day to day. If our decision was represented on a spreadsheet, none of the numbers would be changing—there's no new information being added—but it doesn't feel that way in our heads."
4. **Overconfidence:** "People think they know more than they do about how the future will unfold."

The Heaths came up with a process to help us overcome these villains and make better choices. “We can’t deactivate our biases, but ... we can counteract them with the right discipline.” The nature of each of the four decision-making villains suggests a strategy for how to defeat it.

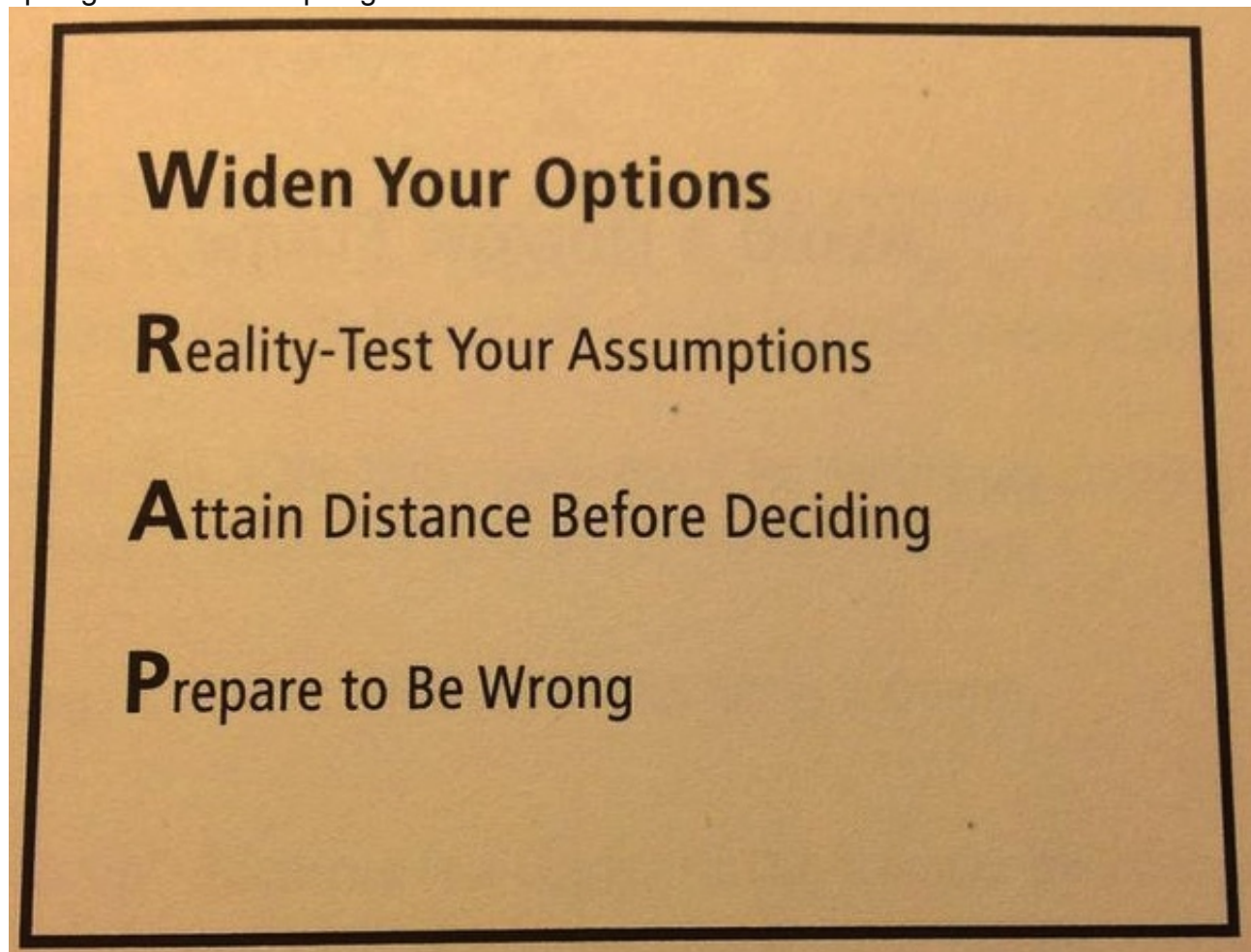
1. *You encounter a choice. But narrow framing makes you miss options. So ... Widen Your Options. How can you expand your set of choices? ...*

2. *You analyze your options. But the confirmation bias leads you to gather self-serving information. So ... Reality-Test Your Assumptions. How can you get outside your head and collect information you can trust? ...*

3. *You make a choice. But short-term emotion will often tempt you to make the wrong one. So ... Attain Distance Before Deciding. How can you overcome short-term emotion and conflicted feelings to make better choices? ...*

4. *Then you live with it. But you’ll often be overconfident about how the future will unfold. So ... Prepare to Be Wrong. How can we plan for an uncertain future so that we give our decisions the best chance to succeed? ...*

They call this WRAP. “At its core, the WRAP model urges you to switch from “auto spotlight” to manual spotlight.



Source: Decisive

All in all this was a great book. We focus our efforts on analysis. If a decision is wrong the analysis must have been the problem. Not only does this ignore the fact that you can have ‘bad outcomes’ with good decisions but it also places your spotlight on the analysis at the cost of the process by which the decision was made.

47. Decision Making Psychology with Rory Sutherland

Below are three excerpts from a great interview with Rory Sutherland on decision making psychology.

Understanding Human Behavior

That attempt to model economic behaviour as though it were Newtonian physics was responsible for many past mistakes. This is closer to weather forecasting than to conventional physics as a science. But it is still a science and can still make progress like a science. And the great news is that we are starting from such a low base. If our ability to understand and predict human behaviour only improves by a few percent a decade, the benefits will be immense. And even a tiny reduction in misdirected effort (by abandoning daft, ineffectual sunk-cost-plagued endeavours such as the war on drugs or, at a more modest level, badly conceived choice-architectures in a new range of cars) all can be economically transformative.

The Physical Fallacy

The problem we all face is “The physical fallacy”. All of us, even those the social sciences, have an innate bias where we are happier fixing problems with stuff, rather than with psychological solutions – building faster trains rather than putting wifi on existing trains, to use my oft cited example. But as Benjamin Franklin (no mean decision scientist himself) remarked “There are two ways of being happy: We must either diminish our wants or augment our means – either may do. The result is the same and it is for each man to decide for himself and to do that which happens to be easier.”

There is no reason to prefer one solution over another simply because it involves solid matter rather than grey matter. This is an interesting area where the advertising industry and the environmental movement (rarely seen as natural bedfellows) sometimes find common ground. Intangible value is the best kind of value – since the materials needed to create it are not in short supply.

Marketing and Advertising

If you need to understand why marketing and advertising (and reputation and brands) are important to the functioning of markets, Akerlof’s paper “The Market for Lemons” is essential reading. So too is his excellent and underread book “Identity Economics” written with Rachel Kranton. The problem is not with economics as practiced by great economists – it is the unquestioning adherence to the dumber assumptions of Basic Economics 101 as unthinkingly absorbed by the product of a thousand business schools.

You are particularly made aware of the pernicious influence of bad economics if you work in advertising. Even when advertising demonstrably works and is highly cost effective, people in finance and in the boards of companies don’t seem to like it very much. Since they have a mental model of the world in which everyone has perfect information, they have of course constructed in their heads a vision of the world in which marketing shouldn’t exist.

48. The Munger Two Step

A simple and easy approach to decision making that prevents us from being manipulated.

1. Understand the forces at play.
2. Understand how your subconscious might be leading you astray.

While most of us make decisions daily, few of us have a useful framework for thinking that protects us when making decisions.

We're going to explore Munger's two-step process for making effective decisions and reducing human misjudgment.

In A Lesson on Elementary Worldly Wisdom, Charlie Munger offers a simple two-step filter for making effective decisions:

Personally, I've gotten so that I now use a kind of two-track analysis. First, what are the factors that really govern the interests involved, rationally considered? And second, what are the subconscious influences where the brain at a subconscious level is automatically doing these things-which by and large are useful, but which often malfunction.

One approach is rationality-the way you'd work out a bridge problem: by evaluating the real interests, the real probabilities and so forth. And the other is to evaluate the psychological factors that cause subconscious conclusions-many of which are wrong.

Let's take a closer look.

1. The Forces at Play

The key to the first step is knowing what you know and what you don't know. You need to understand your circle of competence. It's just as important to know what you don't know as it is to know what you know.

If you know what you don't know, you might still have to make a decision, but your approaches for making that decision will change. For example, if you're forced to make a decision in an area that you know is well outside your circle of competence, one tool you can use is inversion.

While there are millions of factors that go into decisions, there will always be a few variables and factors that will carry the bulk of the weight. If you're operating within your circle of competence, it should be relatively easy to figure out the relevant variables and forces at play.

I can't tell you the relevant variables. There is no magic formula. To make consistently good decisions, you need to develop a deep fluency in the area in which you are making decisions, and you need to pull in the big ideas from multiple disciplines to make sure you're exercising good judgment.

2. The Psychological Factors

There are many causes of human misjudgment, including over-confidence. These are the subtle ways that your mind might be leading you astray at a subconscious level. Your subconscious mind is larger than your conscious mind, and yet we rarely pay attention to how we might be tricking ourselves. One way to mislead yourself, for instance, is to make decisions based on a small sample size and extrapolate the results to a larger population. Another way we fool ourselves is to remain committed to something we've said in the past. We might rely on an authority figure or default to what everyone else is doing. You get the idea.

Usually, when we have extreme success or failure, there are four or five factors working in the same direction. The same goes for psychology. The more human misjudgment factors there are working against us, the more likely we are to make an ill-informed decision.

49. Understanding and Diagnosing Problems

We all know one, the Monday morning quarterback.

They walk into the meeting room primed and ready for action. Ready that is, to apply the knowledge they know now to decisions of the past. And too often we're defenseless.

The outcome by now is likely apparent to everyone.

"When a decision goes awry," writes Albert Bernstein in his book Dinosaur Brains, "we tend to focus on the people who made it, rather than on the decision itself. Our assumption, which is really unwarranted, is that good people make good decisions, and vice versa."

The point is to focus on what was known at the time. And consider, in light of that, was it a reasonable decision?

Good decisions don't always have a good outcome, just as bad decisions don't always have bad outcomes. It's scary but a lot of otherwise smart people are unable to distinguish the difference.

This image from our rethink conference on decision making helps us understand what's going on.

	Good Outcome	Bad Outcome
<i>Good Process</i>	What we are aiming for.	We are not omniscient. We need courage to weather this. Your system will not work every time, and it is easy to abandon the system the first time it fails.
<i>Bad Process</i>	Gambling and winning. Feeds the halo effect.	Gambling and losing. My bad luck, your poor skill.

RE:THINKING DECISIONS

fs

It's easy to shine the spotlight on the outcome. It doesn't involve a lot of thinking either and it certainly isn't going to help you understand or diagnose problems.

It's harder, yet profitable, to think back and evaluate the merits of a particular decision based on what was known at the time. Was it a good decision with a bad outcome?

But usually, the only information we have about how and why decisions were made is the self-serving memories of the people in the room. "We have very little vocabulary for talking about internal thought processes," writes James March, "Decisions feel as if they jump fully grown from one's head."

This is where having a good decisionprocess comes in. Keeping a decision journals is also helpful.

Maybe executives in responsible positions should be required to keep logs, as sea captains do. After each decision, a manager would list his or her reasons for having made it and record how it turned out.

If you have a journal, you can pull it out and see, in light of the facts and assumptions at the time, whether the best decision possible was made and if there was, in fact, a mistake. If there really was a mistake, you can look at your decision process and determine what went wrong and how to avoid it in the future. Don't hide mistakes behind vagueness but, equally important, stay away from the blame/credit mentality because it undermines understanding. And understanding is the key to getting better.

One way to reinforce good decisions is to document the assumptions at the time the decision is made in a decision journal.

50. How to Make Smart Decisions Without Getting Lucky

Few things will change your trajectory in life or business as much as learning to make effective decisions. Yet no one really teaches us what it means to make consistently high-quality decisions.

The decision-making principles in this article are both practical and time-tested. They work in the real world.

In this guide, we'll cover:

- [No One Taught you How to Decide](#)
- [Your Mind is a Pattern Matching Machine](#)
- [Decision Making](#)
- [Smart People Make Terrible Decisions](#)
- [Sources of Stupidity](#)
- [Intelligent Preparation: The World Is Multidisciplinary](#)
- [How We Make Decisions](#)
- [General Thinking Concepts](#)
- [Add To Your Decision-Making Skills](#)
- [Books to Improve Decisions](#)

Ready? Ok, Let's dig in.

No one Taught you How to Decide

I started working at an intelligence agency on August 28, 2001. Two weeks later, the world would never be the same.

My computer science degree lost its value after a few promotions. I came from a world of 1s and 0s, not people, families, and interpersonal dynamics.

Just out of school, I found that my decisions affected not only my employees but their families. Not only my country but other countries. However, there was one small problem. I had no idea how to make smart decisions. I had no idea how to reduce errors. I only knew I had an obligation to make the best decisions I could. But where do you start?

There is no class called "decision making." Making better decisions isn't one skill but rather a series of tools and frameworks. What distinguishes consistently good decision-makers from poor ones is a series of diverse mental frameworks and tools (as well as relevant specific information).

Most of us operate like a carpenter with only a hammer. To a man with a hammer, every problem looks like a nail. No matter the job, we pull out our hammer and attempt to make it work. While a hammer can often get the job done eventually, it comes with a cost. In my world, a poor decision could cost lives, impact my country, or even start a war. A hammer wasn't enough, I wanted more tools.

"The older I get the more I realize how many kinds of smart there are. There are a lot of kinds of smart. There are a lot of kinds of stupid, too."

— JeFF Bezos

To fill my mental toolbox, I looked around my organization and found some mentors. I watched them, asked them annoying questions, and tried to learn as much as I could from them. I went back to school to get an MBA. I read everything I could about making decisions and the tools I needed to develop.

Thanks to the internet, I was no longer limited to the best teachers in my organization or university. The entire world was available. I could find the best teachers in the world, learn their tools and frameworks, and add them to my mental toolbox.

Pattern Matching

You probably don't know it but you already think in mental models. Mental models are mental chunks of knowledge that represent a concept. Gravity is a model. So are probabilistic thinking, inversion, and entropy.

Mental models shape how you think, how you approach problems, and how you identify the information that matters and ignore what doesn't. The mental models in your head are your cognitive skillset.

Decision Making

Think about the state of your life, your career, your business, your major relationships — anything consequential to you.

How many important decisions have you already had to make? With the benefit of hindsight, how well did you make them?

How many decisions did you make today? How did you make these decisions? Is there a better way?



Not all decisions matter. Most decisions, like where to grab a sandwich, are unimportant. The consequences of these decisions don't matter.

Yet some decisions are critical — they change our lives. Whether its who to trust, where to live, or whom to marry, these decisions reverberate for years.

Yet most of us don't have the right skills to think through these problems. As a result, we often fall back to the pro-con list, where you list all the positive things that happen on one side and the negative things on the other trading them off.

While useful when deciding what to have for lunch, the pro-con list comes with a lot of blind spots.

"I regard it as a criminal waste of time to go through the slow and painful ordeal of ascertaining things for one's self if these same things have already been ascertained and made available by others."

— Thomas Edison

SMART People Make Terrible Decisions

Otherwise smart people can make terrible decisions. Think about decisions like these:

- Napoleon decided to invade Russia (and Hitler did it again 130 years later)
- An editor deciding to publish O.J Simpson's *If I Did It*

- Chris Webber choosing the timeout he didn't have in the 1993 Final Four
- NASA's decision to ignore the O-ring issues on the Challenger
- President Kennedy's famous blunder to continue the Bay of Pigs operation inherited from the previous administration (a mistake he quickly learned from)
- Margaret Thatcher deciding to get behind a "poll tax" that led to her ouster by her own party
- Juergen Schrempp, the CEO of Daimler-Benz, deciding to merge with Chrysler despite massive internal opposition and general history of big M&A deals working very poorly
- Jim Cramer looking at Bear Stearns in 2007 and calling it a "BUY"
- ...and a hundred thousand more...

These were catastrophic decisions made by people who were, in some sense, professional decision-makers. They had impeccable credentials and judgment, and yet they made poor decisions due to poor judgment, a too-limited mental representations of the world, or just plain stupidity.

Sources of Stupidity

There are a lot of reasons we fail to make effective decisions.

Let's take a look at five of the biggest ones:

1. We're unintentionally stupid. I like to think that I'm rational and capable of interpreting all information in a non-biased way but that's a dream. Cognitive biases are great at explaining how our evolutionary programming leads us astray. Knowledge of these biases in advance rarely helps us make better decisions. There are, however, many easily recognizable situations that increase the odds we're about to do something stupid. Whether we're tired, overly focused on a goal, rushing, distracted, operating in a group, or under the influence of a group, we're more prone to stupidity.²
2. We have the wrong information. Making decisions with the wrong assumptions or facts is likely to lead to disaster.
3. We use the wrong model. We use mental models to make decisions. The quality of those models determines the quality of our thinking. There are a variety of reasons that we use false, incomplete, or incorrect models. Novices are prone to using models that the expert knows are incomplete or irrelevant. The odds of employing the wrong models increase as the pace of environmental change increases.
4. We fail to learn. We all know the person that has 20 years of experience but it's really the same year over and over. Well, that person is sometimes us. If we don't understand how we learn, we're likely to make the same mistakes over and over.
5. Looking over doing good. Our evolutionary programming conditions us to do what's easy over what's right. After all it's often easier to signal being virtuous than actually being virtuous. We unconsciously make choices based on optics, politics, and defendability. We hate criticism and seek the validation of our peers and superiors. We often want to feel good about ourselves first and have the outcome we desire second.

Luckily, we can take steps to reduce the odds of stupidity and increase the odds of good decisions in each of these categories.

"The frog in the well knows nothing of the mighty ocean."

— Japanese Proverb

Intelligent Preparation: The World Is Multidisciplinary

We live in a society that demands specialization. Being the best means being an expert in something. Letters after your name and decades in the trenches of experience are required before you can claim to know anything. In one sense there is nothing wrong with this — specialized knowledge is required to solve problems and advance our global

potential. But a byproduct of this niche focus is that it narrows the ways we think we can apply our knowledge without being called a fraud.

So we think physicists can't teach us about love; mathematicians can't instruct us on how to run a business; poets don't know squat about "my life." And bloggers can't contribute to philosophy.

I don't believe this is true.

Knowledge is hard to come by.

It takes work and commitment, and I think we owe it to ourselves to take it out of the box it comes in and experiment with it. We should blow past conformity and apply all the knowledge at our disposal to the problems and challenges we face every day.

Think about it. Over time you've picked up a lot of fundamentals about how the world works. You may have read a book about the Manhattan Project and the building of the nuclear bomb that was launched at Hiroshima. This story conveys the awesome power of self-sustaining nuclear reactions. Have you ever thought about applying those ideas to your life? You should.

How We Make Decisions

When was the last time you thought about how you make decisions?

If you're like most people, you've never been explicitly taught how to make effective decisions. You make decisions like a golfer who never took any lessons: miserable with the state of your game and yet not seeking to learn a better swing, and instead hoping for the best every time you lift the club. Hoping that this time your choice will finally work out. In the early 1980s, Charlie Munger and his partner Warren Buffett realized that a Savings & Loan operation they owned, as with the rest of the industry, was doomed to fail miserably due to forces outside of their control. At a time when almost none of their peers were taking action, they changed course dramatically, massively reducing the effect of the bank's failure on the rest of their business holdings. These two men knew they had to act much differently than their peers.

It worked: The S&L industry collapsed, yet Munger and Buffett escaped with barely a scratch. They saved themselves a great deal of stress and financial pain by applying a uniquely effective system of organized common sense. In hindsight, it seems like an obvious good decision; at the time, it seemed odd and unusual.

The lesson for us is that the people making consistently good decisions take advantage of how the world works. That's wisdom.

Real knowledge of the art of decision making, which remains true across time and circumstances, eras and epochs, can help increase the odds that we get what we want and reduce costly mistakes.

While everyone else is guessing, falling into old patterns, blindly following cognitive biases, we can be clear-headed and laser-focused.

That's what Farnam Street is all about.

Here are some examples of applying — or failing to apply — knowledge about how the world really works.

- It doesn't matter how smart you are if you don't realize where things are additive and where they are multiplicative. Nikola Tesla failed to understand Multiplication by Zero when he failed to realize that poor relations with others affected his life. While the Serbian-American was a brilliant inventor, he had difficulty relating to others, which made him difficult to work with. This problem cost him a Nobel Prize and a fortune that today would likely have made him the richest man in the world.
- While we all rely on maps, which are reductions of complexity, to make decisions, they are not always accurate. General George S. Patton Jr. understood that the map is not the territory. When he visited the troops near Coutances, he found them sitting on the side of the road, studying a map. Responding to Patton's inquiry as to

why they had not crossed the Seine, the troops informed him that they were studying the map and could not find a safe place to wade across. Patton informed them that he had just waded across it and it was not more than two feet deep.

- While we all like to be in the sexy industries, that desire shows an under-appreciation for the laws of thermodynamics. Smart companies like Berkshire Hathaway, guided by legendary investor Warren Buffett, understand that contrast is important. Sexy internet businesses are rarely effective, no matter how good they are, because the others are nearly just as good. What you want is contrast — to be the big fish in a small pond. And when you analyze the types of investments he's made over the years, that's what you find. If you're going to compete with people, you want to compete with people who are way less sophisticated than you.
- Understanding and applying the mental model of relativity helped Michael Abrashoff take the worst-performing ship in the US Pacific Fleet and turn it into the best. In his book, *It's Your Ship*, he wrote: "The most important skill a skipper can have is the ability to see through the eyes of the crew."

This website is about understanding and applying these time-tested mental models. Knowing how the world works means that you can stop fighting reality — and yourself along with it.

General Thinking Concepts

Combining intelligent preparation — learning about the big time-tested ideas from multiple disciplines — with general thinking frameworks will dramatically improve your decision-making skills.

These thinking frameworks help you look at problems through different lenses.

- Inversion — Otherwise known as thinking something through in reverse or thinking "backwards," inversion is a problem-solving technique.
- Second-Order Thinking — Ask yourself, "And then what?"
- The Map Is Not the Territory — The map of reality is not reality itself. If any map were to represent its actual territory with perfect fidelity, it would be the size of the territory itself.

All of these concepts (and six others) can be found in *The Great Mental Models Volume 1: General Thinking Concepts*.

51. How Not to Be Stupid

After a four-hour conversation on The Knowledge Project (Part 1, Part 2), Adam Robinson (@IAmAdamRobinson) and I shared another 10-minutes that shouldn't be missed on how not to be stupid.

Shane Parrish: Adam, you did a presentation once on how not to be stupid. Can you tell me about that? What is stupidity?

Adam Robinson: Right. It's so funny you should ask that, because people think stupidity is the opposite of intelligence. In fact, stupidity is the cost of intelligence operating in a complex environment. It's almost inevitable. And so I was asked by an organizer of an investment conference in the Bahamas of some elite global investors to do a talk on anything I wanted to do, except not about investing. It's just, pick an interesting topic. So I thought for a second and I blurt out, "Okay. How about how not to be stupid?" He laughed and he said, "Okay. Great." It took me a month of hard thinking, mind you, just to define stupidity. By the way, if you're in any field and you want to find ways to innovate, focus on words that are commonly used and try to define them simply.

It took me about a month, and I defined stupidity as overlooking or dismissing conspicuously crucial information. Right? It's crucial information, like you better pay attention to it. It's conspicuous, like it's right in front of your nose and yet you either overlook it or you dismiss it. How not to be stupid, what are the causes of human error—and it took me a couple of months of research just to come up with data points, because most stupidity is ignored or swept under the rug. I studied instances of scientific stupidity and literary stupidity and military stupidity and every other kind of stupidity, as well as two domains that engineer stupidity.

One is benign: magic. The magician misdirects your attention. The whole goal of the magician is to make you stupid, to not notice something you should have. The other is frauds and cons and hoaxes. That's also—but that's a malicious, malevolent kind of engineering of stupidity. The magician does so with our full consent, for entertainment purposes. The conman engineers stupidity for their own gain. I do historical research, everything, and I identify seven factors that lead to stupidity.

These seven factors are fascinating. In no particular order: one, being outside your normal environment or changing your routines. Two, being in the presence of a group. Three, being in the presence of an expert or if you, yourself, are an expert. Four, doing any task that requires intense focus. Five, information overload. Six, physical or emotional stress, fatigue. Seven—I'll come back to seven. I forget it right now. It's a few years. It'll come back to me in a second.

All seven factors are present in U.S. hospitals. All seven factors. This will astonish you.

This was recently written about, but I don't think it's really dawned on people. In the United States every year, there are roughly 30,000 fatalities from automobile accidents. That is a benchmark. How many deaths accidentally occur, accidentally, in hospitals every year? In other words, you go in with a broken arm and you don't come out. Not, you died as a result of what you went in for. You died because of error, human error. I would tell you the current best estimate—this is deaths, mind you, not injuries—is 210 to 440 thousand people die every year in the United States from hospital error.

[quote]Stupidity is overlooking or dismissing conspicuously crucial information[/quote]

(Editors note, that was not part of the conversation but will add context: When it comes to overloading our cognitive brains, the seven factors are: being outside of your circle of competence, stress, rushing or urgency, fixation on an outcome, information overload, being in a group where social cohesion comes into play, and being in the presence of an "authority." Acting alone any of these are powerful enough, but together they dramatically increase the odds you are unaware that you've been cognitively compromised.)

We know what to do, we just don't do it correctly. (Atul Gawande and I talk about this in [our interview](#)).

It's the third leading cause of death in the United States, right behind cancer and heart disease. If those seven factors—by the way, you don't need all seven factors to be present. They're additive. Oh, I remember what the final one was, and it's so funny I should forget it because it's the one that usually triggers stupidity. Rushing or a sense of urgency. So funny I would forget that one. It's usually the first one I say. By the way, if you're outside your normal environment and you are rushing, you are in big trouble, which is why often people are rushing on the way to the airport and they forget their passport or they do something. It has to do with information overload. All seven factors were present at the U.S. Challenger disaster. Remember back in 1986?

Didn't have to happen. All seven factors were present. There was the musician Yo-Yo Ma, in 1998 I believe, was rushing to an appointment in New York City. He lives in Boston. He was outside his normal environment, rushing, and he was preoccupied because he was late for an appointment. Three of the seven factors. You don't need all seven to create stupidity. In the back of the cab in which he's being driven is his million-dollar cello in a big blue Plexiglas thing. It's in the trunk. He gets out of the cab, he leaves it in the back of the trunk. All of a sudden, because Yo-Yo Ma is such a celebrity, the mayor is called, the police chief and all cars bulletin goes out, find this cello.

Cello?

They do. In the press conference, get this, he says, "I just did something stupid." I'm using air quotes. That's an exact phrase. "I just did something stupid. I was in a rush." Sure enough, in my research, I found three other situations where world class musicians were in a different city, rushing, and they left their instruments. Each one of them. One a \$3 million violin. He was on a national tour, left a \$3 million violin in an Amtrak train. Imagine \$3 million violin in the luggage compartment of an Amtrak train. Fortunately, they called ahead and they found it at the next station. He was lucky. Each of the musicians, in exactly the same—

Circumstance.

*—circumstances led to stupidity. Now, Atul Gawande wrote a book called [The Checklist Manifesto](#). Atul Gawande is brilliant. Brilliant, brilliant, brilliant. However, the problem with checklists is that the stupidity factors override them. The worst aviation disaster in history, *Shane*, occurred in 1977. Nearly 600 lives were lost when two planes collided during the day on the ground. Imagine, two planes collided in an airport on the ground. Six hundred lives were lost. You might say, how does that even happen? All seven factors were present. Something else. Do you know what the pilot that caused the crash was doing right before he took off and slammed into the plane? He was racing through a checklist.*

Checklists don't help you if you're stupid about the checklist. You're just not going to use it. A really important takeaway from that, and I'm so glad we got that final question in, is beware of rushing—and if these factors are present, don't make any important decisions. It doesn't take much. By the way, I mentioned fatigue and illness. If you're tired or emotionally overwrought, if you have pulled an all-nighter, you have the motor control and the reflex speed of someone who is legally drunk. An all-nighter you think, I mean we've all pulled all-nighters, right? We all sometimes pull multiple all-nighters.

You gotta be aware. You may think that cognitively you're okay, but your motor control skills and your reflexes are those of someone who's legally drunk. You've really got to be careful. By the way, multitasking is information overload. That comes under the information overload thing, and if you're talking on Bluetooth while you're driving a car, you have exponentially increased the odds that you're going to get into an accident.

This is why when you're lost, the first thing you do is turn down the radio.

Oh, fascinating. You're right.

When you're in a car, when you get lost, you always...one of the first things you do is eliminate an input, which is the radio.

That's so funny. You're right.

Or if you're talking with somebody you say, "Hold on a second," because you intuitively know that that's just—subconsciously, you know that's distracting you.

By the way, that's so funny you should mention that, because that's why when I tell people that statistic about...talking on Bluetooth on the phone when you're driving is incredibly dangerous. People say, "Yeah, but what about if someone's in the front of the seat talking to you?" That in fact doubles your odds. If someone's in the front seat with you, talking while you're driving, you've doubled the chances of your getting into an accident. Just doubled. Just that, but the difference is that that person, when you are dealing with unusual traffic conditions, he or she will shut up.

Right, they can see it.

They can see it. The person on the phone who's talking on Bluetooth doesn't shut up. You're still getting the input. That's why it's so dangerous.

That's really interesting. I never thought of that.

Yeah. Well, I didn't think about it until I researched it.

52. The Decision Matrix: How to Prioritize What Matters

The decisions we spend the most time on are rarely the most important ones. Not all decisions need the same process. Sometimes, trying to impose the same process on all decisions leads to difficulty identifying which ones are most important, bogging us down and stressing us out.

I remember once struggling at the intelligence agency shortly after I received a promotion. I was being asked to make too many decisions. I had no way to sort through them to figure out which ones mattered, and which ones were inconsequential.

The situation built slowly over a period of weeks. My employees were scared to make decisions because their previous boss had hung them out to dry when things went wrong. My boss, a political high flyer, also liked to delegate down the riskiest decisions. As a result, I had more decisions to make than capacity to make them. I was working longer and longer to keep up with the volume of decisions. Worse, I followed the same process for all of them. I was focusing on the most urgent decisions as the cost of the most important decisions.

It was clear to me that I wasn't the right person to make all of the decisions. I needed a quick and flexible framework to categorize decisions into the ones I should be making and the ones I should be delegating. I figured most of the urgent decisions could be made by the team because they were easily reversible and not very consequential. In fact, they were only becoming urgent because the team wasn't making the decisions in the first place. And because I was rushing through these decisions in an effort to put more time into the important decisions, I was making worse choices than the team would have.

As I was walking home one night, I came up with an idea that I used from the next day on, with pretty good success. I call it the Decision Matrix. It's a decision making version of the Eisenhower Matrix, which helps you distinguish between what's important and what's urgent. It's so simple you can draw it on a napkin, and once you get it, you get it.

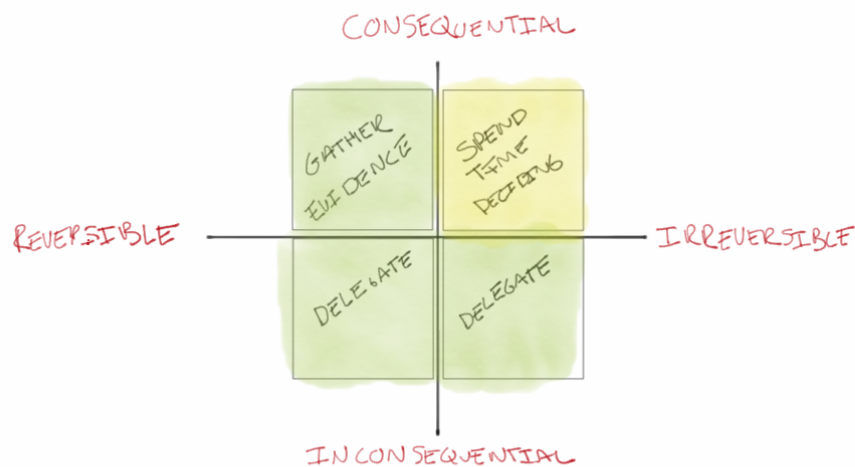
While it won't make the decisions for you, it will help you quickly identify which decisions you should focus on.

The Decision Matrix

My strategy for triaging was simple. I separated decisions into four possibilities based on the type of decision I was making.

1. Irreversible and inconsequential
2. Irreversible and consequential
3. Reversible and inconsequential
4. Reversible and consequential

The great thing about the matrix is that it can help you quickly delegate decisions. You do have to do a bit of mental work before you start, such as defining and communicating consequentiality and reversibility, as well as where the blurring lines are.



The Decision Matrix in Practice

This matrix became a powerful ally to help me manage time and make sure I wasn't bogged down in decisions where I wasn't the best person to decide.

I delegated both types of inconsequential decisions. Inconsequential decisions are the perfect training ground to develop judgment. This saved me a ton of time. Before this people would come to me with decisions that were relatively easy to make, with fairly predictable results. The problem wasn't making the decision—that took seconds in most cases. The problem was the 30 minutes the person spent presenting the decision to me. I saved at least 5–7 hours a week by implementing this one change.

I invested some of that time meeting with the people making these decisions once a week. I wanted to know what types of decisions they made, how they thought about them, and how the results were going. We tracked old decisions as well, so they could see their judgment improving (or not).

Consequential decisions are a different beast. Reversible and consequential decisions are my favorite. These decisions trick you into thinking they are one big important decision. In reality, reversible and consequential decisions are the perfect decisions to run experiments and gather information. The team or individual would decide experiments we were going to run, the results that would indicate we were on the right path, and who would be responsible for execution. They'd present these findings.

Consequential and irreversible decisions are the ones that you really need to focus on. All of the time I saved from using this matrix didn't allow me to sip drinks on the beach.

Rather, I invested it in the most important decisions, the ones I couldn't justify delegating. I also had another rule that proved helpful: unless the decision needed to be made on the spot, as some operational decisions do, I would take a 30-minute walk first.

The key to successfully employing this in practice was to make sure everyone was on same page with the terms of consequential and reversible. At first, people checked with me but later, as the terms became clear, they just started deciding.

While the total volume of decisions we made as a team didn't change, how they were allocated within the team changed. I estimate that I was personally making 75% fewer decisions. But the real kicker was that the quality of all the decisions we made improved dramatically. People started feeling connected to their work again, productivity improved, and sick days (a proxy for how engaged people were) dropped.

Give the Decision Matrix a try—especially if you're bogged down and fighting to manage your time, it may change your working life.

53. The Skill You've Never Been Taught: How to Think Better

No skill is more valuable or harder to come by than the ability to critically think through problems.

Thinking better than others means you'll have more free time and fewer problems. If you can't think well, you'll spend a lot of time fixing avoidable mistakes.

If you stop thinking when most people stop thinking, you'll come to the same conclusions most people come to. Thinking is hard, so it's natural that most people stop as soon as possible. We get the gist of something and move on to the next problem.

Where do the ideas come from? Mine come from sitting and thinking.

Ed Thorp

How can we learn to think better?

One answer comes from the lecture Solitude and Leadership by William Deresiewicz, author of the *New York Times* bestseller *Excellent Sheep: The Miseducation of the American Elite and the Way to a Meaningful Life*. The entire speech, which was delivered at Westpoint, is worth reading, but here is the essential takeaway.

Learning How To Think

Let's start with how you don't learn to think. A study by a team of researchers at Stanford came out a couple of months ago. The investigators wanted to figure out how today's college students were able to multitask so much more effectively than adults. How do they manage to do it, the researchers asked? The answer, they discovered—and this is by no means what they expected—is that they don't. The enhanced cognitive abilities the investigators expected to find, the mental faculties that enable people to multitask effectively, were simply not there. In other words, people do not multitask effectively. And here's the really surprising finding: the more people multitask, the worse they are, not just at other mental abilities, but at multitasking itself.

One thing that made the study different from others is that the researchers didn't test people's cognitive functions while they were multitasking. They separated the subject group into high multitaskers and low multitaskers and used a different set of tests to measure the kinds of cognitive abilities involved in multitasking. They found that in every case the high multitaskers scored worse. They were worse at distinguishing between relevant and irrelevant information and ignoring the latter. In other words, they were more distractible. They were worse at what you might call "mental filing": keeping information in the right conceptual boxes and being able to retrieve it quickly. In other words, their minds were more disorganized. And they were even worse at the very thing that defines multitasking itself: switching between tasks.

Multitasking, in short, is not only not thinking, it impairs your ability to think. Thinking means concentrating on one thing long enough to develop an idea about it. Not learning other people's ideas, or memorizing a body of information, however much those may sometimes be useful. Developing your own ideas. In short, thinking for yourself. You simply cannot do that in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.

I find for myself that my first thought is never my best thought. My first thought is always someone else's; it's always what I've already heard about the subject, always the conventional wisdom. It's only by concentrating, sticking to the question, being patient, letting all the parts of my mind come into play, that I arrive at an original idea. By giving my brain a chance to make associations, draw connections, take me by surprise. And often even that idea doesn't turn out to be very good. I need time to think about it, too, to make mistakes and recognize them, to make false starts and correct them, to outlast my impulses, to defeat my desire to declare the job done and move on to the next thing.

*I used to have students who bragged to me about how fast they wrote their papers. I would tell them that the great German novelist Thomas Mann said that a writer is someone for whom writing is more difficult than it is for other people. The best writers write much more slowly than everyone else, and the better they are, the slower they write. James Joyce wrote *Ulysses*, the greatest novel of the 20th century, at the rate of about a hundred words a day—half the length of the selection I read you earlier from *Heart of Darkness*—for seven years. T. S. Eliot, one of the greatest poets our country has ever produced, wrote about 150 pages of poetry over the course of his entire 25-year career. That's half a page a month. So it is with any other form of thought. You do your best thinking by slowing down and concentrating.*

Improving Thinking

The best way to improve your thinking ability is to spend time thinking.

Immersing ourselves in a subject and giving it our full attention offers insights that can't be gained simply by skimming on the surface.

How can we force ourselves to spend more time thinking?

One way to engage with an idea is to write about it.

If you're thinking without writing, you only think you're thinking.

Leslie Lamport

While we naturally understand that writing is a good way to share ideas with others, we under-appreciate just how much good writing helps us think about an idea ourselves.

Writing is not only a means of communication, it enables us to practice reasoning.

Writing forces you to slow down, focus, and think deeply. In a world where attention is fragmented into seconds, thinking becomes more reactive than reasoned. Only when take time to play with our ideas can we hope to think about them substantially. Writing requires sticking with something a little longer and developing a deeper understanding.

Writing is the process by which we realize we do not understand and the process by which we come to understand.

Writing requires the compression of an idea. When done poorly, compression removes crucial information. When done well, compression keeps the essential and removes the rest. Compression requires both thinking and clarity, which is one reason writing is an important aid to thinking.

It's only by concentrating, sticking to the question, being patient, letting all the parts of my mind come into play, that I arrive at an original idea. By giving my brain a chance to make associations, draw connections, take me by surprise.

— William Deresiewicz

Good writing gives poor thinking nowhere to hide. It's easy to read and flows. Poor writing is a drag as your mind is forced to sift through the obfuscation to try and pull out the right information. Poor writing is a strong indication of poor thinking.

Good writing requires thinking. Thinking takes time. Good thinking is expensive, but bad thinking costs a fortune.

The Bottom Line

The process of writing helps you think through an idea.

Writing forces you to test your thinking. Strangers can't know your thoughts, unless you put them into words. So one way to test your ideas is to let other people read them.

Take the time to write down your thoughts.

54. The Anatomy of a Decision: An Introduction to Decision Making

“The only proven way to raise your odds of making a good decision is to learn to use a good decision-making process—one that can get you the best solution with a minimal loss of time, energy, money, and composure.”

— John Hammond

This is an introduction to decision making.

A good decision-making process can literally change the world.

Consider the following example from Predictable Surprises: In 1962, when spy planes spotted Soviet missiles in Cuba, U.S. military leaders urged President Kennedy to authorize an immediate attack. Fresh from the bruising failure of the Bay of Pigs, Kennedy instead set up a structured decision-making process to evaluate his options. In a precursor of the Devil's Advocacy method, Kennedy established two groups each including government officials and outside experts, to develop and evaluate the two main options—attack Cuba or set up a blockade to prevent more missiles from reaching its shores. Based on the groups' analysis and debate, Kennedy decided to establish a blockade. The Soviets backed down, and nuclear war was averted. Recently available documents suggest that if the United States had invaded Cuba, the consequences would have been catastrophic: Soviet missiles that had not been located by U.S. Intelligence could still have struck several U.S. cities.

The concept of a decision-making process can be found in the early history of thinking.

Decisions should be the result of rational and deliberate reasoning.

Plato argues that human knowledge can be derived based on reason alone using deduction and self-evident propositions. Aristotle formalized logic with logical proofs where someone could reasonably determine if a conclusion was true or false.

However, as we will discover, not all decisions are perfectly rational. Often, we let our system one thinking—intuition—make decisions for us. Our intuition is based on long-term memory that has been primarily acquired over the years through learning and allows our mind to process and judge without conscious awareness. System one thinking, however, does not always lead to optimal solutions and often tricks our mind to thinking that consequences and second-order effects are either non-existent or less probable than reality would indicate.

In Predictable Surprises Max Bazerman writes:

Rigorous decision analysis combines a systematic assessment of the probabilities of future events with a hard-headed evaluation of the costs and benefits of particular outcomes. As such, it can be an invaluable tool in helping organizations overcome the biases that hinder them in estimating the likelihood of unpleasant events. Decision analysis begins with a clear definition of the decision to be made, followed by an explicit statement of objectives and explicit criteria for assessing the “goodness” of alternative courses of action, by which we mean the net cost or benefit as perceived by the decision-maker. The next steps involve identifying potential courses of action and their consequences. Because these elements often are laid out visually in a decision tree, this technique is known as “decision tree analysis.” Finally, the technique instructs decision-makers to explicitly assess and make trade-offs based on the potential costs and benefits of different courses of action.

To conduct a proper decision analysis, leaders must carefully quantify costs and benefits, their tolerance for accepting risk, and the extent of uncertainty associated with different potential outcomes. These assumptions are inherently subjective, but the process of quantification is nonetheless extremely valuable' it forces participants to express their

assumptions and beliefs, thereby making them transparent and subject to challenge and improvement.

From Judgment in Management Decision Making by Max Bazerman:

The term judgment refers to the cognitive aspects of the decision-making process. To fully understand judgment, we must first identify the components of the decision-making process that require it.

Let's look at six steps you should take, either implicitly or explicitly, when applying a "rational" decision-making process to each scenario.

1. Define the problem. (M)anagers often act without a thorough understanding of the problem to be solved, leading them to solve the wrong problem. Accurate judgment is required to identify and define the problem. Managers often err by (a) defining the problem in terms of a proposed solution, (b) missing a bigger problem, or (c) diagnosing the problem in terms of its symptoms. Your goal should be to solve the problem not just eliminate its temporary symptoms.

2. Identify the criteria. Most decisions require you to accomplish more than one objective. When buying a car, you may want to maximize fuel economy, minimize cost, maximize comfort, and so on. The rational decision maker will identify all relevant criteria in the decision-making process.

3. Weight the criteria. Different criteria will vary in importance to a decision maker. Rational decision makers will know the relative value they place on each of the criteria identified. The value may be specified in dollars, points, or whatever scoring system makes sense.

4. Generate alternatives. The fourth step in the decision-making process requires identification of possible courses of action. Decision makers often spend an inappropriate amount of search time seeking alternatives, thus creating a barrier to effective decision making. An optimal search continues only until the cost of the search outweighs the value of added information.

5. Rate each alternative on each criterion. How well will each of the alternative solutions achieve each of the defined criteria? This is often the most difficult stage of the decision-making process, as it typically requires us to forecast future events. The rational decision maker carefully assesses the potential consequences on each of the identified criteria of selecting each of the alternative solutions.

6. Compute the optimal decision. Ideally, after all of the first five steps have been completed, the process of computing the optimal decision consists of (a) multiplying the ratings in step 5 by the weight of each criterion, (b) adding up the weighted ratings across all of the criteria for each alternative, and (c) choosing the solution with the highest sum of weighted ratings.

Hammond, Keeney, and Raiffa suggest 8 steps in their book Smart Choices:

- 1. Work on the right problem.*
- 2. Identify all criteria.*
- 3. Create imaginative alternatives.*
- 4. Understand the consequences.*
- 5. Grapple with your tradeoffs.*
- 6. Clarify your uncertainties.*
- 7. Think hard about your risk tolerance.*
- 8. Consider linked decisions.*

* * *

People, however, are not always entirely logical machines. In Judgment in Managerial Decision Making, the distinction between System One and System Two thinking becomes clear:

System 1 thinking refers to our intuitive system, which is typically fast, automatic, effortless, implicit, and emotional. We make most decisions in life using System 1 thinking. For instance, we usually decide how to interpret verbal language or visual information

automatically and unconsciously. By contrast, System 2 refers to reasoning that is slower, conscious, effortful, explicit, and logical. System 2 thinking can be broken down into (1) define the problem; (2) identify the criteria; (3) weigh the criteria; (4) generate alternatives; (5) rate each alternative on each criterion; (6) compute the optimal decision. In most situations, our system 1 thinking is quite sufficient; it would be impractical, for example, to logically reason through every choice we make while shopping for groceries. But System 2 logic should preferably influence our most important decisions.

* * *

When making a decision, we are psychologically influenced either consciously or unconsciously. By exploring these biases and other elementary, worldly wisdom, we hope to make you a better decision-maker.

Following a rational decision process can help us focus on outcomes that are low in probability but high in potential costs. Without easily quantifiable costs, we often dismiss low probability events or fall prey to biases. We don't want to be the fragilista.

Even rational decision-making processes like the one presented above make several assumptions. The first assumption is that a rational decision-maker is completely informed which means they know about all the possible options and outcomes. The second major assumption is that the decision-maker does not fall prey to any biases that might impact the rational decision.

In researching decision-making processes, it struck us as odd that few people question the information upon which criteria are measured. For instance, if you are purchasing a car and use fuel efficiency as the sole criterion for decision making, you would need to make sure that the cars under consideration were all tested and measured fuel consumption in the same way. This second order of thinking can help you make better decisions.

If you want to make better decisions, you should read Judgment in Managerial Decision Making. That is the best book I've come across on decision making. If you know of a better one, please send me an email.

Stanovich's book, What Intelligence Tests Miss: The Psychology of Rational Thought, proposes a whole range of cognitive abilities and dispositions independent of intelligence that have at least as much to do with whether we think and behave rationally.

55. Creating a Decision Journal: Template And Example Included

We all make decisions. And yet few of us think about what we can learn from our past decisions to make smarter decisions in the future. A decision journal helps you learn from past decisions, think through current decisions, and avoid problems before they happen. In this article we'll cover:

- Your Product is Decisions
- What is a Decision Journal
- A Decision Journal Template
- An Example Decision
- Tips on Using a Decision Journal

Ok, let's dig in.

Your Product is Decisions

In most organizations your product is decisions. By and large, your success will be the sum of the decisions you make over your career. The problem is it's not easy to get better at making decisions.

Bosses would be the easy solution to helping you improve. After all, they have the best view of the problem and you. They should be able to point out strengths and weaknesses in your decision process as well as your judgment. All of this is known at the time you made the decision. This is hard and subjective and requires people doing a lot of thinking. So bosses tend to default to resulting, a process by which the outcome of the decision is attached to the process used to make that decision. Under resulting good outcomes are the product of good decisions and bad outcomes are the product of bad decisions. The problem isn't that people don't want to get better at decisions, it's the system that's preventing them from doing so.

Even if we can't get our boss to help us make better decisions we can take things into our own hands. The way to test the quality of your decisions is to test the process by which you make them. Daniel Kahneman, Nobel Prize winner and dean of biases, argues that using a decision journal is the best solution. Kahneman said:

Go down to a local drugstore and buy a very cheap notebook and start keeping track of your decisions. And the specific idea is whenever you're making a consequential decision, something going in or out of the portfolio, just take a moment to think, write down what you expect to happen, why you expect it to happen and then actually, and this is optional, but probably a great idea, is write down how you feel about the situation, both physically and even emotionally. Just, how do you feel? I feel tired. I feel good, or this stock is really draining me. Whatever you think.

The key to doing this is that it prevents something called hindsight bias, which is no matter what happens in the world, we tend to look back on our decision-making process, and we tilt it in a way that looks more favorable to us, right? So we have a bias to explain what has happened.

A decision journal helps you collect accurate and honest feedback on what you were thinking at the time you made the decision. This feedback helps you see when you were stupid and lucky as well as when you were smart and unlucky. Finally, you can get the feedback you need to make better decisions.

The key to understanding the limits to our knowledge (see circle of competence) is to check the results of our decisions against what we thought was going to happen and why we thought it was going to happen. That feedback loop is incredibly powerful because our minds won't provide it by themselves.

I'll give you the spoiler right now. We don't know as much as we think we know. We're fooled into thinking that we understand something when we don't and we have no means to correct ourselves.

Our minds revise history to preserve our view of ourselves. The story that we tell ourselves conflates the cause and effect of a decision we made and the actual outcome. The best cure for this revising is the decision journal.

What is a Decision Journal?

You can think of a decision journal as quality control for our thinking — something like what we'd find in a manufacturing plant or a restaurant. Using a decision journal is simple but not easy. Implementing one requires discipline and humility.

Not all decisions need to be journaled. Decisions of consequence should be logged with the basics of the situation, what you expect to happen, and why.

You should write in your decision journal before you make the decision official. Writing is the process where you realize that you don't know what you think you know. Writing about your decision forces you to explain your thinking. If we write about the decision after we make it, it's often too late to do anything about it.

Write your decision down sleep on it and read it with fresh eyes in the morning. Often you'll find that what you wrote doesn't make sense. Catching mistakes before you make a decision saves you time and money.

A Decision Journal Template

The key question is what information to include in your decision journal. Here's the template we use at FS.

Decision No: _____

Date: _____

Time: _____

Decision: _____

Mental/Physical State (check boxes)

Energized ☐ Focused ☐ Relaxed ☐

Confident ☐ Tired ☐ Accepting ☐

Accommodating ☐ Anxious ☐ Resigned ☐

Frustrated ☐ Angry ☐

The situation/context:

The problem statement or frame:

The variables that govern the situation include:

[Click for PDF](#)

Whenever you're making a consequential decision, either individually or as part of a group, you take a moment and write down:

1. The situation or context
2. The problem statement or frame
3. The variables that govern the situation
4. The complications or complexity as you see it
5. Alternatives that were seriously considered and why they were not chosen (think: the work required to have an opinion)
6. A paragraph explaining the range of outcomes
7. A paragraph explaining what you expect to happen and the reasoning and actual probabilities you assign to each projected outcome (The degree of confidence matters, a lot.)

8. The time of day you're making the decision and how you feel physically and mentally (If you're tired, for example, write it down.)

You have to make this part your own. I've seen others include:

- What's the primary thesis
- What is the expected outcome(s)
- What are the second and third-order consequences
- What is the worst-case scenario and why that's ok
- What is the potential upside beyond the core thesis
- What emotions am I experiencing
- What is the opportunity cost (by doing this what am I not doing)
- What unique advantages or insights do I have in this situation
- Who is the best person to make this decision
- What does this look like in 5 weeks, 5 months, 5 years?

An Example Decision

Perhaps an example will help illustrate. Here's a real decision that I made using the FS decision journal template.

Tips on Using a Decision Journal

Here are some tips to keep in mind as you implement your decision journal.

Your decision journal can be tailored to the situation and context. Specific decisions might include trade-offs, second-order effects, weighting criteria, or other relevant factors. These examples are only to get you started.

We can't improve our thinking if we can't see it. Don't spend too much time on the brief and obvious insights. Often our first thoughts represent the thinking of someone else and not our own thinking.

Any decision you're journaling is inherently complex and may involve non-linear systems. In such a world, small effects can cause disproportionate responses whereas bigger ones might have no impact. Remember that causality is complex, especially in complex domains.

Two common ways people wiggle out of their own decisions are hindsight bias and jargon. It's hard to remember what we knew at the time and what we were thinking. Hindsight makes things far more explainable and changes our story. A decision journal helps combat this by recording what you knew and what you thought at the time. When you look at your own handwriting you come face to face with the person you were when you made the decision. There is nowhere to hide.

The words we use are also important. When we use vague terms, we give ourselves wiggle room. If we want to get better at making decisions we can't give ourselves wiggle room. Be clear. Be direct. Be simple. An 8-year-old should understand what decision you're making and why.

A decision journal that sits on the shelf is less useful than one that gets reviewed. Every six months or so pick it up and look at your past decisions, update entries with what actually happened, and spend time thinking about your process.

Realizing where you make mistakes, how you make them, what types of decisions you're bad at, etc., helps you make better decisions going forward. When you start to identify patterns, you can change your decision process to help account for the things you miss. Just because you had a bad outcome doesn't mean you made a bad decision. You might have made the right decision (which, in our sense, means that used a good process) and still had a bad outcome. We call that a bad break.

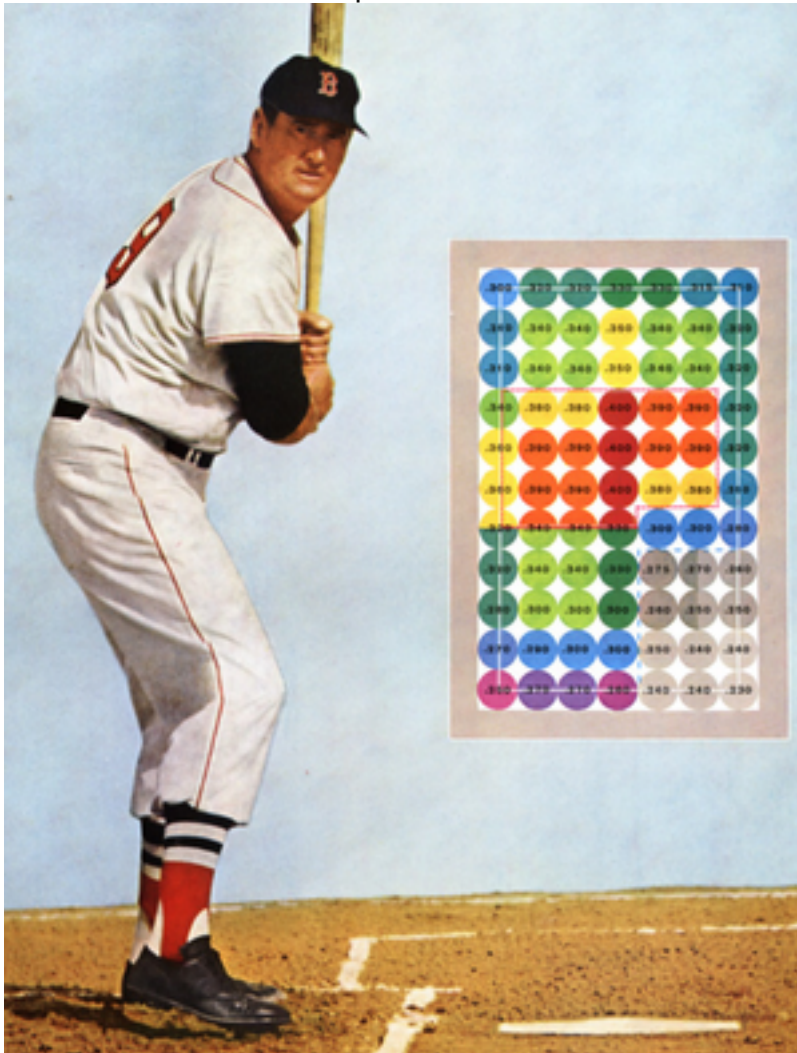
When you use a decision journal, you'll discover two things right away. First, you're right a lot of the time. Second, it's often for the wrong reasons. Discovering how lucky you are can be somewhat humbling. This is where the learning begins.

56. Swing for Success: Mastering Your Circle of Competence with Ted Williams' Winning Strategy

Ted Williams (1918-2002) was arguably the greatest hitter in baseball history. He was the last player to break the revered .400 barrier—a remarkable achievement in any era.

How did he do it, and what can we learn from him to improve our decision-making?

Admittedly, I'm not a diehard baseball fan, but Ted Williams' book, *The Science of Hitting*, piqued my interest. It contains a compelling illustration of him at-bat, with the strike zone divided into 77 distinct squares.



Source: The Science of Hitting

Williams recognized that waiting for a pitch in his sweet spot significantly increased his chances of getting a hit. Being patient and waiting for the right opportunity, offered a 40% hit rate. Impatience, on the other hand, could lower his success rate to a mere 23-25%. Williams understood that average batters turned into great batters if they waited for the right pitch, and even the best batters turned into average ones if they swung at the wrong pitch.

A good hitter can hit a pitch that is over the plate three times better than a great hitter with a questionable ball in a tough spot.

According to baseball legend Rogers Hornsby, the most crucial factor for a hitter is getting a good ball to hit. Williams took this advice to heart, meticulously dividing the strike zone into 77 baseball-sized spaces, and understanding which pitches yielded the highest odds of success for him.

The Zone of Opportunity

We all possess a zone of opportunity, where the odds are in our favor. This is your Circle of Competence, your “sweet spot.”

The most important thing about your circle of competence is knowing where it starts and stops. While simple, it's not easy. As Richard Feynman once said, “the first principle is that you must not fool yourself, and you are the easiest person to fool.”

A common mistake is to confuse familiarity with understanding. Deep fluency takes a lot of work. If you want to test your understanding of something (or learn something new), try this approach.

“It's not a competency if you don't know the edge of it.”

— Charlie Munger

Warren Buffett understands sticking to what you understand rather than chasing what's new and exciting. He writes:

If we have a strength, it is in recognizing when we are well within our circle of competence and when we are approaching the perimeter. Predicting the long term economics of companies that operate in fast-changing industries is simply far beyond our perimeter. If others claim predictive skills in those industries—and seem to have claims validated by the behaviour of the stock market we neither envy nor emulate them. Instead, we just stick with what we understand. If we stray, we will have done so inadvertently, not because we got restless and substituted hope for rationality.

Unlike Williams, Buffett can't be called “out” on strikes if he resists pitches that are barely in the strike zone. He can, quite literally, wait for the perfect pitch—looking at thousands of different investments before finding one that is just right.

If straying from our core competence decreases our success rate, what can we do to improve our odds?

When you are operating outside of your area of understanding, focusing on positioning rather than predicting is crucial. Two ways to achieve this are by increasing the margin of safety and ensuring circumstances don't force us into a bad decision.

By learning from Ted Williams and understanding our Circle of Competence, we can make better decisions and increase our odds of success in various domains.

57. This Time is Different: The Four Most Costly Words Ever Spoken

When we look at situations we're always looking for what's unique. We should, however, give more thought to similarities.

"This time is different" could be the 4 most costly words ever spoken. It's not the words that are costly so much as the conclusions they encourage us to draw.

We incorrectly think that differences are more valuable than similarities.

After all, anyone can see what's the same but it takes true insight to see what's different, right? We're all so busy trying to find differences that we forget to pay attention to what is the same.

Imagine sitting in a meeting where people are about to make the same mistake they made last year on the same decision. Let's say, for example, Jack has a history of messing up the annual tax returns. He's a good guy. He's nice to everyone. In fact, he buys everyone awesome Christmas presents. But the last three years—the period he's been in charge of tax returns—have been nothing short of a disaster causing more work for you and your department.

The assignment for the tax return comes up and Jack is once again nominated.

Before you have a chance to voice your concerns, one of your co-workers speaks up: "I know Jack has dropped the ball on this assignment in the past but I think this time is different. He's been working hard to make sure he's better organized."

That's all it takes. Conversation over — everyone is focused on what's unique about this time and it's unlikely, despite ample evidence, that you'll be able to convince them otherwise.

In part, people want to believe in Jack because he's a nice guy. In part, we're all focused on why this time is different and we'll ignore evidence to the contrary.

Focusing on what's different makes it easy to forget historical context. We lose touch with the base rate. We only see the evidence that supports our view (confirmation bias). We become optimistic and overconfident.

History provides context. And what history shows us is that no matter how unique things are today there are a lot of similarities with the past.

Consider investors and the dotcom bubble. Collectively people saw this as unprecedented and unique, a massive transformation that was unparalleled.

That reasoning, combined with a blindness to what was the same about this situation and previous ones, encouraged us to draw conclusions that proved costly. We reasoned that everything would change and everyone who owned internet companies would prosper and the old non-internet companies would quickly go into bankruptcy.

All of a sudden profits didn't matter. Nor did revenue. They would come in time, we hoped. Market share mattered no matter how costly it was to acquire.

More than that, if you didn't buy now you'd miss out. These companies would take over the world and you'd be left out.

We got so caught up in what was different that we forgot to see what was the same.

And there were historical parallels: Automobiles, Radio, Television, and Airplanes to name a few. At the time these innovations completely transformed the world as well. You can consider them the dotcoms of yesteryear.

And how did these massively transformational industries end up for investors?

At one time there were allegedly over 70 different auto manufacturing operations in the United States. Only 3 of them survived (and a few of those even required government funds.)

If you catch yourself reasoning based on "this time is different" remember that you are probably speculating. While you may be right, odds are, this time is not different. You just haven't looked for the similarities.

58. Blog Posts, Book Reviews, and Abstracts: On Shallowness

We're quite glad that you read Farnam Street, and we hope we're always offering you a massive amount of value. (If not, email us and tell us what we can do more effectively.) But there's a message all of our readers should appreciate: Blog posts are not enough to generate the deep fluency you need to truly understand or get better at something. We offer a starting point, not an end point.

This goes just as well for book reviews, abstracts, cliff's notes, and a good deal of short-form journalism.

This is a hard message for some who want a shortcut. They want the "gist" and the "high level takeaways", without doing the work or eating any of the broccoli. They think that's all it takes: Check out a 5-minute read, and instantly their decision making and understanding of the world will improve right-quick. Most blogs, of course, encourage this kind of shallowness. Because it makes you feel that the whole thing is pretty easy.

Here's the problem: The world is more complex than that. It doesn't actually work this way. The nuanced detail behind every "high level takeaway" gives you the context needed to use it in the real world. The exceptions, the edge cases, and the contradictions.

Let me give you an example.

A high-level takeaway from reading Kahneman's Thinking Fast, and Slow would be that we are subject to something he and Amos Tversky call the Representativeness Heuristic. We create models of things in our head, and then fit our real-world experiences to the model, often over-fitting drastically. A very useful idea.

However, that's not enough. There are so many follow-up questions. Where do we make the most mistakes? Why does our mind create these models? Where is this generally useful? What are the nuanced examples of where this tendency fails us? And so on. Just knowing about the Heuristic, knowing that it exists, won't perform any work for you.

Or take the rise of human species as laid out by Yuval Harari. It's great to post on his theory; how myths laid the foundation for our success, how "natural" is probably a useless concept the way it's typically used, and how biology is the great enabler.

But Harari's book itself contains the relevant detail that fleshes all of this out. And further, his bibliography is full of resources that demand your attention to get even more backup. How did he develop that idea? You have to look to find out.

Why do all this? Because without the massive, relevant detail, your mind is built on a house of cards.

What Farnam Street and a lot of other great resources give you is something like a brief map of the territory.

Welcome to Colonial Williamsburg! Check out the re-enactors, the museum, and the theatre. Over there is the Revolutionary City. Gettysburg is 4 hours north. Washington D.C. is closer to 2.5 hours.

Great – now you have a lay of the land. Time to dig in and actually learn about the American Revolution. (This book is awesome, if you actually want to do that.)

Going back to Kahneman, one of his and Tversky's great findings was the concept of the Availability Heuristic. Basically, the mind operates on what it has close at hand.

As Kahneman puts it, "An essential design feature of the associative machine is that it represents only activated ideas. Information that is not retrieved (even unconsciously) from memory might as well not exist. System 1 excels at constructing the best possible story that incorporates ideas currently activated, but it does not (cannot) allow for information it does not have."

That means that in the moment of decision making, when you're thinking hard on some complex problem you face, it's unlikely that your mind is working all that successfully without the details. It doesn't have anything to draw on. It'd be like a chess player who

read a book about great chess players, but who hadn't actually studied all of their moves. Not very effective.

The great difficulty, of course, is that we lack the time to dig deep into everything. Opportunity costs and trade-offs are quite real.

That's why you must develop excellent filters. What's worth learning this deeply? We think it's the first-principle style mental models. The great ideas from physical systems, biological systems, and human systems. The new-new thing you're studying is probably either A. Wrong or B. Built on one of those great ideas anyways. Farnam Street, in a way, is just a giant filtering mechanism to get you started down the hill.

But don't stop there. Don't stop at the starting line. Resolve to increase your depth and stop thinking you can have it all in 5 minutes or less. Use our stuff, and whoever else's stuff you like, as an entrée to the real thing.

59. Three Filters Needed to Think Through Problems

One of the best parts of Garrett Hardin's wonderful *Filters Against Folly* is when he explores the three filters that help us interpret reality.

No matter how much we'd like it to, the world does not only operate in our circle of competence. Thus we must learn ways to distinguish reality in areas where we lack even so much as a map.

Most geniuses—especially those who lead others—prosper not by deconstructing intricate complexities but by exploiting unrecognized simplicities.

Andy Benoit

Mental Tools

We need not be a genius in every area but we should understand the big ideas of most disciplines and try to avoid fooling ourselves. That's the core to the mental models approach. When you're not an expert in a field, often the best approach is one that avoids stupidity. There are few better ways of avoiding stupidity than understanding how the world works.

We can never merely do one thing.

Hardin begins by outlining his goal: to understand reality and understand human nature as it really is, removing premature judgment from the analysis.

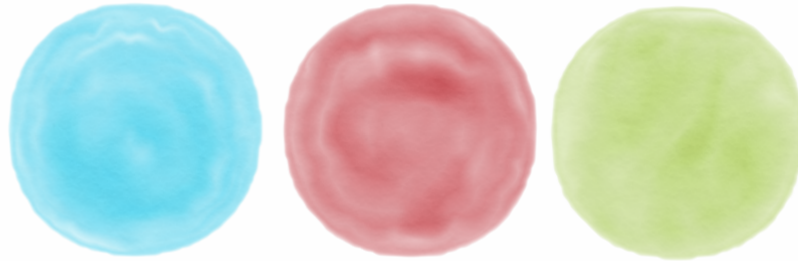
He appropriately quotes Spinoza, who laid out his principles for political science thusly:

That I might investigate the subject matter of this science with the same freedom of spirit we generally use in mathematics, I have labored carefully not to mock, lament, or execrate human actions, but to understand them; and to this end I have looked upon passions such as love, hatred, anger, envy, ambition, pity, and other perturbations of the mind, not in the light of vices of human nature, but as properties just as pertinent to it as are heat, cold, storm, thunder, and the like to the nature of the atmosphere.

The goal of these mental filters is to understand reality by improving our ability to judge the statements of experts, promoters, and persuaders of all kinds. As the saying goes, we are all laymen in some field.

Hardin writes:

What follows is one man's attempt to show that there is more wisdom among the laity than is generally concluded, and that there are some rather simple methods of checking on the validity of the statements of experts.



1. The Literate Filter

The first filter through which we must interpret reality, says Hardin, is the literate filter: What do the words really mean? The key to remember is that Language is action. Language is not just a way to communicate or interpret; language acts as a call to, or just as importantly, an inhibitor to action.

The first step is to try to understand what is really being said. What do the words and the labels actually *mean*? If a politician proposes a “Poverty Assistance Plan,” that sounds almost inarguably good, no? Many a pork-barrel program has passed based on such labels alone.

But when you examine the rhetoric, you must ask what those words are trying to do: Promote understanding, or inhibit it? If the program had a rational method of assistance to the deserving poor, the label might be appropriate. If it was simply a way to reward undeserving people in his or her district for their vote, the label might be simply a way to fool. *The literate filter asks if we understand the true intent behind the words.*

In a chapter called “*The Sins of the Literate*,” Hardin discusses the misuse of language by examining literate, but innumerate, concepts like “indefinite” or “infinite”:

He who introduces the words “infinity” or any of its derivatives (“forever” or “never” for instance) is also trying to escape discussion. Unfortunately he does not honestly admit the operational meaning of the high-flown language used to close off discussion. “Non-negotiable” is a dated term, no longer in common use, but “infinity” endures forever.

Like old man Proteus of Greek mythology, the wish to escape debate disguises itself under a multitude of verbal forms: infinity, non-negotiable, never, forever, irresistible, immovable, indubitable, and the recent variant “not meaningfully finite.” All these words have the effect of moving discussion out of the numerate realm, where it belongs, and into a wasteland of pure literacy, where counting and measuring are repudiated.

Later, in the final chapter, Hardin repeats:

The talent for handling words is called “eloquence.” Talent is always desirable, but the talent may have an unfair, even dangerous, advantage over those with less talent. More than a century ago Ralph Waldo Emerson said, “The curse of this country is eloquent men.” The curse can be minimized by using words themselves to point out the danger of words. One of their functions is to act as inhibitors of thought. People need to be made allergic to such thought-stoppers as infinity, sacred, and absolute. The real world is a world

of quantified entities: “infinity” and its like are no words for quantities but utterances used to divert attention from quantities and limits.

It is not just innumerate exaggeration we are guarding against, but the literate tendency to replace actors with abstractions, as Hardin calls it. He uses the example of donating money to a poor country (Country X), which on its face sounds noble:

Country X, which is an abstraction, cannot act. Those who act in its name are rich and powerful people. Human nature being what it is, we can be sure that these people will not voluntarily do anything to diminish either their power or their riches...

Not uncommonly, the major part of large quantities of food sent in haste to a poor country in the tropics rot on the docks or is eaten up by rats before it can be moved to the people who need it. The wastage is seldom adequately reported back to the sending country... (remember), those who gain personally from the shipping of food to poor nations gain whether fungi, rats, or people eat the food.

2. The Numerate Filter

Hardin is clear on his approach to numerical fluency: The ability to count, weigh, and compare values in a general or specific way is essential to understanding the claims of experts or assessing any problem rationally:

The numerate temperament is one that habitually looks for approximate dimensions, ratios, proportions, and rates of change in trying to grasp what is going on in the world.

Given effective education—a rare commodity, of course—a numerate orientation is probably within the reach of most people.

[...]

Just as “literacy” is used here to mean more than merely reading and writing, so also will “numeracy” be used to mean more than measuring and counting. Examination of the origins of the sciences shows that many major discoveries were made with very little measuring and counting. The attitude science requires of its practitioners is respect, bordering on reverence, for ratios, proportions, and rates of change.

Rough and ready back-of-the-envelope calculations are often sufficient to reveal the outline of a new and important scientific discovery....In truth, the essence of many of the major insights of science can be grasped with no more than child’s ability to measure, count, and calculate.

*

To explain the use of the literate and numerate filters together, Hardin uses the example of the Delaney Amendment, passed in 1958 to restrict food additives. This example should be familiar to us today:

Concerned with the growing evidence that many otherwise useful substances can cause cancer, Congress decreed that henceforth, whenever a chemical at any concentration was found to cause cancer—in any fraction of any species of animal—that substance must be totally banned as an additive to human food.

From a literate standpoint, this sounds logical. The Amendment sought to eradicate harmful food additives that the free market had allowed to surface. However, says Hardin:

The Delaney Amendment is a monument to innumerate thought. “Safe” and “unsafe” are literate distinctions; nature is numerate. Everything is dangerous at some level. Even molecular oxygen, essential to human life, becomes lethal as the concentration approaches 100 percent.

[...]

Sensitivity is ordinarily expressed as “1 part per X,” where X is a large number. If a substance probably increases the incidence of cancer at a concentration of 1 part per 10,000, one should probably ban it at that concentration in food, and perhaps at 1 in 100,000. But what about 1 part per million?...In theory there is no final limit to sensitivity. What about 1 milligram per tank car? Or 1 milligram per terrestrial globe?

Obviously, some numerical limits must be applied. This is the usefulness of the numerate filter. As Charlie Munger says, "Quantify, always quantify."

3. The Ecology Filter

Hardin introduces his final filter by requiring that we ask the question "*And then what?*"

There is perhaps no better question to prompt second-order thinking.

Even if we understand what is truly being said and have quantified the effects of a proposed policy or solution, it is imperative that we consider the second layer of effects or beyond. Hardin recognizes that this opens the door for potentially unlimited paralysis (the poorly understood and innumerate Butterfly Effect), which he boxes in by introducing his own version of the First Law of Ecology:

We can never merely do one thing.

This is to say, all proposed solutions and interventions will have a multitude of effects, and we must try our best to consider them in their totality. Most unintended consequences are just unanticipated consequences.

In proposing this filter, Hardin is very careful to guard against the *Slippery Slope* argument or the idea that one step in the wrong direction will lead us directly to Hell. This, he says, is a purely literate but wholly innumerate approach to thinking.

Those who take the wedge (Slippery Slope) argument with the utmost seriousness act as though they think human beings are completely devoid of practical judgment. Countless examples from everyday life show the pessimists are wrong...If we took the wedge argument seriously, we would pass a law forbidding all vehicles to travel at any speed greater than zero. That would be an easy way out of the moral problem. But we pass no such law.

In reality, the ecology filter helps us understand the layers of unintended consequences.

Take inflation:

The consequences of hyperinflation beautifully illustrate the meaning of the First Law of Ecology. A government that is unwilling or unable to stop the escalation of inflation does more than merely change the price of things; it turns loose a cascade of consequences the effects of which reach far into the future.

Prudent citizens who have saved their money in bank accounts and government bonds are ruined. In times of inflation people spend wildly with little care for value, because the choice and price of an object are less important than that one put his money into material things. Fatalism takes over as society sinks down into a culture of poverty....

In the end, the filters must be used wisely together. They are ways to understand reality, and cannot be divorced from one another. Hardin's general approach to thinking sums up much like his multi-disciplinary friend Munger's:

No single filter is sufficient for reaching a reliable decision, so invidious comparisons between the three is not called for. The well-educated person uses all of them.

60. How People Make Big Decisions

We all go through psychological steps when we make big decisions. Some people call this the “existential cycle,” which really has four stages: doing, contemplating, preparing, and experimenting.

Echoing Tolstoy on regret avoidance, Sebastian Bailey and Octavius Black write in Mind Gym: Achieve More by Thinking Differently:

These four stages are much like exercises in risk management. No one wants to look back on his or her life at some point and say I wish I would have or If only I had.

While there are other ways, the existential cycle helps us make life changing decisions — like who to marry, where to work, and where to live.

The first stage, “doing,” is where you spend most of your life: It is your settled, equilibrium position. The doing may be all sorts of things— writing emails, riding horses, reading books, washing up, going to meetings, listening to lectures, cooking, dancing, running, sharing stories with friends, telling jokes, or making love. Of course, these are not done all at the same time (not unless you’re really talented). Whatever the activity may be, and however enjoyable or dull it is, you are doing it and it tends to keep you occupied.

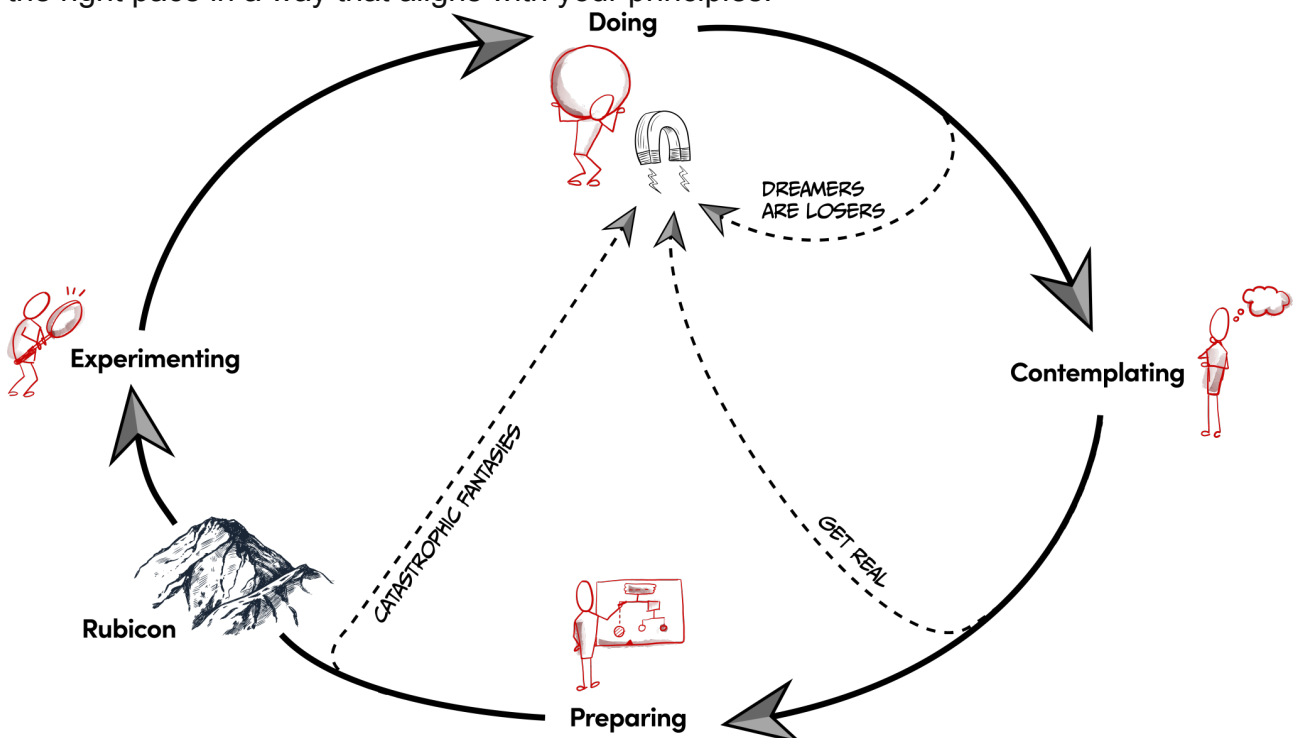
Sometimes we get to “contemplating,” where we consider whether or how things would be different. What would life be like if you move to California? (Hint: It won’t make you happier.)

Then occasionally we move to “preparing.”

You search on the web for real estate agents in San Diego or Key West, find out what property prices are, check weather patterns, possibly even visit your preferred destination on your next vacation. You have moved beyond imagining how things could be different to investigating the practical options for how to make them different.

Finally you make the change.

You leave your job, buy a house, and move all your possessions. This stage is called “experimenting.” After you’ve settled in and started the beachside bar you’d dreamed about, this becomes your normal way of living, and you are once again in a state of doing. The process isn’t overly complicated or hard. The challenge becomes moving through it at the right pace in a way that aligns with your principles.



The Doing Magnet

As you travel around your cycle, you will have conversations with yourself that stop you from moving on to the next stage and instead take you back to doing.

Sometimes these thoughts can be very sensible and prevent you from wasting time or following the wrong path. But sometimes, unfortunately, they prevent you from both spotting and taking opportunities that could dramatically improve your life. The trick lies in recognizing the internal conversations and being able to make an informed decision about whether to listen to them or to ignore them and move on.

When the Doing Magnet is Weak

Irrational exuberance are those people who are forever saying things like I wish I hadn't rushed into that or If only I'd thought about it first. Rather than never crossing the Rubicon, they're happy to head over far too easily— without ever considering the size of the army on the other side. In terms of the existential cycle, their doing magnet is relatively weak—the centrifugal momentum of the next new thing is stronger than the gravitational force of the status quo.

If you find that you can't hold down a job, you can't keep a relationship, you spend money on a whim, or you haven't gotten around to making your home into a place you like living in, and you regret it, then you may be suffering from a form of irrational exuberance. The best advice in this situation is this: spend longer at the preparing stage before wading across your Rubicon.

For example, consider one of these choices:

- Think through all the possible disadvantages of taking this course of action as well as the advantages— really make an effort to present the case for caution on this occasion.*
- Contrast the allure of the new situation with how your existing life might improve even if you don't make this big change. People who are always moving on to new jobs often fail to consider how their current jobs could get better. A new job may be attractive, but it is wrong to assume the old one will stay the same. New possibilities could open up. What happens when your boss moves on?*
- Contemplate the bigger and better gains and pleasures you could have if you didn't always go for instant gratification. Could the gratification get more gratifying?*
- Consider any decisions you made in the past that led to situations you later regretted. What can you learn from these that will help you make a wiser decision this time.*

If you Want to Improve, you have to Cross the Rubicon

“Do. Or do not. There is no try.” — Yoda

You have a choice in how you run your life. There is no “can't,” only “will” and “won't.” The trick is knowing why you are, or aren't, moving around the existential cycle and, in particular, crossing your Rubicon. Like we've said, the right thing isn't to always cross or always not cross. The right thing is to understand why you want to cross or don't want to cross, and then make your decision.

Nevertheless, none of us want to live our lives in a constant state of doing. I might not be in good enough shape today to swim 2.4 miles, but that doesn't mean I won't be in the future. Plus, our reasons for remaining in one state may not be strong. At some point, in certain aspects of our lives, if we want to progress, we must cross the Rubicon.

A decision to not cross the Rubicon based on the wrong reasons— when catastrophic fantasies rule our mind-sets— is what causes people to look back on their lives and think If

only. ... All of us who have looked back and been proud of what we have done have crossed the Rubicon at least once and maybe many times.

There's a famous Latin maxim, carpe diem, which translated means "seize the day." The question you have to ask yourself is, When it comes to crossing Rubicons, just how much of a Caesar am I prepared to be?

61. The Two Types of Knowledge: The Max Planck/Chauffeur Test

Charlie Munger, the billionaire business partner of Warren Buffett, frequently tells the story below to illustrate how to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

At the 2007 Commencement to the USC Law School, Munger explained it this way:

I frequently tell the apocryphal story about how Max Planck, after he won the Nobel Prize, went around Germany giving the same standard lecture on the new quantum mechanics. Over time, his chauffeur memorized the lecture and said, "Would you mind, Professor Planck, because it's so boring to stay in our routine. [What if] I gave the lecture in Munich and you just sat in front wearing my chauffeur's hat?" Planck said, "Why not?" And the chauffeur got up and gave this long lecture on quantum mechanics. After which a physics professor stood up and asked a perfectly ghastly question. The speaker said, "Well I'm surprised that in an advanced city like Munich I get such an elementary question. I'm going to ask my chauffeur to reply."

The point of the story is not the quick-wittedness of the protagonist, but rather — to echo Richard Feynman — it's about making a distinction between knowing the name of something and knowing something.

Two Types of Knowledge

The first type of knowledge is real. It can't be bought. It can't be copied. If you want real knowledge you need to earn it. The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work.

Munger continues:

In this world we have two kinds of knowledge. One is Planck knowledge, the people who really know. They've paid the dues, they have the aptitude. And then we've got chauffeur knowledge. They've learned the talk. They may have a big head of hair, they may have fine temper in the voice, they'll make a hell of an impression.

But in the end, all they have is chauffeur knowledge. I think I've just described practically every politician in the United States.

And you are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge.

And there are huge forces working against you. My generation has failed you a bit... but you wouldn't like it to be too easy now would you?

Real knowledge comes when people do the work. On the other hand, we have the people who don't do the work — they pretend. While they've learned to put on a good show, they lack understanding. They can't answer questions that don't rely on memorization. They can't explain things without using jargon or vague terms. They have no idea how things interact. They can't predict the consequences.

"Any fool can know. The point is to understand."

— Albert Einstein

The problem is that it's difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.

In The Art of Thinking Clearly, Rolf Dobelli offers some commentary on distinguishing fake from real knowledge:

With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the

tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and — often as compensation for their patchy knowledge— snarky and self-satisfied in tone. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case.

One way to guard against this is to understand your circle of competence.

Dobelli concludes with some advice worth taking to heart.

Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

62. Avoiding Stupidity is Easier than Seeking Brilliance

The path to victory is to avoid obvious stupidity. It can be hard to appreciate that the person who avoids losing wins. Winning can happen without explicitly seeking to win. The word stupidity is important here. Avoiding stupidity is not an argument to do nothing. Avoiding stupidity is about remembering the obvious, playing in domains where you have an edge, ensuring you are compensated for the risks you take, ensuring you financially and psychologically stay in the game, and having a lot of patience.

The key to avoiding stupidity boils down to knowing which game you are playing. There are two.

Winning or Losing?

Let us explore the difference between a professional game and an amateur game.

Often we focus on trying to be brilliant when we would get a lot more mileage out of avoiding stupidity.

We often focus on trying to be brilliant, yet many great people get far more mileage out of avoiding making stupid mistakes. Amateurs win the game when their opponent loses points, experts win the game by gaining points.

It is remarkable how much long-term advantage people like us have gotten by trying to be consistently not stupid, instead of trying to be very intelligent.

Charlie Munger

Scientist and statistician Simon Ramo wrote a fascinating little book that few people have ever bothered to read called *Extraordinary Tennis Ordinary Players*.

In the book, Ramo identifies the crucial difference between a *Winner's Game* and a *Loser's Game*.

Professionals win points. Amateurs lose them.

Professionals play a winner's game – they win by being better than their opponent. The outcome is mostly within their control.

In a professional game, each player, nearly equal in skill, plays a nearly perfect game rallying back and forth until one player hits the ball just beyond the reach of his opponent. This is about positioning, control, and spin. It's a game of inches and sometimes centimeters. This is not how amateurs play.

In expert tennis, about 80 per cent of the points are won; in amateur tennis, about 80 per cent of the points are lost. In other words, professional tennis is a Winner's Game – the final outcome is determined by the activities of the winner – and amateur tennis is a Loser's Game – the final outcome is determined by the activities of the loser. The two games are, in their fundamental characteristic, not at all the same. They are opposites.

Amateur games are different. Amateur tennis — likely the level you and I play at — is a loser's game. The winner is the person who makes the fewest mistakes and lets the other person beat themselves. If you keep the ball in play long enough, your opponent will make a mistake. In effect, amateurs win because their opponent makes more mistakes than they do.

Ordinary people win at games they are not skilled in by letting their opponents beat themselves.

... if you choose to win at tennis – as opposed to having a good time – the strategy for winning is to avoid mistakes. The way to avoid mistakes is to be conservative and keep the ball in play, letting the other fellow have plenty of room in which to blunder his way to defeat, because he, being an amateur will play a losing game and not know it.

While the amateur can't *consistently* hit winners, they want to. When amateurs play a Winner's game, they force shots that have a low probability of winning and a high probability of error. While they might hit the occasional winner, the ratio between winning shots and losing shots is skewed heavily toward losers.

Sometimes amateurs convince themselves they are professionals, but professionals never convince themselves they are amateurs. Professionals know they are not playing the same game as amateurs.

If you are within your circle of competence, seek brilliance. If you are not, avoid stupidity.

Investors Bet on Someone Else's Game

This reminds me of something.

Warren Buffett used to convene a group of people called the *Buffett Group*. At one such meeting, Benjamin Graham, Buffett's mentor, gave them all a quiz. I spent hours searching for this reference, which comes from *Benjamin Graham on Value Investing: Lessons from the Dean of Wall Street*.

"He gave us a quiz," Buffett said, "A true-false quiz. And there were all these guys who were very smart. He told us ahead of time that half were true and half were false. There were 20 questions. Most of us got less than 10 right. If we'd marked every one true or every one false, we would have gotten 10 right."

Graham made up the deceptively simple historical puzzler himself, Buffett explained. "It was to illustrate a point, that the smart fellow kind of rigs the game. It was 1968, when all this phoney accounting was going on. You'd think you could profit from it by riding along on the coattails, but (the quiz) was to illustrate that if you tried to play the other guy's game, it was not easy to do."

"Roy Tolles got the highest score, I remember that," Buffett chuckled. "We had a great time. We decided to keep doing it."

Avoiding Stupidity is Easier Than Seeking Brilliance

The point is that most of us are amateurs but we refuse to believe it.

This is a problem because we're often playing the game of the professionals. What we should do in this case, when we're the amateur, is to invert the problem. Rather than trying to win, we should avoid losing.

This was a point Charlie Munger, the billionaire business partner of Warren Buffett made a long time ago.

In a letter to Wesco Shareholders, where he was at the time Chairman (Found in *Damn Right!: Behind the Scenes with Berkshire Hathaway Billionaire Charlie Munger*), Munger writes:

Wesco continues to try more to profit from always remembering the obvious than from grasping the esoteric. ... It is remarkable how much long-term advantage people like us have gotten by trying to be consistently not stupid, instead of trying to be very intelligent. There must be some wisdom in the folk saying, 'It's the strong swimmers who drown.'

And there is so much wisdom embedded in that quote that I've printed it out and attached it to my wall.

63. Keeping Things Simple and Tuning out Folly

Keeping things simple makes a huge difference and yet we are drawn to the sexiness of complexity. Einstein was a master of sifting the essential from the non-essential.

And consider this from Charlie Munger: The Complete Investor:

Peter Bevelin's book Seeking Wisdom: From Darwin to Munger has a section on the importance of simplicity.

Bevelin advised: "Turn complicated problems into simple ones. Break down a problem into its components, but look at the problem holistically." Keeping things as simple as possible, but no more so, is a constant theme in Munger's public statements. In a joint letter to shareholders, Munger and Buffett once wrote: "Simplicity has a way of improving performance through enabling us to better understand what we are doing."

[...]

By focusing on finding decisions and bets that are easy, avoiding what is hard, and stripping away anything that is extraneous, Munger believes that an investor can make better decisions. By "tuning out folly" and swatting away unimportant things "so your mind isn't cluttered with them ... you're better able to pick up a few sensible things to do," said Munger. Focus enables both simplicity and clarity of thought, which in Munger's view leads to a more positive investing result.

"If something is too hard, we move on to something else. What could be simpler than that?"

— Charlie Munger

There is a compelling advantage in life to be found in exploiting unrecognized simplicities, something Peter Thiel tries to tease out in interviews. Essential to recognizing simplicity is scheduling time to think.

"We have three baskets: in, out, and too tough... We have to have a special insight, or we'll put it in the too tough basket."

— Charlie Munger

Simplicity is Filtering

William James said: "The art of being wise is the art of knowing what to overlook." And there are no truer words that have been spoken.

In Arthur Conan Doyle's The Reigate Puzzle, Sherlock Holmes says: "It is of the highest importance in the art of detection to be able to recognize, out of a number of facts, which are incidental and which vital."

And part of filtering is understanding what you know and what you don't know, that is, understanding your circle of competence.

"We have a passion for keeping things simple."

— Charlie Munger

In an interview with Jason Zweig, Munger said:

Confucius said that real knowledge is knowing the extent of one's ignorance. Aristotle and Socrates said the same thing. Is it a skill that can be taught or learned? It probably can, if you have enough of a stake riding on the outcome. Some people are extraordinarily good at knowing the limits of their knowledge, because they have to be. Think of somebody who's been a professional tightrope walker for 20 years—and has survived. He couldn't survive as a tightrope walker for 20 years unless he knows exactly what he knows and what he doesn't know. He's worked so hard at it, because he knows if he gets it wrong he won't survive. The survivors know.

Another time he offered:

Part of that [having uncommon sense], I think, is being able to tune out folly, as distinguished from recognizing wisdom. You've got whole categories of things you just bat away so your brain isn't cluttered with them. That way, you're better able to pick up a few sensible things to do.

Warren Buffett, the CEO of Berkshire Hathaway agrees:

Yeah, we don't consider many stupid things. I mean, we get rid of 'em fast.. Just getting rid of the nonsense — just figuring out that if people call you and say, "I've got this great, wonderful idea", you don't spend 10 minutes once you know in the first sentence that it isn't a great, wonderful idea... Don't be polite and go through the whole process.

And Peter Bevelin, writing in Seeking Wisdom, offers:

Often we try to get too much information, including misinformation, or information of no use to explain or predict. We also focus on details and what's irrelevant or unknowable and overlook the obvious truths. Dealing with what's important forces us to prioritize. There are often just a few actions that produce most of what we are trying to achieve. There are only a few decisions of real importance.

More information doesn't equal more knowledge or better decisions. And remember that today we not only have access to more information, but also misinformation.

And the harder we work at something the more confident we become.

It's worth pausing to reflect on three things at this point: 1) understanding and seeking simplicity; 2) dealing with the easy problems first; and 3) honing your skills by learning what to overlook and getting rid of bad ideas quickly (how many organizations do that!?)... this goes hand in hand with understanding your circle of competence.

64. Your Environment Shapes Your Decisions

When it comes to making decisions, your environment matters. Just as it's hard to eat healthily if your kitchen is full of junk food, it's hard to make good decisions when you're too busy to think. Just as the kitchen influences what you eat, your office influences how you make decisions.

The Modern Office is Terrible for Thinking

No one understands how your environment shapes your ability to make decisions more than Warren Buffett and Charlie Munger. While they're gifted with intellect, they make sure they get the most out of it by structuring their environment to help them make good decisions.

Most of us make decisions in an environment where it is very hard for us to behave rationally.

You can't design a worse environment for good decisions than the modern office. When you first arrive at work, you immediately start to answer the critical emails from your swelling inbox. The inner voice in your head tells you don't worry; you'll get to the rest later. Suddenly, the phone rings, it's your boss wanting to know if you have time to chat on the 15-page proposal she was supposed to read for the meeting in 30 minutes. But you haven't read the proposal either. So you glance at the executive summary and, like anyone that has learned to survive in an office, you confidently act like you know what's going on. You haven't done the work to have an opinion. But that's the game. Everyone else did the same thing. When you finally lift your head up, your email box is swelling again, you have missed calls, and it's almost time to pick up the kids from school. Where did the day go? This isn't an abnormal day. This is every day. From the moment you arrive until the moment you leave, you make an inch of progress on twenty things rather than ten feet of progress on one thing.

The unwritten rule is that you have to do these things to justify your job. If you're not pushing paper, firing up hundreds of emails, calling and attending meetings, and chasing something down ... just what the heck are you doing?

The cultural environment is typically about politics and signalling, not about putting people in a position to succeed. The physical environment is about busyness and distraction, not focus and thinking. Neither of these environments line up with the good decision making. Contrast this to Warren Buffett. He has no computer in his office. He's not distracted every few minutes by that annoying little ding that signals a new email has arrived. His day isn't full of meetings. He doesn't have an annoying boss that comes around and asks him for something tangible that's he's working on. He just reads and thinks. No wonder he's so good at it.

If you want to think for yourself, you can't have someone always whispering in your ear. If you want space to think, you need quiet and calm not a bunch of smart people throwing out new ideas. That's why Buffett moved from New York to Omaha. "In some places, it's easy to lose perspective. But I think it's very easy to keep perspective in a place like Omaha," Buffett says. He continues:

It's very easy to think clearly here. You're undisturbed by irrelevant factors and the noise generally of business investments. If you can't think clearly in Omaha, you're not going to think clearly anywhere.

Putting Buffett in a modern office is like giving Superman kryptonite. His superpowers would disappear. He wouldn't be able to think and concentrate. Luckily, he intentionally set up his environment in a way that makes it easier to behave rationally.

The (Super) Power of Environment

We influence our environments, but we forget they influence us too.

We like to believe that we are in charge that our brains are only influenced by our conscious thoughts. That sounds amazing, but it's wrong. Our conscious brain is much

smaller than our subconscious brain. And yet when it comes to getting better at thinking and making decisions, we place all the emphasis on the conscious brain, learning mental models and methods of thinking that improve outcomes. In so doing, we improve the raw horsepower of our brain. Yet, there is no point having a 400 horsepower engine if you can only get 25 horsepower out of it.

Designing an Effective Environment

There is no environment that works for everyone. We all respond differently to different stimuli. A corner office on the 100th floor in New York might provide inspiration to some and distraction to others. What works for me might not work for you.

Here are three things we've found work for a lot of different people in a lot of different situations.

First, structure your day to maximize your energy. Most people do the tasks requiring the least amount of thought (answering emails, checking voicemails, catching up with people) in the morning when they are most productive. Meetings and decisions get pushed to the afternoon when our brains are not working as well. Switch your day around. Do the most important thing first.

Second, use chunks of time and be conscious when interrupting other people. Block chunks of time in your calendar for your own projects. I don't mean like 20 minutes, I mean like hours. I have every morning blocked off from 9-12. It's not easy to get into a state of flow, but once you're there, you're focused on one thing. It could be thinking about a problem in a three dimensional way or refining a report that you're writing for work. If you interrupt this time, it's expensive to get back to where you were, often taking 25 minutes or more to recover. Keep that in mind when you interrupt others.

Third, make effective behaviors easy. If there is chocolate in our office, you can be sure I'll eat it. That's why I lock the good stuff in a safe. Literally. This makes it harder to get to, and I eat less of it. OK, you probably want a better example than chocolate. Here's one I used to use at work. On the first page of my notebook at the intelligence agency, I listed some general thinking tools that I could fall back on for tough decisions. This prompted me to think through problems in a structured way and saved me from more than one mess.

(Update: These are now a book).

Your Environment Matters More Than You Think

We intuitively know that the physical and cultural environment matters.

You don't control everything in your environment, but you control enough to make a huge difference. Think about what you control and how you can change it to get more horsepower out of your brain.

65. What Matters More in Decisions: Analysis or Process?

We all make decisions. Some of them are large and many of them are small. Few of us understand that the process we use to make those decisions is more important than the analysis we put into the decision.

Think of the last major decision you made.

Maybe it was an acquisition, a large purchase, or perhaps it was whether to launch a new product.

Odds are three things went into that decision: (1) It probably relied on the insights of a few key executives; (2) it involved some sort of fact gathering and analysis; and (3) it was likely enveloped in some sort of decision process—whether formal or informal—that translated the analysis into a decision.

Now how would you rate the *quality* of your organization's strategic decisions?

If you're like most executives, the answer wouldn't be positive:

In a recent McKinsey Quarterly survey of 2,207 executives, only 28 percent said that the quality of strategic decisions in their companies was generally good, 60 percent thought that bad decisions were about as frequent as good ones, and the remaining 12 percent thought good decisions were altogether infrequent.

How could it be otherwise? Product launches are frequently behind schedule and over budget. Strategic plans often ignore even the anticipated response of competitors.

Mergers routinely fail to live up to the promises made in press releases.

The persistence of problems across time and organizations, both large and small, indicates that we can make better decisions.

"I have no use whatsoever for projections or forecasts. They create an illusion of apparent precision. The more meticulous they are, the more concerned you should be. We never look at projections."

— Warren Buffett

The best place to start if we're trying to improve the quality of our decisions is to look at how organizations make decisions. One interesting thing about bureaucracies is that they develop processes to limit the damage the worst people can do at every level. That is they come up with mechanisms to reduce the impact the worst people can have. Yes, this also limits the positive impact that people can have as well. When it comes to decisions, organizations default to gathering data and analyzing decisions.

The widespread belief is that analysis reduces biases. But does it?

Is putting your faith in analysis any better than using your gut? What does the evidence say? Is there a better way?

Dan Lovallo and Olivier Sibony set to find out.

Lovallo is a professor at the University of Sydney and Olivier is a director at McKinsey & Company. Together they studied 1,048 "major" business decisions over five years. The results are surprising.

Most business decisions were not made on "gut calls" but rather rigorous analysis. And yet they were poor decisions. In short, most people did the all the legwork we think we're supposed to do: they delivered large quantities of detailed analysis.

Yet this wasn't enough. "Our research indicates that, contrary to what one might assume, good analysis in the hands of managers who have good judgment won't naturally yield good decisions."

[Projections] are put together by people who have an interest in a particular outcome, have a subconscious bias, and its apparent precision makes it fallacious. They remind me of Mark Twain's saying, 'A mine is a hole in the ground owned by a liar.' Projections in

America are often a lie, although not an intentional one, but the worst kind because the forecaster often believes them himself."

— Charlie Munger

Lovallo and Sibony didn't only look at the analysis, they also asked executives about the process used to make decisions.

Did they, for example, "explicitly explore and discuss major uncertainties or discuss viewpoints that contradicted the senior leader's?"

So what matters more, process or analysis? After comparing the results they determined that "process mattered more than analysis—by a factor of six."

This finding does not mean that analysis is unimportant, as a closer look at the data reveals: almost no decisions in our sample made through a very strong process were backed by very poor analysis. Why? Because one of the things an unbiased decision-making process will do is ferret out poor analysis. The reverse is not true; superb analysis is useless unless the decision process gives it a fair hearing.

To illustrate the weakness of how most organizations make decisions, Sibony used an interesting analogy: the legal system.

Imagine walking into a courtroom where the trial consists of a prosecutor presenting PowerPoint slides. In 20 pretty compelling charts, he demonstrates why the defendant is guilty. The judge then challenges some of the facts of the presentation, but the prosecutor has a good answer to every objection. So the judge decides, and the accused man is sentenced.

That wouldn't be due process, right? So if you would find this process shocking in a courtroom, why is it acceptable when you make an investment decision? Now of course, this is an oversimplification, but this process is essentially the one most companies follow to make a decision. They have a team arguing only one side of the case. The team has a choice of what points it wants to make and what way it wants to make them. And it falls to the final decision maker to be both the challenger and the ultimate judge. Building a good decision-making process is largely ensuring that these flaws don't happen.

Simply understanding our cognitive biases doesn't make you immune to them. It's not enough. A disciplined decision process is the best place to improve the quality of decisions and guard against common decision-making biases.

66. Why Bad Things Happen to Good Decisions

Good decisions don't always have a good outcome, just as bad decisions don't always have bad outcomes. Sometimes bad outcomes happen to good decisions. And sometimes good things happen to bad decisions. Learning to distinguish between when you're brilliant and lucky is the key to rapid improvement.

When other people make decisions with bad outcomes, we tend to focus on the people behind the decision. We can't seem to shake the belief that good people make good decisions and bad people make bad decisions. It's easy to think that we would have made a better decision.

When our decisions have bad outcomes, we know the outcomes is not all there is to see. Our thoughts and intentions come into play. We can't see the thoughts and intentions of others—we only see their actions through a biased lens. We can, however, see our thoughts and intentions. Our bad outcomes happen because we were unlucky.

The Decision Outcome Matrix

Consider this simple two-by-two decision outcome matrix.

	Good Outcome	Bad Outcome
Good Process	What we are aiming for.	We are not omniscient. We need courage to weather this. Your system will not work every time, and it is easy to abandon the system the first time it fails.
Bad Process	Gambling and winning. Feeds the halo effect.	Gambling and losing. My bad luck, your poor skill.

We want to deserve success. Everyone wants to be in the upper left box — a good process that results in a good outcome. The problem is the world doesn't always comply with our wishes. Following a good process can lead to a bad outcome because of uncertainty.

A good process with a bad outcome requires that we remember nothing is for sure. Bad outcomes from a bad process require a choice. If we are delusional and let our ego dominate, we mistakenly see this as bad luck. While we are aware that we had a negative outcome, we are unaware that it resulted from a bad process. In this case, we learn nothing. We are doomed to repeat our mistakes. More self-reflective people see bad

outcomes resulting from bad process as an opportunity to learn as much as we can to avoid repeat failures.

Perhaps the worst quadrant to be in is the lower left — a bad process leads to a good outcome. Ignoring the fact that this isn't repeatable, we convince ourselves that we deserved success.

If you can't recognize when you've had 'dumb luck,' you'll never be in a position to correct the way you're making decisions. Eventually, your luck runs out.

Of course, it's easier to place others into the matrix than ourselves. When it comes to others, we see more of reality because we're a disconnected observer. When it comes to ourselves, however, we default to ego protection.

One of the ways to calibrate your decisions is to use a decision journal. A good decision is known *before* the outcome. It involves a mental representation of the facts known at the time as well as applied judgment. Good decisions are valuable, but they are more valuable if they are part of a good decision process because a good process allows for feedback about where you can improve. This feedback, in turn, allows you to constantly get better at making decisions.

Article Summary:

- Good decisions don't always have a good outcome. Bad decisions don't always have bad outcomes.
- Bad outcomes can happen to good decisions.
- When other people have a bad outcome, we tend to think they made a bad decision. When we have a bad outcome, we tend to focus on intentions.
- There is a simple 2*2 matrix to help you see what happened. On one axis is Good/Bad Process, on the other is good/bad outcome.
- A bad process with a good outcome is gambling and winning. This is the most dangerous quadrant.
- A bad process with a bad outcome is gambling and losing.
- A good process with a bad outcome needs to be put into perspective.
- You can calibrate your decisions using a decision journal.

67. William Morris: Adventures in Decision-Making

This isn't my advice, it comes from the 1973 book How to Get Rich Slowly, But Almost Surely: Adventures in Decision-Making by William Morris.

"It's foolish," Morris writes, "to suppose that anyone could give you a set of rules for making ... decisions which you would actually follow. Something of greater subtlety, but also of greater practicality is involved."

It's useful to make judgments about the quality and effectiveness of your decision making. Only when you look at how you make decisions, will actual behavioral changes result. *You've got to begin by appreciating your own self-image by seeing your own style, and by becoming conscious of what you ordinarily do without the slightest self-consciousness. Then compensation and change will begin to occur, almost entirely without effort on your part.*

So, let's take a precise look at our behavior in the way we make decisions. How do we make decisions?

Here are some questions to ask (Keep in mind that one style of deciding isn't necessarily better than another):

To what extent is your style of decision making intuitive, implicit and private? To what extent is it analytical, explicit, and open?

To what degree are you tolerant of ambiguity in a decision situation? Can you decide in the face of ambiguous notions about objectives or ambiguous statements of the alternative courses of action? Some studies suggest that experienced decision makers are highly tolerate of ambiguity and capable of resolving it in their own special ways.

Similarly, to what degree are you tolerant of uncertainty as to the consequences of various actions? Some of us require considerable information and assurances before we will act, others are far more willing to act on the basis of limited information and substantial uncertainty. We should not imagine that one such style is always "better" than the other.

How reasonable is your hindsight? How effectively do you learn from your past decisions? Are you given to regretting decisions which turn out badly or do you suppress these feelings and look to the future? Do you distinguish clearly between a good decision which depends on reason and logic, and a good result or outcome which always depends to some degree on chance, luck and circumstances beyond your control.

How much cognitive effort to you invest in a decision? Some decision makers are careful and deliberate thinkers, others tend to proceed "off the top of their heads" or "by the seat of their pants."

To what degree do you seek external aids or outside help in deciding?

To what extent is there a need for coherence between your beliefs, your actions, and your objectives?

We may seek coherence by becoming more optimistic about a course of action after we have chosen it, than before. Sometimes we adopt the belief that what we have become committed to is the best possible course of action, while we had no such conviction prior to our commitment. We achieve coherence or reduce "cognitive dissonance" by revising our preconceptions.

How sensitive are your unaided decision making ability to conditions of stress? There is considerable evidence that most of us become distinctly poorer decision makers when we are under stress or pressure.

To what extent are your perceptions and thoughts influenced, not so much by the external world, as by our own needs and desires. One of the great discoveries of modern psychology is that what we see and what we think are influenced subconsciously by our needs and tensions.

To what degree are you clear about your own decision making processes? How much self-knowledge or self-consciousness do you have in this connection? It is well established

that we seldom understand very well the reasons we do what we do, or the goals we are striving to attain.

To what degree are your perceptions of the external world distorted because of distortions shared by your associates? Science is full of instances of socially shared distortions, often going about under the heading of "common sense." Indeed, one of the best definitions of common sense pictures it as that kind of sense which tells us when we look out of the window that the world is flat.

To what degree do you abstract or simplify the external world in making a decision?

To what degree do you rely on rules of thumb or platitudes for disposing of decision problems?

To what degree do you look ahead in a decision? Is the planning horizon in the relatively near, or relatively distant future? One of the skills of a good chess player is his ability to look ahead to the future consequences of his moves. The ability of computers to play chess is rather directly related to their "look-ahead" ability.

When things are looking very bad, how good are you at remaining clam and free from a slight panicky feeling?

How much experience do you have in living with the consequences of your choices? Have you made some "big" decisions?

How strong is your desire to get immediate, remarkable results when you make a decision?

What can you say about your ability to see the facts, the data, both sides of a question, when you are confronted with an emotionally charged decision situation?

How do you rate yourself in terms of self-confidence and respect for your own abilities?

How capable are you of filtering through the giving structure to large volumes of information?

Do you have a tendency to write down important considerations when you have to make a decision of some consequence?

68. The Remarkable Way We Gain Insights

In 1936 Graham Wallas, co-founder of the London School of Economics, published The Art of Thought, outlining the four stages of the creative process. This pre-dates, by at least a decade, James Webb's A Technique for Producing Ideas.

Wallas's model "is still the most common explanation of how insight works. If you do any exploration into the field of insight, you can't go far without bumping into Wallas, who is the epitome of a British freethinking intellectual," writes Gary Klein in Seeing What Others Don't: The Remarkable Ways We Gain Insights.

The Creativity Question, published in 1976, preserves Wallas's "Stages of Control" and presents his model of insight: (1) preparation; (2) incubation; (3) illumination; and (4) verification.

In Seeing What Others Don't: The Remarkable Ways We Gain Insights, Klein summarizes: *During the preparation stage we investigate a problem, applying ourselves to an analysis that is hard, conscious, systematic, but fruitless.*

Then we shift to the incubation stage, in which we stop consciously thinking about the problem and let our unconscious mind take over. Wallas quoted the German physicist Hermann von Helmholtz, who in 1891 at the end of his career offered some reflections on how this incubation stage feels. After working hard on a project, Helmholtz explained that "happy ideas come unexpectedly without effort, like an inspiration. So far as I am concerned, they have never come to me when my mind was fatigued, or when I was at my working table. They came particularly readily during the slow ascent of wooded hills on a sunny day."

Wallas advised his readers to take this incubation stage seriously. We should seek out mental relaxation and stop thinking about the problem. We should avoid anything that might interfere with the free working of the unconscious mind, such as reading serious materials.

...

Next comes the illumination stage, when insight bursts forth with conciseness, suddenness, and immediate certainty. Wallas believed that the insight, the "happy idea," was the culmination of a train of unconscious associations. These associations had to mature outside of conscious scrutiny until they were ready to surface. Wallas claimed that people could sometimes sense that an insight was brewing in their minds. The insight starts to make its appearance in fringe consciousness, giving people an intimation that the flash of illumination is nearby. At this point the insight might drift away and not evolve into consciousness. Or it might get interrupted by an intrusion that causes it to miscarry. That's why if people feel this intimation arising while reading, they often stop and gaze out into space, waiting for the insight to appear. Wallas warned of the danger of trying to put the insight into words too quickly, before it was fully formed.

Finally, during the verification stage we test whether the idea is valid. If the insight is about a topic such as mathematics, we may need to consciously work out the details during this final stage.

Wallas noted that none of these stages exist in isolation.

In the daily stream of thought these four different stages constantly overlap each other as we explore different problems. An economist reading a Blue Book, a physiologist watching an experiment, or a business man going through his morning's letters, may at the same time be "incubating" on a problem which he proposed to himself a few days ago, be accumulating knowledge in "preparation" for a second problem, and be "verifying" his conclusions on a third problem. Even in exploring the same problem, the mind may be unconsciously incubating on one aspect of it, while it is consciously employed in preparing for or verifying another aspect. And it must always be remembered that much very important thinking, done for instance by a poet exploring his own memories, or by a man

trying to see clearly his emotional relation to his country or his party, resembles musical composition in that the stages leading to success are not very easily fitted into a “problem and solution” scheme. Yet, even when success in thought means the creation of something felt to be beautiful and true rather than the solution of a prescribed problem, the four stages of Preparation, Incubation, Illumination, and the Verification of the final result can generally be distinguished from each other. (The Creativity Question)

If you talk to anyone about insight today, most people are familiar with the model Wallas proposed.

“It’s a very satisfying explanation that has a ring of plausibility,” writes Klein, “until we examine it more closely.”

Klein points to many counterexamples where people had insights that came unexpectedly, without a preparation stage. A lot of people aren’t wrestling with a problem when they come up with an accidental insight.

According to Wallas, when we’re stuck and need to find an insight that will get us past an impasse, we should start with deliberate preparation. ... One flaw in Wallas’s method is that his sample of cases was skewed. He only studied success stories. He didn’t consider all the cases in which people prepared very hard but got nowhere. (Seeing What Others Don’t: The Remarkable Ways We Gain Insights)

Specific preparation doesn’t always lead to insights. And the people who gain insights may or may not follow the Wallas model, so perhaps it is incomplete.

We need another theory.

Discontinuous Discoveries

Sometimes shifts in thinking are not about making minor adjustments or adding details.

Sometimes we fundamentally shift core beliefs. This allows us to see the problem in a new way and may lead to insight. We shift from a poor story to a better one. These are discontinuous discoveries.

Insights shift us toward a new story, a new set of beliefs that are more accurate, more comprehensive, and more useful. Our insights transform us in several ways. They change how we understand, act, see, feel, and desire. They change how we understand. They transform our thinking; our new story gives us a different viewpoint. They change how we act. ... Insights transform how we see; we look for different things in keeping with our new story. (Seeing What Others Don’t)

In Wolf Hall, Hilary Mantel makes an important observation, “Insight cannot be taken back. You cannot return to the moment you were in before.” After insight, everything is different.

Insights are unique in some other ways:

When they do appear, they are coherent and unambiguous. They don’t come as part of a set of possible answers. When we have the insight, we think, “Oh yes, that’s it.” We feel a sense of closure. This sense of closure produces a feeling of confidence in the insight.

(Seeing What Others Don’t)

The Difference Between Insight and Intuition

Intuition is the use of patterns they’ve already learned, whereas insight is the discovery of new patterns. (Seeing What Others Don’t)

The Role of Stories

Stories are a way we frame and organize the details of a situation. There are other types of frames besides stories, such as maps and even organizational wiring diagrams that show where people stand in a hierarchy. ... These kinds of stories organize all kinds of details about a situation and depend on a few core beliefs we can call “anchors,” because they are fairly stable and anchor the way we interpret the other details. (Seeing What Others Don’t)

And anchors can change. They change when we get new information. They change when we shift our beliefs.

What causes us to change our story? Klein proposes five strategies connections, coincidences, curiosities, contradictions, and creative desperation.

In all of these cases we change our story.

When faced with creative desperation, we try to find a weak belief that is trapping us. We want to jettison this belief so that we can escape from fixation and from impasse. In contrast, when using a contradiction strategy, we center on the weak belief. We take it seriously instead of explaining it away or trying to jettison it. We use it to rebuild our story.

(Seeing What Others Don't)

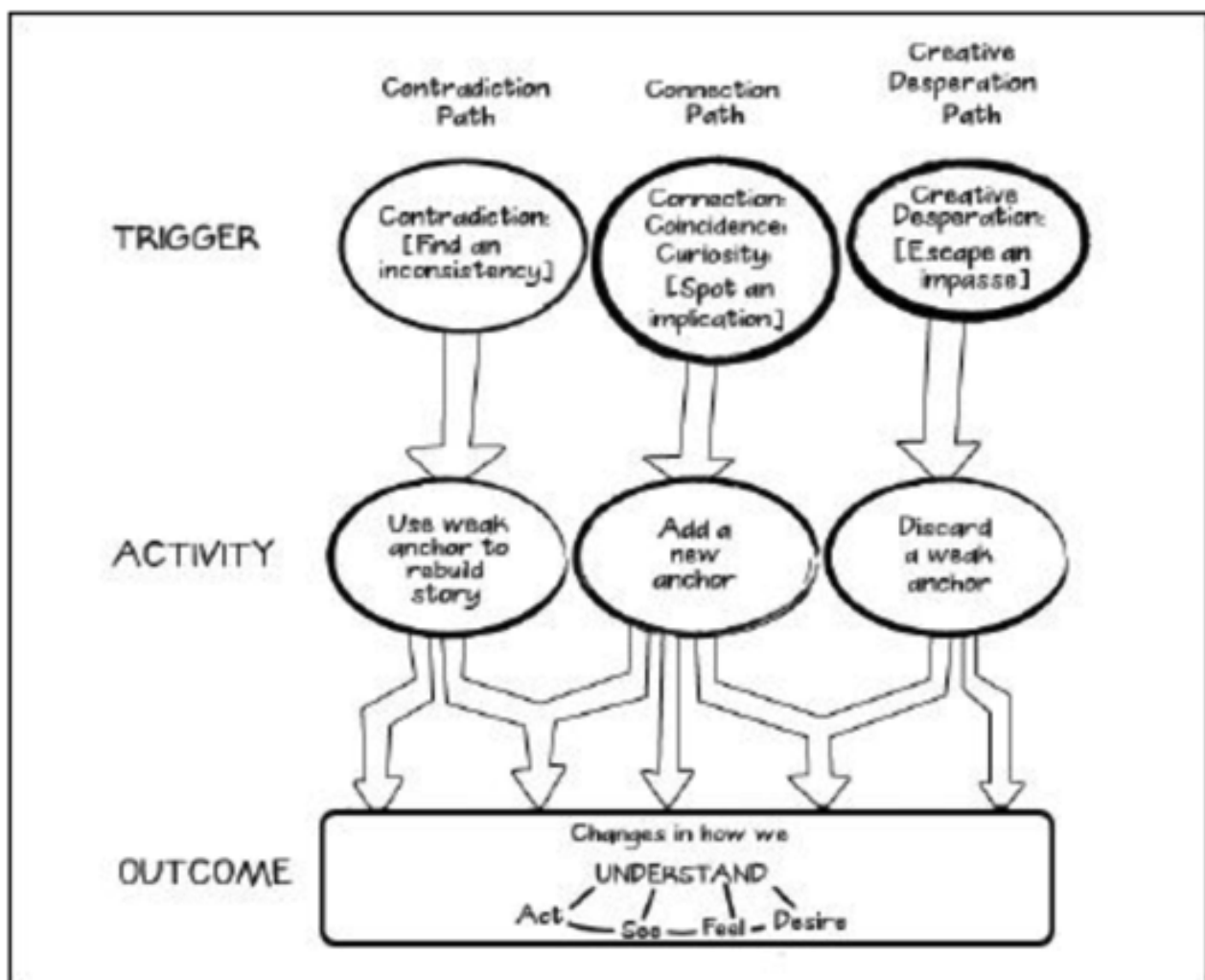
When we're desperate, we're more likely to attack a weak anchor and give something a try.

In times of desperation, we actively search for an assumption we can reverse. We don't seek to imagine the implications if the assumption was valid. Rather, we try to improve the situation by eliminating the assumption. (Seeing What Others Don't)

But changing our story is not the only way to gain insight. We can also add new anchors.

The Triple Path

In the end, Klein came up with the tripe path model of insight, which tries to capture the similarities between the strategies.



Source: Seeing What Others Don't: The Remarkable Ways We Gain Insights

The connection path is different from the desperation path or the contradiction path. We're not attacking or building on weak anchors. When we make connections or notice coincidences or curiosities, we add a new anchor to our beliefs and then work out the implications. Usually the new anchor comes from a new piece of information we receive.

...

I've combined the connections, coincidences, and curiosities in the Triple Path Model. They have the same dynamic: to build on a new potential anchor. They have the same trigger: our thinking is stimulated when we notice the new anchor. Coincidences and curiosities aren't insights in themselves; they start us on the path to identifying a new anchor that we connect to the other beliefs we hold. Connections, coincidences, and curiosities have the same activity: to combine the new anchor with others. This path to insight doesn't force us to abandon other anchors. It lets us build a new story that shifts our understanding. This path has a different motivation, a different trigger, and a different activity from the contradiction and the creative desperation paths. Nevertheless, like the other two paths, the outcome is the same: an unexpected shift in the story. Each of the three paths, the contradiction path, the connection path, and the creative desperation path, gets sparked in a different way. And each operates in a different fashion: to embrace an anomaly that seems like a weak anchor in a frame, to overturn that weak anchor, or to add a new anchor. Future work on insight is likely to uncover other paths to insight besides the three shown in the diagram. (Seeing What Others Don't)

Other people weren't wrong, they were just following one path. The Triple Path Model shows why earlier accounts aren't wrong as much as they are incomplete. They restrict themselves to a single path. Researchers and theorists such as Wallas who describe insight as escaping from fixation and impasses are referring to the creative desperation path. Researchers who emphasize seeing associations and combinations of ideas are referring to the connection path. Researchers who describe insight as reformulating the problem or restructuring how people think have gravitated to the contradiction path. None of them are wrong. The Triple Path Model of insight illustrates why people seem to be talking past each other. It's because they're on different paths. (Seeing What Others Don't)

69. Eric Drexler on taking action in the face of limited knowledge

Science pursues answers to questions, but not always the questions that engineering must ask.

The founding father of nanotechnology, Eric Drexler, who aptly described the difference between science and engineering, comments on the central differences between how science and engineering approach solutions in a world of limited knowledge.

Drexler's explanation, found in his insightful book Radical Abundance: How a Revolution in Nanotechnology Will Change Civilization, discusses how there is a certain amount of ignorance that pervades everything. How, then, should we respond? Engineers apply a margin of safety.

Drexler writes:

When faced with imprecise knowledge, a scientist will be inclined to improve it, yet an engineer will routinely accept it. Might predictions be wrong by as much as 10 percent, and for poorly understood reasons? The reasons may pose a difficult scientific puzzle, yet an engineer might see no problem at all. Add a 50 percent margin of safety, and move on. Safety margins are standard parts of design, and imprecise knowledge is but one of many reasons.

Engineers and scientists ask different questions:

... Accuracy can only be judged with respect to a purpose and engineers often can choose to ask questions for which models give good-enough answers.

The moral of the story: Beware of mistaking the precise knowledge that scientists naturally seek for the reliable knowledge that engineers actually need.

Nature presents puzzles that thwart human understanding.

Some of this is necessary fallibility—some things we simply cannot understand or predict. Just because we want to understand something doesn't mean it's within our capacity to do so.

Other problems represent limited understanding and predictability — there are things we simply cannot do yet, for a variety of reasons.

... Predicting the weather, predicting the folding of membrane proteins, predicting how particular molecules will fit together to form a crystal— all of these problems are long-standing areas of research that have achieved substantial but only partial success. In each of these cases, the unpredictable objects of study result from a spontaneous process— evolution, crystallization, atmospheric dynamics— and none has the essential features of engineering design.

What leads to system-level predictability?

— *Well-understood parts with predictable local interactions, whether predictability stems from calculation or testing*

— *Design margins and controlled system dynamics to limit the effects of imprecision and variable conditions*

— *Modular organization, to facilitate calculation and testing and to insulate subsystems from one another and the external*

... When judging engineering concepts, beware of assuming that familiar concerns will cause problems in systems designed to avoid them.

Seeking Unique Answers vs. Seeking Multiple Options

Expanding the range of possibilities plays opposite roles in inquiry and design.

If elephantologists have three viable hypotheses about an animal's ancestry, at least two hypotheses must be wrong. Discovering yet another possible line of descent creates more uncertainty, not less— now three must be wrong. In science, alternatives represent ignorance.

If automobile engineers have three viable designs for a car's suspension, all three designs will presumably work. Finding yet another design reduces overall risk and increases the

likelihood that at least one of the designs will be excellent. In engineering, alternatives represent options. Not knowing which scientific hypothesis is true isn't at all like having a choice of engineering solutions. Once again, what may seem like similar questions in science and engineering are more nearly opposite.

Knowledge of options is sometimes mistaken for ignorance of facts.

Remarkably, in engineering, even scientific uncertainty can contribute to knowledge, because uncertainty about scientific facts can suggest engineering options.

Simple, Specific Theories vs. Complex, Flexible Designs

Engineers value what scientists don't: flexibility.

Science likewise has no use for a theory that can be adjusted to fit arbitrary data, because a theory that fits anything forbids nothing, which is to say that it makes no predictions at all. In developing designs, by contrast, engineers prize flexibility — a design that can be adjusted to fit more requirements can solve more problems. The components of the Saturn V vehicle fit together because the design of each component could be adjusted to fit its role.

In science, a theory should be easy to state and within reach of an individual's understanding. In engineering, however, a fully detailed design might fill a truck if printed out on paper.

This is why engineers must sometimes design, analyze, and judge concepts while working with descriptions that take masses of detail for granted. A million parameters may be left unspecified, but these parameters represent adjustable engineering options, not scientific uncertainty; they represent, not a uselessly bloated and flexible theory, but a stage in a process that routinely culminates in a fully specified product.

...

Beware of judging designs as if they were theories in science. An esthetic that demands uniqueness and simplicity is simply misplaced.

Curiosity-Driven Investigation vs. Goal-Oriented Development

The organizational structure differs between scientific and engineering pursuits. The coordination of work isn't interchangeable.

In science, independent exploration by groups with diverse ideas leads to discovery, while in systems engineering, independent work would lead to nothing of use, because building a tightly integrated system requires tight coordination. Small, independent teams can design simple devices, but never a higher-order system like a passenger jet.

...

In inquiry, investigator-led, curiosity-driven research is essential and productive. If the goal is to engineer complex products, however, even the most brilliant independent work will reliably produce no results.

...

The moral of the story: Beware of approaching engineering as if it were science, because this mistake has opportunity costs that reduce the value of science itself.

In closing, Drexler comments on applying the engineering perspective.

Drawing on established knowledge to expand human capabilities, by contrast, requires an intellectual discipline that, in its fullest, high-level form, differs from science in almost every respect.

70. More Information Doesn't Mean Better Decisions

We tend to think that if we only had more information, we'd make better decisions. The world, however, doesn't always work that way. Paradoxically, More information often means that we make worse decisions.

When you want to make a good decision, your first action is most likely to collect more information. If you know more about the situation, you can make better judgments. Right? Not always. Paradoxically, more information can lead us to make worse decisions. One of the reasons we make worse decisions with more information is that we pursue information that appears relevant but isn't. The harder the information is to find—that is, the more work we have to do to find it and the more exclusive is it—the more psychology tells us that we'll put too much value on that information. In part, this happens because of our bias toward commitment and consistency; we've spent time and effort seeking out that information, so mentally, we feel obliged to use it. This nudges us toward decisions we otherwise wouldn't have made. We also over-value information that is easily obtainable, thinking that it possesses unique insights when, in fact, it's nothing more than you'd find on the first page of Google. A little knowledge truly is a dangerous thing.

“
**We love irrelevant
information because
we lack a fundamental
understanding of what
variables matter and how
they interact.**

”

— Shane Parrish —

fs

And yet, another reason we love irrelevant information is that we really lack fundamental understanding.

If we don't understand something, we won't have a firm grasp of the fundamental variables that govern the situation and how they interact, so we'll look for new variables. When you're not sure how to weigh one attribute compared with another, you end up searching for a reason.

Often this mountain of new information — even if easily obtainable — is largely irrelevant to the situation. The problem is we don't know it is irrelevant.

“The result is that peculiar feeling of inward unrest known as indecision. Fortunately, it is too familiar to need description, for to describe it would be impossible. As long as it lasts, with the various objects before the attention, we are said to deliberate; and when finally the original suggestion either prevails and makes the movement take place, or gets definitively quenched by its antagonists, we are said to decide, or to utter our voluntary fiat in favor of one or the other course. The reinforcing and inhibiting ideas meanwhile are termed the reasons or motives by which the decision is brought about.”

— William James

Decisions

Decisions are hard to make. In part, this is because of conflict and uncertainty. We are uncertain of the consequences of our actions and have difficulty making tradeoffs between attributes. Just as knowledge can make decision making easier, a lack of knowledge compounds the problem.

When faced with two choices of equal alternatives, Slovic (1975, 1990) suggests we make choices based on what's easy to explain and justify. Sounds logical, right, why flip a coin when I can come up with a reason.

Sometimes we weigh the pros and cons. Subconsciously, when deciding for something, we focus on the pros, and when we decide against something, we focus on the reasons for rejection. This has the added advantage of giving us a good story to tell but causes problems when there are no striking positive or negative aspects to help make the decision.

When we can't find a compelling reason to do something or avoid something, we are left in a state of conflict. So we search for more information.

"Seeking new alternatives usually requires additional time and effort and may involve the risk of losing the previously available options."

— Amos Tversky and Shafir

The implications of my cobbled together theory seem worth considering.

If our current choices don't give us a convincing reason to opt for a choice, we'll likely seek out additional information (rather than questioning our understanding). When we do seek out additional information, we're really just looking for a compelling rationale for choosing one alternative over another.

The more we look for a new rationale to make decisions, the further we are from understanding. The harder we look, the more we'll find. The more we find, the more we'll miss-weigh what we find. The more we miss-weigh, the more likely we are to make a poor decision.

So the next time you find yourself seeking out hard-to-find esoteric information to give yourself an edge in that important decision, think hard about whether you understand the fundamentals of the situation. The more esoteric information you seek the further you move from the likely variables that will govern the outcomes of the situation.

71. Decisions Under Uncertainty

If you're a knowledge worker you make decisions every day. In fact, whether you realize it or not, decisions are your job.

Decisions are how you make a living. Of course, not every decision is easy. Decisions tend to fall into different categories. The way we approach the actual decision should vary based on category.

Here are a few basic categories that decisions fall into.

There are decisions where:

1. Outcomes are known. In this case, the range of outcomes is known and the individual outcome is also known. This is the easiest way to make decisions. If I hold out my hand and drop a ball, it will fall to the ground. I know this with near certainty.
2. Outcomes are unknown, but probabilities are known. In this case, the range of outcomes are known but the individual outcome is unknown. This is risk. Think of this as going to Vegas and gambling. Before you set foot at the table, all of the outcomes are known as are the probabilities of each. No outcome surprises an objective third party.
3. Outcomes are unknown and probabilities are unknown. In this case, the distribution of outcomes are unknown and the individual outcomes are necessarily unknown. This is uncertainty.

We often think we're making decisions in #2 but we're really operating in #3. The difference may seem trivial but it makes a world of difference.

Decisions Under Uncertainty

Ignorance is a state of the world where some possible outcomes are unknown: when we've moved from #2 to #3.

One way to realize how ignorant we are is to look back, read some old newspapers, and see how often the world did something that wasn't even imagined.

Some examples include the Arab Spring, the collapse of the Soviet Union, the financial meltdown.

We're prepared for a world much like #2 — the world of risk, with known outcomes and probability that can be estimated, yet we live in a world with a closer resemblance to #3.

72. The Two Types of Ignorance

The first category of ignorance is when we do not know we are ignorant. This is primary ignorance. The second category of ignorance is when we recognize our ignorance.

This article builds on Decisions Under Uncertainty. In fact, consider this a continuation. Think of how we make decisions in organizations — we often do what standard decision theory would ask of us.

We create a powerpoint that identifies the future desired state, identify what might happen, attach weighted probabilities to outcomes, and make a choice. Perfectly rational. Right? One of the problems with this approach is the risk charts and matrices that accompany this analysis.

In my experience, these charts are rarely discussed in detail and become more about checking the ‘I thought about risk’ box than anything else. We conveniently pin things into categories of low, medium, or high risk with a corresponding “impact” scale.

What gets most of the attention is high-risk, high-impact. Perhaps deservedly so. But you have to ask yourself, how did we arrive at these arbitrary scales? Is one person’s look at risk the same as someone else’s? Are there hidden incentives to nudge risk one way or another? What biases come into play?

Often we can’t even identify everything. Rarely do people ever go back and look at what happened and how accurate those “risk” tables were. From the ones I’ve seen, the “low risk” stuff happens a lot more often than people imagined. And a lot of things happen that never even made the chart in the first place.

On the occasion when people do go back, and I’ve seen this firsthand, hindsight bias creeps in. “Oh, we discussed that, but it didn’t make it in the document. But we knew about it.” Yes, of course, you did.

Ignorant and Unknowing

We’re largely ignorant, that is, we operate in a state of the world where some possible outcomes are unknown. However, we’ve prepared for a world where outcomes and probabilities can be estimated. There is a mismatch between our training and reality. You can’t even hope to accurately estimate probabilities if the range of outcomes is unknown.

The Two Types of Ignorance

The first category is when we do not know we are ignorant. This is primary ignorance. The second category is when we recognize our ignorance. This is called recognized ignorance. Empty Suits and Fragilistas are almost always ignorant and unknowing.

In Antifragile, Nassim Taleb writes:

[The Empty Suit/Fragilista] defaults to thinking that what he doesn’t see is not there, or what he does not understand does not exist. At the core, he tends to mistake the unknown for the nonexistent.

That my friends is primary ignorance. And it’s not limited to empty suits and fragilistas.

Consider Anna Karenina:

Primary ignorance ruins the life of one of fiction’s most famous characters, Anna Karenina. Readers of Anna Karenina (1877/2004) know that, in this novel, a train bookends bad news. Anna alights from one train as the novel begins and throws herself under another one as it ends. As she enters the glittering world of pre-Revolutionary Saint Petersburg, Anna catches the eye of the aristocratic bachelor Count Vronsky and quickly falls under his spell. But there is a problem: she is married to the rising politician Karenin, the two have a son Seryozha, and society will not take kindly to the conspicuous adultery of a prominent citizen. Indulging in an extra-marital affair, especially when one’s husband is a respected member of society, promotes the likelihood of unpleasant (events). But her passion for Vronsky dulls Anna’s capacities for self-awareness. She becomes pregnant out of wedlock, a disastrous condition for a woman in nineteenth-century Russia. Anna

consistently displays an unfortunate propensity to take action without recognizing that a terrible consequential outcome is possible. That is, she operates in primary ignorance. Anna demonstrates all the characteristics of primary ignorance. She fails to consider all the possible scenarios that will occur from her impulsive decision making. She risks her marriage with Karenin, a kind if undemonstrative husband, who is willing to forgive and even offers to raise her illegitimate child as his own. Leaving Seryozha with Karenin, she and Vronsky escape to Italy and then to his Russian country estate. Ultimately, she finds that while Vronsky continues to be accepted socially, living his life exactly as he pleases, the door of society slams shut in her face. No one will associate with her and she is insulted as an adulterer wherever she goes. It is only when she is completely isolated socially and cut off from her beloved son that Anna recognizes the dangers of primary ignorance: she risked her family and her reputation for too little. ... She realizes she was ignorant of the possible outcomes that jumping headlong into an illicit relationship would bring.

Ignorance, primary or recognized, is only important if the expected consequences are significant. Otherwise, we can be ignorant without consequence.

While human irrationality factors into all decisions, it hits us most when we are unknowingly ignorant.

Rational decision making becomes harder as we move along the continuum: outcomes are known → risk → uncertainty/ignorance.

If we can not consider all possible outcomes, preventing failure becomes nearly impossible. Further complicating matters, situations of ignorance often take years to play out. Joy and Zeckhauser write:

One could argue ... that a rational decision maker should always consider the possibility of ignorance, thus ruling out primary ignorance. But that is a level of rationality that very few achieve.

If we could do this we'd always be in the space of recognized ignorance, better, at least, than primary ignorance.

"Fortunately," write Joy and Zeckhauser, "there is a group of highly perceptive chroniclers of human decision-making who observe individuals and follow their paths, often over years or decades. They are the individuals who write fiction: plays, novels, and short stories describing imagined events and people (or fictional characters.)"

Joy and Zeckhauser argue these works have "deep insights" into the way we approach decisions, "both great and small."

In the Poetics, a classical treatise on the principles of literary theory, Aristotle argues that art imitates life. We refer here to Aristotle's ideas of mimesis, or imitation. Aristotle claims one of art's functions is the representation of reality. "Art" here includes creative products of the human imagination and, therefore, any work of fiction. Indeed, a crevice, not a canyon, separates fact and fiction.

For centuries, authors have attempted to depict situations of ignorance. In Greek literature, Sophocle's King Oedipus and Creon, and Homer's Odysseus all seek forecasting skills of the blind prophet Tiresias who is doomed by Zeus to "speak the truth no man may believe."

For its status as one of literature's most enduring love stories, Jane Austen's Pride and Prejudice begins rather unpromisingly: the hero and the heroine cannot stand each another. The arrogant Mr. Darcy claims Elizabeth Bennet is "not handsome enough to tempt me"; Elizabeth offers the equally withering riposte that she "may safely promise ... never to dance with him." Were we to encounter them after these early skirmishes, we (like Elizabeth and Darcy themselves) would be ignorant of the possibility of an ultimate romance.

In Gustave Flaubert's Madame Bovary (1856/2004), Charles Bovary is a stolid rural doctor who is ignorant of the true character of the woman he is marrying. Dazzled by her youth

and beauty, he ends up with an adulterous wife who plunges him into debt. His wife Emma, the titular “Madame Bovary,” is equally ignorant of the true character of her husband. Her head filled with romantic fantasies, she yearns for a sophisticated partner and the glamor of city life, but finds herself trapped in a somnolent marriage with a rustic man.

K., the land surveyor and protagonist of Franz Kafka’s The Castle, attempts, repeatedly and unsuccessfully, to gain access to the mysterious authorities of a castle but is frustrated by an authoritarian bureaucracy and by ambiguous responses that defy rational interpretation. He begins and ends the novel (as does the reader) in ignorance.

Joy and Zeckhauser use stories to study ignorance, which makes sense.

Stories offer “simulations of the social world,” according to Psychologists Raymond Mar and Keith Oatley, through abstraction, simplification, and compression. Stories afford us a kind of flight simulator. We can test run new things and observe and learn, with little economic or social cost. Joy and Zeckhauser believe “that characters in great works of literature reproduce the behavioral propensities of real-life individuals.”

While we’ll likely never uncover situations as fascinating as we find in stories, this doesn’t mean they are not a useful tool for learning about choice and consequence.

“In a sense,” Joy and Zeckhauser write, “this is why great literature will never get dated: these stories observe the details of human behavior, and present such behavior awash with all the anguish and the splendor that is the lot of the human predicament.

As Steven Pinker notes in How The Mind Works:

Characters in a fictitious world do exactly what our intelligence allows us to do in the real world. We watch what happens to them and mentally take notes on the outcomes of the strategies and tactics they use in pursuing their goals.

If we assume, we live in a world where we are, to some extent, ignorant then the best course is “thoughtful action or prudent information gathering.” Yet, when you look at the stories, “we frequently act in ways that violate such advice.”

So reading fiction can help us adapt and deal with the world of uncertainty.

73. Avoiding Ignorance

This is a continuation of two types of ignorance.

You can't deal with ignorance if you can't recognize its presence. If you're suffering from primary ignorance, it means you probably failed to consider the possibility of being ignorant or you found ways not to see that you were ignorant.

You're ignorant and unaware, which is worse than being ignorant and aware.

The best way to avoid this suggests Joy and Zeckhauser, is to raise self-awareness.

Ask yourself regularly: "Might I be in a state of consequential ignorance here?"

They continue:

If the answer is yes, the next step should be to estimate base rates. That should also be the next step if the starting point is recognized ignorance.

Of all situations such as this, how often has a particular outcome happening? Of course, this is often totally subjective.

and its underpinnings are elusive. It is hard to know what the sample of relevant past experiences has been, how to draw inferences from the experience of others, etc.

Nevertheless, it is far better to proceed to an answer, however tenuous, than to simply miss (primary ignorance) or slight (recognized ignorance) the issue. Unfortunately, the assessment of base rates is challenging and substantial biases are likely to enter.

When we don't recognize ignorance, the base rate is extremely underestimated. When we do recognize ignorance, we face "duelling biases; some will lead to underestimates of base rates and others to overestimates."

Three biases come into play while estimating base rates: overconfidence, salience, and selection biases.

So we are overconfident in our estimates. We estimate things that are salient – that is, "states with which (we) have some experience or that are otherwise easily brought to mind." And "there is a strong selection bias to recall or retell events that were surprising or of great consequence."

Our key lesson is that as individuals proceed through life, they should always be on the lookout for ignorance. When they do recognize it, they should try to assess how likely they are to be surprised—in other words, attempt to compute the base rate. In discussing this assessment, we might also employ the term "catchall" from statistics, to cover the outcomes not specifically addressed.

It's incredibly interesting to view literature through the lens of human decision making.

Crime and Punishment is particularly interesting as a study of primary ignorance.

Raskolnikov deploys his impressive intelligence to plan the murder, believing, in his ignorance, that he has left nothing to chance. In a series of descriptions not for the squeamish or the faint-hearted, the murderer's thoughts are laid bare as he plans the deed. We read about his skills in strategic inference and his powers of prediction about where and how he will corner his victim; his tactics at developing complementary skills (what is the precise manner in which he will carry the axe?; what strategies will help him avoid detection) are revealed.

But since Raskolnikov is making decisions under primary ignorance, his determined rationality is tightly "bounded." He "construct[s] a simplified model of the real situation in order to deal with it; ... behaves rationally with respect to this model, [but] such behavior is not even approximately optimal with respect to the real world" (Simon 1957). The second-guessing, fear, and delirium at the heart of Raskolnikov's thinking as he struggles to gain a foothold in his inner world show the impact of a cascade of Consequential Amazing Development's (CAD), none predicted, none even contemplated. Raskolnikov anticipated an outcome in which he would dispatch the pawnbroker and slip quietly out of her apartment. He could not have possibly predicted that her sister would show up, a characteristic CAD that challenges what Taleb (2012) calls our "illusion of predictability."

Joy and Zeckhauser argue we can draw two conclusions.

First, we tend to downplay the role of unanticipated events, preferring instead to expect simple causal relationships and linear developments. Second, when we do encounter a CAD, we often counter with knee-jerk, impulsive decisions, the equivalent of Raskolnikov committing a second impetuous murder.

74. Your Product is Decisions

If you asked people what they produce on a daily basis, most would say email or meetings. Even the ones who offered a deeper answer would probably think of these first. It is natural to think this way if you're a knowledge worker. Natural and incorrect. In a conversation with journalist Jason Zweig, Nobel Laureate Daniel Kahneman argues that knowledge workers produce decisions. And the quality of those decisions varies widely.

(At many financial institutions) the product is decisions. They produce decisions. And there ought to be something that is equivalent to the quality control you find in manufacturing. Now you can't control the product itself; test the product. But you can test the process by which the product was created. So there are questions you can ask about the process by which a judgment was made or a decision was made. And one of these aspects is going to be the quality and quantity of the information on which the judgment was based. And if you isolate that as one of the issues you are going to focus on, it's not the quality of the story you can make, it's actually 'Where does the evidence come from?', 'What do we really know?' It's when you ask those questions that you work out that, actually, you know very little and that you told yourself a coherent story on the basis of inadequate information.

Kahneman doesn't feel individuals can go back and objectively assess their own decisions. This is, however, something organizations can do. Most, however, will choose not to because it is too painful.

Most organizations don't use a consistent process or framework to make important decisions. Yet we know that the process by which you come to a decision is the most important thing. It's not about more information. Process matters more than the analysis. We also know that when you don't use a consistent process you make it hard to improve. If your product is decisions, you might be curious as to how we can improve our ability to make them::

1. Know your circle of competence. This is how Ted Williams excelled.
2. When operating within your circle of competence, use a double filter for making decisions.
3. Avoid using vague and ambiguous terms.
4. Keep a decision journal.
5. Ignore outcome when evaluating decisions.

Kahneman's book, Thinking, Fast and Slow, is a must-read.

75. How to Make Smart Decisions Without Getting Lucky

Few things will change your trajectory in life or business as much as learning to make effective decisions. Yet no one really teaches us what it means to make consistently high-quality decisions.

The decision-making principles in this article are both practical and time-tested. They work in the real world.

In this guide, we'll cover:

- [No One Taught you How to Decide](#)
- [Your Mind is a Pattern Matching Machine](#)
- [Decision Making](#)
- [Smart People Make Terrible Decisions](#)
- [Sources of Stupidity](#)
- [Intelligent Preparation: The World Is Multidisciplinary](#)
- [How We Make Decisions](#)
- [General Thinking Concepts](#)
- [Add To Your Decision-Making Skills](#)
- [Books to Improve Decisions](#)

Ready? Ok, Let's dig in.

No one Taught you How to Decide

I started working at an intelligence agency on August 28, 2001. Two weeks later, the world would never be the same.

My computer science degree lost its value after a few promotions. I came from a world of 1s and 0s, not people, families, and interpersonal dynamics.

Just out of school, I found that my decisions affected not only my employees but their families. Not only my country but other countries. However, there was one small problem. I had no idea how to make smart decisions. I had no idea how to reduce errors. I only knew I had an obligation to make the best decisions I could. But where do you start?

There is no class called "decision making." Making better decisions isn't one skill but rather a series of tools and frameworks. What distinguishes consistently good decision-makers from poor ones is a series of diverse mental frameworks and tools (as well as relevant specific information).

Most of us operate like a carpenter with only a hammer. To a man with a hammer, every problem looks like a nail. No matter the job, we pull out our hammer and attempt to make it work. While a hammer can often get the job done eventually, it comes with a cost. In my world, a poor decision could cost lives, impact my country, or even start a war. A hammer wasn't enough, I wanted more tools.

"The older I get the more I realize how many kinds of smart there are. There are a lot of kinds of smart. There are a lot of kinds of stupid, too."

— JeFF Bezos

To fill my mental toolbox, I looked around my organization and found some mentors. I watched them, asked them annoying questions, and tried to learn as much as I could from them. I went back to school to get an MBA. I read everything I could about making decisions and the tools I needed to develop.

Thanks to the internet, I was no longer limited to the best teachers in my organization or university. The entire world was available. I could find the best teachers in the world, learn their tools and frameworks, and add them to my mental toolbox.

Pattern Matching

You probably don't know it but you already think in mental models. Mental models are mental chunks of knowledge that represent a concept. Gravity is a model. So are probabilistic thinking, inversion, and entropy.

Mental models shape how you think, how you approach problems, and how you identify the information that matters and ignore what doesn't. The mental models in your head are your cognitive skillset.

Decision Making

Think about the state of your life, your career, your business, your major relationships — anything consequential to you.

How many important decisions have you already had to make? With the benefit of hindsight, how well did you make them?

How many decisions did you make today? How did you make these decisions? Is there a better way?



Not all decisions matter. Most decisions, like where to grab a sandwich, are unimportant. The consequences of these decisions don't matter.

Yet some decisions are critical — they change our lives. Whether its who to trust, where to live, or whom to marry, these decisions reverberate for years.

Yet most of us don't have the right skills to think through these problems. As a result, we often fall back to the pro-con list, where you list all the positive things that happen on one side and the negative things on the other trading them off.

While useful when deciding what to have for lunch, the pro-con list comes with a lot of blind spots.

"I regard it as a criminal waste of time to go through the slow and painful ordeal of ascertaining things for one's self if these same things have already been ascertained and made available by others."

— Thomas Edison

SMART People Make Terrible Decisions

Otherwise smart people can make terrible decisions. Think about decisions like these:

- Napoleon decided to invade Russia (and Hitler did it again 130 years later)
- An editor deciding to publish O.J Simpson's *If I Did It*

- Chris Webber choosing the timeout he didn't have in the 1993 Final Four
- NASA's decision to ignore the O-ring issues on the Challenger
- President Kennedy's famous blunder to continue the Bay of Pigs operation inherited from the previous administration (a mistake he quickly learned from)
- Margaret Thatcher deciding to get behind a "poll tax" that led to her ouster by her own party
- Juergen Schrempp, the CEO of Daimler-Benz, deciding to merge with Chrysler despite massive internal opposition and general history of big M&A deals working very poorly
- Jim Cramer looking at Bear Stearns in 2007 and calling it a "BUY"
- ...and a hundred thousand more...

These were catastrophic decisions made by people who were, in some sense, professional decision-makers. They had impeccable credentials and judgment, and yet they made poor decisions due to poor judgment, a too-limited mental representations of the world, or just plain stupidity.

Sources of Stupidity

There are a lot of reasons we fail to make effective decisions.

Let's take a look at five of the biggest ones:

1. We're unintentionally stupid. I like to think that I'm rational and capable of interpreting all information in a non-biased way but that's a dream. Cognitive biases are great at explaining how our evolutionary programming leads us astray. Knowledge of these biases in advance rarely helps us make better decisions. There are, however, many easily recognizable situations that increase the odds we're about to do something stupid. Whether we're tired, overly focused on a goal, rushing, distracted, operating in a group, or under the influence of a group, we're more prone to stupidity.²
 2. We have the wrong information. Making decisions with the wrong assumptions or facts is likely to lead to disaster.
 3. We use the wrong model. We use mental models to make decisions. The quality of those models determines the quality of our thinking. There are a variety of reasons that we use false, incomplete, or incorrect models. Novices are prone to using models that the expert knows are incomplete or irrelevant. The odds of employing the wrong models increase as the pace of environmental change increases.
 4. We fail to learn. We all know the person that has 20 years of experience but it's really the same year over and over. Well, that person is sometimes us. If we don't understand how we learn, we're likely to make the same mistakes over and over.
 5. Looking over doing good. Our evolutionary programming conditions us to do what's easy over what's right. After all it's often easier to signal being virtuous than actually being virtuous. We unconsciously make choices based on optics, politics, and defendability. We hate criticism and seek the validation of our peers and superiors. We often want to feel good about ourselves first and have the outcome we desire second.
- Luckily, we can take steps to reduce the odds of stupidity and increase the odds of good decisions in each of these categories.

"The frog in the well knows nothing of the mighty ocean."

— Japanese Proverb

Intelligent Preparation: The World Is Multidisciplinary

We live in a society that demands specialization. Being the best means being an expert in something. Letters after your name and decades in the trenches of experience are required before you can claim to know anything. In one sense there is nothing wrong with this — specialized knowledge is required to solve problems and advance our global

potential. But a byproduct of this niche focus is that it narrows the ways we think we can apply our knowledge without being called a fraud.

So we think physicists can't teach us about love; mathematicians can't instruct us on how to run a business; poets don't know squat about "my life." And bloggers can't contribute to philosophy.

I don't believe this is true.

Knowledge is hard to come by.

It takes work and commitment, and I think we owe it to ourselves to take it out of the box it comes in and experiment with it. We should blow past conformity and apply all the knowledge at our disposal to the problems and challenges we face every day.

Think about it. Over time you've picked up a lot of fundamentals about how the world works. You may have read a book about the Manhattan Project and the building of the nuclear bomb that was launched at Hiroshima. This story conveys the awesome power of self-sustaining nuclear reactions. Have you ever thought about applying those ideas to your life? You should.

How We Make Decisions

When was the last time you thought about how you make decisions?

If you're like most people, you've never been explicitly taught how to make effective decisions. You make decisions like a golfer who never took any lessons: miserable with the state of your game and yet not seeking to learn a better swing, and instead hoping for the best every time you lift the club. Hoping that this time your choice will finally work out. In the early 1980s, Charlie Munger and his partner Warren Buffett realized that a Savings & Loan operation they owned, as with the rest of the industry, was doomed to fail miserably due to forces outside of their control. At a time when almost none of their peers were taking action, they changed course dramatically, massively reducing the effect of the bank's failure on the rest of their business holdings. These two men knew they had to act much differently than their peers.

It worked: The S&L industry collapsed, yet Munger and Buffett escaped with barely a scratch. They saved themselves a great deal of stress and financial pain by applying a uniquely effective system of organized common sense. In hindsight, it seems like an obvious good decision; at the time, it seemed odd and unusual.

The lesson for us is that the people making consistently good decisions take advantage of how the world works. That's wisdom.

Real knowledge of the art of decision making, which remains true across time and circumstances, eras and epochs, can help increase the odds that we get what we want and reduce costly mistakes.

While everyone else is guessing, falling into old patterns, blindly following cognitive biases, we can be clear-headed and laser-focused.

That's what Farnam Street is all about.

Here are some examples of applying — or failing to apply — knowledge about how the world really works.

- It doesn't matter how smart you are if you don't realize where things are additive and where they are multiplicative. Nikola Tesla failed to understand Multiplication by Zero when he failed to realize that poor relations with others affected his life. While the Serbian-American was a brilliant inventor, he had difficulty relating to others, which made him difficult to work with. This problem cost him a Nobel Prize and a fortune that today would likely have made him the richest man in the world.
- While we all rely on maps, which are reductions of complexity, to make decisions, they are not always accurate. General George S. Patton Jr. understood that the map is not the territory. When he visited the troops near Coutances, he found them sitting on the side of the road, studying a map. Responding to Patton's inquiry as to

why they had not crossed the Seine, the troops informed him that they were studying the map and could not find a safe place to wade across. Patton informed them that he had just waded across it and it was not more than two feet deep.

- While we all like to be in the sexy industries, that desire shows an under-appreciation for the laws of thermodynamics. Smart companies like Berkshire Hathaway, guided by legendary investor Warren Buffett, understand that contrast is important. Sexy internet businesses are rarely effective, no matter how good they are, because the others are nearly just as good. What you want is contrast — to be the big fish in a small pond. And when you analyze the types of investments he's made over the years, that's what you find. If you're going to compete with people, you want to compete with people who are way less sophisticated than you.
- Understanding and applying the mental model of relativity helped Michael Abrashoff take the worst-performing ship in the US Pacific Fleet and turn it into the best. In his book, *It's Your Ship*, he wrote: "The most important skill a skipper can have is the ability to see through the eyes of the crew."

This website is about understanding and applying these time-tested mental models. Knowing how the world works means that you can stop fighting reality — and yourself along with it.

General Thinking Concepts

Combining intelligent preparation — learning about the big time-tested ideas from multiple disciplines — with general thinking frameworks will dramatically improve your decision-making skills.

These thinking frameworks help you look at problems through different lenses.

- Inversion — Otherwise known as thinking something through in reverse or thinking "backwards," inversion is a problem-solving technique.
- Second-Order Thinking — Ask yourself, "And then what?"
- The Map Is Not the Territory — The map of reality is not reality itself. If any map were to represent its actual territory with perfect fidelity, it would be the size of the territory itself.

All of these concepts (and six others) can be found in *The Great Mental Models Volume 1: General Thinking Concepts*.

76. Just In Time Information Gathering

We're becoming more like factories.

Just-in-time is a production strategy aimed at, among other things, reducing the need for excess inventory. Parts are supplied only when needed in the amount needed. While it makes a business more capital efficient, it also makes it more fragile.

We've adopted a similar strategy for information gathering. We're so consumed by noise and busy work that the only time we really seek out signal is when we need it the most: right before we make a decision.

This creates a host of problems.

The worst time to look for information is when we need it to make a decision. When we do that we're more likely to see what's unique and miss the historical context. We're also more likely to be biased by what is available. And searching for information at the time of need is an indication that you have no idea what you're doing.

"Pattern recognition," says Alice Schroeder, "creates an impulse always to connect new knowledge to old and to primarily be interested in new knowledge that genuinely builds on the old." It helps knowledge snowball.

If we can't connect the current situation to something we already understand, we might reason that it is not in our circle of competence and thus we shouldn't be drawing conclusions. If we can, however, connect it to something we previously understood then we're less likely to draw conclusions on the basis of "this time is different."

There is merit to thinking about information gathering as a logistics problem.

77. Daniel Kahneman's Favorite Approach For Making Better Decisions

Bob Sutton's book, *Scaling Up Excellence: Getting to More Without Settling for Less*, contains an interesting section towards the end on looking back from the future, which talks about "a mind trick that goads and guides people to act on what they know and, in turn, amplifies their odds of success."

We build on Nobel winner Daniel Kahneman's favorite approach for making better decisions. This may sound weird, but it's a form of imaginary time travel.

It's called the premortem. And, while it may be Kahneman's favorite, he didn't come up with it. A fellow by the name of Gary Klein invented the premortem technique.

A premortem works something like this. When you're on the verge of making a decision, not just any decision but a big decision, you call a meeting. At the meeting, you ask each member of your team to imagine that it's a year later.

Split them into two groups. Have one group imagine that the effort was an unmitigated disaster. Have the other pretend it was a roaring success. Ask each member to work independently and generate reasons, or better yet, write a story, about why the success or failure occurred. Instruct them to be as detailed as possible, and, as Klein emphasizes, to identify causes that they wouldn't usually mention "for fear of being impolite." Next, have each person in the "failure" group read their list or story aloud, and record and collate the reasons. Repeat this process with the "success" group. Finally use the reasons from both groups to strengthen your ... plan. If you uncover overwhelming and impassible roadblocks, then go back to the drawing board.

Premortems encourage people to use "prospective hindsight," or, more accurately, to talk in "future perfect tense." Instead of thinking, "we will devote the next six months to implementing a new HR software initiative," for example, we travel to the future and think, "we have devoted six months to implementing a new HR software package."

You imagine that a concrete success or failure has occurred and look "back from the future" to tell a story about the causes.

[...]

Pretending that a success or failure has already occurred—and looking back and inventing the details of why it happened—seems almost absurdly simple. Yet renowned scholars including Kahneman, Klein, and Karl Weick supply compelling logic and evidence that this approach generates better decisions, predictions, and plans. Their work suggests several reasons why. ...

1. This approach helps people overcome blind spots

As ... upcoming events become more distant, people develop more grandiose and vague plans and overlook the nitty-gritty daily details required to achieve their long-term goals.

2. This approach helps people bridge short-term and long-term thinking

Weick argues that this shift is effective, in part, because it is far easier to imagine the detailed causes of a single outcome than to imagine multiple outcomes and try to explain why each may have occurred. Beyond that, analyzing a single event as if it has already occurred rather than pretending it might occur makes it seem more concrete and likely to actually happen, which motivates people to devote more attention to explaining it.

3. Looking back dampens excessive optimism

As Kahneman and other researchers show, most people overestimate the chances that good things will happen to them and underestimate the odds that they will face failures, delays, and setbacks. Kahneman adds that "in general, organizations really don't like pessimists" and that when naysayers raise risks and drawbacks, they are viewed as "almost disloyal."

Max Bazerman, a Harvard professor, believes that we're less prone to irrational optimism when we predict the fate of projects that are not our own. For example, when it comes to friends' home renovation projects, most people estimate the costs will run 25 to 50 percent

over budget. When it comes to our projects; however, they will be “completed on time and near the project costs.”

4. A premortem challenges the illusion of consensus

Most times, not everyone on a team agrees with the course of action. Even when you have enough cognitive diversity in the room, people still keep their mouths shut because people in power tend to reward people who agree with them while punishing those who dare to speak up with a dissenting view.

The resulting corrosive conformity is evident when people don't raise private doubts, known risks, and inconvenient facts. In contrast, as Klein explains, a premortem can create a competition where members feel accountable for raising obstacles that others haven't. “The whole dynamic changes from trying to avoid anything that might disrupt harmony to trying to surface potential problems.”

78. The Default-Thinking Method of Problem Solving

You've been here before. It's Monday morning and you walk into the office only to have your boss call an urgent meeting to "streamline processes." You haven't thought about this enough to have an opinion but you go anyway.

You know how to deal with this. You've done it before. You turn on your default brain and start solving the problem. You build a hypothesis to determine the problem, find some data to analyze, and presto out comes some efficiency.

Most of the time this works well enough, but not always. Sometimes—more often than we'd like to admit—things change: markets shift and consumers behave in unpredictable ways. Now we're rudderless.

In the wonderful book *The Moment of Clarity: Using the Human Sciences to Solve Your Toughest Business Problems*, the authors write:

We are forever in the midst of change, but not all of it is seismic. It's vital for a business to understand the difference between the uncertainties present on an average day and the uncertainties of a major cultural shift. ... Business issues can be categorized along a problem scale within three levels of complexity. This framework is useful for distinguishing very complex problems from those that are actually manageable.

The Three Levels of Business Problems

1. *A clear-enough future with a relatively predictable business environment. You know what the problem is, and you can apply a proven algorithm to fix it. "If I invest \$ 1 in media spending for advertising, I know that I will get something like \$ 1.5 back because of market stimulation." "The industry has average admin costs of 8 percent of total revenue. Mine are 10 percent. We should cut that back."*

2. *Alternative futures with a set of options available. You have a feel for the problem and might have seen something like it before. It makes sense to test your hunch as a hypothesis. For example, "Our sales numbers are down even when we invest in more salespeople, but we have seen the same pattern in the European Union and China. We might be hiring too many new salespeople too quickly and expecting them to deliver the same payback that the existing salespeople are delivering."*

3. *High level of uncertainty, with no understanding of the problem. You simply don't know what the problem is, let alone the solution. You can see that something is wrong, but have no clear idea about what to do. For example, "Our media division is losing business to internet start-ups," "We are investing more in customer service, but our customers are becoming increasingly dissatisfied with us," and "We are designing products that seem right for the marketplace, but the marketplace isn't interested."*

Most of our problems tend to be in 1 or 2. Uncertainty, remember, happens when we fail to know the range of possible outcomes (and, correspondingly, their probabilities.) These are really messy problems.

Solving the problems of 1 and 2 are generally much easier. We use default thinking.

The default problem-solving model has its roots in what can be called instrumental rationalism. At the heart of the model is the belief that business problems can be solved through objective and scientific analysis and that evidence and facts should prevail over opinions and preferences. To get to the right answer, so the thinking goes, you should adhere to the following principles of problem solving:

1. *All business uncertainties are defined as problems. Something in the past caused the problem, and the facts should be analyzed to clarify what the problem is and how to solve it.*

2. *Problems are deconstructed into quantifiable and formal problem statements (issues). For example, "Why is our profitability falling?"*

3. *Each problem is atomized into the smallest possible bits that can be analyzed separately—for example, breaking down the causes of profitability into logical issues. This*

analysis would include “issue trees” for all the hundreds of potential levers for either decreasing costs or growing revenue (customer segments, markets, market share, price, sales channels, operations, new business development, etc.)

4. A list of hypotheses to explain the cause of the problem is generated. For example, “We can increase profitability by lowering the cost of our operations.”

5. Data is gathered and processed to test each hypothesis— all possible stones are turned and no data source is left untouched.

6. Induction and deduction are used to test hypotheses, clarify the problem, and find the areas of intervention with the highest impact, or what is commonly called “bang for the buck.”

7. A well-organized structure of the analysis is deployed to build a logical and fact-based argument of what should be done. The structure is built like a pyramid that develops the supporting facts, some subconclusions, and an overall conclusion and then ends with a prioritized list of interventions to which the company should adhere.

8. All proposed actions are described as manageable work streams or must-win battles for which a responsible committee, or person, is assigned.

9. Performance metrics and a proposed time frame with follow-up monitoring are put in place for each committee to complete the task.

10. When all work streams have been completed, the problem is solved.

When done correctly by competent people, this can be a thing of beauty. This is, in part, why we hire consultants like myself, McKinsey, or Bain. We believe they can solve any problem. The idea that management is a type of science with a repeatable formula in the face of any problem is not a new idea. “It can be traced back to the nineteenth century, when positivism, the prevalent philosophy of the day, argued that you could objectively measure reality.” The founding father of the idea of management science, if there was one, Frederick Winslow Taylor.

Taylor left a prestigious education at Harvard to work at steel companies throughout Pennsylvania. Whereas most manufacturing and factory plants had cobbled together their organization through rules of thumb and common sense, Taylor was the quintessential positivist, seeking scientifically validated measurements, or properties. He followed workers, clicking his stopwatch every time they started and stopped, measuring the time it took to complete each discrete action of hauling their large iron ore loads. Through his enormously successful tenure at steel companies, he extracted generalized principles of management that he used to create the world’s first business case study. It wasn’t long before a partnership between Harvard’s School of Applied Science and its brand-new business school came calling. Might Taylor bring together his experience into something the school could teach its young students about productivity? Taylorism, based on the following premise, was born:

To work according to scientific laws, the management must take over and perform much of the work which is now left to the men; almost every act of the workman should be preceded by one or more preparatory acts of the management which enable him to do his work better and quicker than he otherwise could.

Today’s problems seem infinitely more complex than counting iron ore hauls and yet we still attack them with the same general approach of Taylorism. This is what most MBAs, including mine, taught: people work harder with the right incentives, optimize and perfect workflow, analyze every movement looking for efficiencies, remove discretion when possible because that creates variance, etc. Of course we’ve evolved Taylorism, today we call it “lean” and “six sigma” and whatever else.

For most of us, default thinking is so familiar to us— the very air we breathe— that we are no longer able to explain it or even to see it. For that reason, if we really want to understand why we continue to get people wrong, we need to unpack the fundamental assumptions that make up the culture of most of our days.

Is this really how we approach problems? What are the assumptions we're making when we take this approach?

Assumption 1: People Are Rational And Fully Informed

One of the unintentional consequences of solving problems by testing logical hypotheses is that you are forced to assume that people are rational decision makers: aware of their needs, fully informed of all their choices, and capable of making the best choice. The reason is simple: it is very difficult to test a hypothesis about things that you can't measure objectively. It's even harder to test something that is deeply personal, cannot be decoded into explicit descriptions, and requires a lot of interpretation. Think about the question "Are you a good parent?" or "Do you have good taste?"

A simple answer misses most of what matters about parenting and good taste. To deal with this problem, companies base their problem solving on what can objectively be described, quantified, and analyzed without too much interpretation.

So we default to measuring perceptions and desires, more specifically, we end up with people's perceptions of reality. There is nothing wrong with this but it is limited and we should be aware of its limitations. These are not the only two aspects of humanity that matter. And even if they were, the way default thinking solves problems rarely offers us any understanding of how they work. We find some spurious relationship and assume causation when, in reality, it's merely a correlation. When it changes we have no idea why. We're more complex than that.

Most recent studies evaluating how people buy reveal us to be far more chaotic creatures. We rarely know what we want. We almost never fully grasp the market and, most important, we almost always buy something at a different price than what we thought we would. Even studies of people with written shopping lists (milk, eggs, apples, etc.) reveal that they find themselves far astray from their original intentions once they reach the grocery store.

We do this because intentions are relatively easy to study. But as Dr. House says, "everybody lies."

People think they cook a lot, but they really don't. It's not that they want to lie to other people; they are simply lying to themselves.

There is often a wealth of distance between what people say and what people do.

It's not that people don't care about anything. They just don't care as much as most companies assume that they do. And most often, people couldn't care less. When they buy one kind of chocolate bar rather than another, it is rarely because they have a strong brand preference. More often than not, it is because the chocolate was closer on the counter, it had a color that fit the mood, or it simply came packaged as a "two for one." The good news for companies is that we buy a lot of stuff. The bad news is that we don't always know why.

Assumption 2: Tomorrow Will Look Like Today

A good example of this attitude can be found in a 2006 article in the McKinsey Quarterly. In identifying trends that will shape the business environment, the article says that management itself will shift from an art to a science:

Long gone is the day of the "gut instinct" management style. Today's business leaders are adopting algorithmic decision-making techniques and using highly sophisticated software to run their organizations. Scientific management is moving from a skill that creates competitive advantage to an ante that gives companies the right to play the game.

We're bombarded with the word "science."

When thought leaders use the word science to describe a business discipline like marketing, retail design, negotiation skill, or strategy, we are led to believe that these disciplines can be predicated on scientific truths. Does the science of shopping have the same universal laws as Darwin's theory of natural selection?

This is part of the reason we trick ourselves.

Rarely do we have to ask, “Where does the hypothesis come from?” But by assuming that the hypothesis is based on some kind of universal law, we fool ourselves into believing that the assumptions of the current moment will also hold true in the future. In these situations, the idea that management is a kind of natural science blinds us rather than enlightens us.

Assumption 3: Hypotheses are Objective and Unbiased

Here is a great example:

In the toy industry, the dominating idea is that children have a short attention span and need toys that stimulate their desire for instant traction. A toy, it is assumed, must grab the attention of the child in the store, and he or she should not need any skills to play with it. Another assumption is that physical toys are losing ground to digital toys because the former are too tedious and not stimulating enough.

In reality, when you study children—and if you read the majority of academic literature about children—you will probably reach the opposite conclusion: children are highly motivated by play experiences that require skill and mastery and that can give them a sense of hierarchy and accomplishment. Digital play is gaining in popularity precisely because it requires a very sophisticated skill set; it can be played for thousands of hours and it gives the players clear feedback with levels and hierarchies.

Over time, companies and people create “commonsense” ideas about the world and how it works. We take things as given and rarely challenge them.

*The French anthropologist Pierre Bourdieu coined the term *habitus* to describe the somehow hidden but always present dispositions that shape our perceptions, thoughts, and actions. In his view, many things that we regard as common sense are in fact shaped by the social context we are in. Over time we learn what is normal and taken as a given through our social interaction with the world—our family, our society, our friends, our work—and our perceptions become a kind of automatic understanding of the world. This understanding enables us to act normally without really thinking about it. Over time, companies similarly create commonsense ideas about the world. Certain things are simply taken as a given, no longer contested: for example, the idea that designers and engineers will never see eye-to-eye, or that open offices provide more opportunities for collaboration. This is one reason consultants can be effective, they come in with a different understanding and offer opinions—intentionally or not—that challenge some of these commonsensical views.*

In terms of default thinking:

A company might think that it has created an objective set of possible hypotheses to test. But in reality each hypothesis is always based on something. Very often, that thing is a product of culture, not of science. And once our assumptions are firmly rooted in our cultural understanding, they have a way of becoming ever more entrenched.

Then confirmation bias kicks in. We look for opinions, ideas, and facts that support our beliefs.

In the end, our hypotheses are “almost never based on objective truth.” How could it be otherwise? But of course, the point is to know the limitations of the tools we’re working with and hope that awareness allows us to make better decisions by using better tools.

In Leo Tolstoy’s nonfiction magnum opus *The Kingdom of God Is Within You*, he writes:

“The most difficult subjects can be explained to the most slow-witted man if he has not formed any idea of them already; but the simplest thing cannot be made clear to the most intelligent man if he is firmly persuaded that he knows already, without a shadow of doubt, what is laid before him.”

If you can’t question assumptions at your company, you probably can’t question anything.

Assumption 4: Numbers Are the Only Truth

“Not everything that can be counted counts, and not everything that counts can be counted.” — Albert Einstein

The heart of default problem solving is quantitative analysis.

It has become so dominant that companies tend to forget that the world consists not only of quantities but also of qualities. Roger Martin, the dean of Rothman School of Management, argues that companies will simply lack ability to find the full potential of growth opportunities if they only focus on quantitative models: "The greatest weakness of the quantitative approach is that it decontextualizes human behavior, removing an event from its real-world setting and ignoring the effects of variables not included in the model." Default thinking catalogs the world into properties: how big is the market, how many people will buy our products, how many people know our brand, which category is growing fastest, which geography is the most profitable, which customers have the highest loyalty and what technologies have the highest adoption.

Yes, all of those have a numbers side, but they also have a qualitative side that might also shed light on things. If you know that a certain percent of your customers are happy with their interactions with your company, that's different than knowing what the experience of interacting with your company is like. Both of those things are needed to inform decisions. Numbers are great for covering your ass, so they tend to trump anything else. Numbers however, limit ideas and solutions to only one right answer.

For obvious reasons, the past does not include data on things that haven't happened or ideas that have not yet been imagined. As a result, data analysis of the future tends to underestimate or even ignore past events or conditions that can't be measured while overestimating those that can. Nowhere is this more visible than in business case studies. "In our view," the authors write, "the quantitative obsession leads to a sorely diminished approach to future planning. It tends to be conservative rather than creative because it implicitly favors what can be measured over what cannot."

Assumption 5: Language Needs to be Dehumanizing

Business and management science has become a world in itself, and the language of business has become increasingly technical, introverted, and coded. You don't fire people anymore; you "right-size the organization." You don't do the easiest things first; you "pick the low-hanging fruit." You don't look at where you sell your products; you "evaluate your channel mix." You don't promote people; you "leverage your human resources." You don't give people a bonus check; you "incentivize." You don't do stuff; you "execute." You "synergize, optimize, leverage, simplify, utilize, transform, enhance, and reengineer." You avoid "boiling the ocean, missing the paradigm shift, having tunnel vision, and increasing complexity." You make sure that "resources are allocated to leverage synergies across organizational boundaries and with a customer-centric mind-set that can secure a premium position while targeting white spots in the blue ocean to ensure that there is bang for the buck." It can become almost poetic.

Talk about jargon.

The German philosopher Jürgen Habermas has developed an extensive analysis of what happens when technical language outstrips the language of everyday life. He argues that the change from a normal, everyday language to a technical, specific language suggests a shift in power. When technical language conquers simple language of the every day, it is a sign that the system is gaining ground and everyday human reality, what he calls the lifeworld, is losing ground. He goes so far as to call this shift a colonization of the lifeworld; everyday life being colonized by a force of bureaucratization and rationalization that it cannot defend itself against. Such a shift leads to a far more systematic, rule-based, and technical idea of the world. It widens the gap between who we really are and the systems that we have become.

* * *

Of course, default thinking doesn't always work. You know you've stepped out of default thinking space when leaders say, "think outside the box." Problems arise when you try to solve the third type of problem (where there is a high level of uncertainty) with the same thinking you use to fix problems in one and two.

If you enjoyed this post, you'd love the book *The Moment of Clarity: Using the Human Sciences to Solve Your Toughest Business Problems*.

79. How Complex Systems Fail

A bit of a preface to this post. Please read the definition of Antifragile first. While the article below is interesting, the reader should read with a critical mind. Complexity 'solved' with increased complexity generally only creates a lot of hidden risks, slowness, or fragility.

A short treatise on the nature of failure; how failure is evaluated; how failure is attributed to proximate cause; and the resulting new understanding of patient safety by Richard I. Cook.

1. Complex systems are intrinsically hazardous systems

All of the interesting systems (e.g. transportation, healthcare, power generation) are inherently and unavoidably hazardous by their own nature. The frequency of hazard exposure can sometimes be changed but the processes involved in the system are themselves intrinsically and irreducibly hazardous. It is the presence of these hazards that drives the creation of defenses against hazard that characterize these systems.

2. Complex systems are heavily and successfully defended against failure

The high consequences of failure lead over time to the construction of multiple layers of defense against failure. These defenses include obvious technical components (e.g. backup systems, 'safety' features of equipment) and human components (e.g. training, knowledge) but also a variety of organizational, institutional, and regulatory defenses (e.g. policies and procedures, certification, work rules, team training). The effect of these measures is to provide a series of shields that normally divert operations away from accidents.

3. Catastrophe requires multiple failures – single point failures are not enough

The array of defenses works. System operations are generally successful. Overt catastrophic failure occurs when small, apparently innocuous failures join to create opportunity for a systemic accident. Each of these small failures is necessary to cause catastrophe but only the combination is sufficient to permit failure. Put another way, there are many more failure opportunities than overt system accidents. Most initial failure trajectories are blocked by designed system safety components. Trajectories that reach the operational level are mostly blocked, usually by practitioners.

4. Complex systems contain changing mixtures of failures latent within them

The complexity of these systems makes it impossible for them to run without multiple flaws being present. Because these are individually insufficient to cause failure they are regarded as minor factors during operations. Eradication of all latent failures is limited primarily by economic cost but also because it is difficult before the fact to see how such failures might contribute to an accident. The failures change constantly because of changing technology, work organization, and efforts to eradicate failures.

5. Complex systems run in degraded mode

A corollary to the preceding point is that complex systems run as broken systems. The system continues to function because it contains so many redundancies and because people can make it function, despite the presence of many flaws. After accident reviews nearly always note that the system has a history of prior 'proto-accidents' that nearly generated catastrophe. Arguments that these degraded conditions should have been recognized before the overt accident are usually predicated on naïve notions of system performance. System operations are dynamic, with components (organizational, human, technical) failing and being replaced continuously.

6. Catastrophe is always just around the corner

Complex systems possess potential for catastrophic failure. Human practitioners are nearly always in close physical and temporal proximity to these potential failures – disaster can occur at any time and in nearly any place. The potential for catastrophic outcome is a hallmark of complex systems. It is impossible to eliminate the potential for such catastrophic failure; the potential for such failure is always present by the system's own nature.

7. Post-accident attribution to a 'root cause' is fundamentally wrong

Because overt failure requires multiple faults, there is no isolated 'cause' of an accident. There are multiple contributors to accidents. Each of these is necessarily insufficient in itself to create an accident. Only jointly are these causes sufficient to create an accident. Indeed, it is the linking of these causes together that creates the circumstances required for the accident. Thus, no isolation of the 'root cause' of an accident is possible. The evaluations based on such reasoning as 'root cause' do not reflect a technical understanding of the nature of failure but rather the social, cultural need to blame specific, localized forces or events for outcomes.

8. Hindsight biases post-accident assessments of human performance

Knowledge of the outcome makes it seem that events leading to the outcome should have appeared more salient to practitioners at the time than was actually the case. This means that ex post facto accident analysis of human performance is inaccurate. The outcome knowledge poisons the ability of after-accident observers to recreate the view of practitioners before the accident of those same factors. It seems that practitioners "should have known" that the factors would "inevitably" lead to an accident. Hindsight bias remains the primary obstacle to accident investigation, especially when expert human performance is involved.

9. Human operators have dual roles: as producers & as defenders against failure

The system practitioners operate the system in order to produce its desired product and also work to forestall accidents. This dynamic quality of system operation, the balancing of demands for production against the possibility of incipient failure is unavoidable. Outsiders rarely acknowledge the duality of this role. In non-accident filled times, the production role is emphasized. After accidents, the defense against failure role is emphasized. At either time, the outsider's view misapprehends the operator's constant, simultaneous engagement with both roles.

10. All practitioner actions are gambles

After accidents, the overt failure often appears to have been inevitable and the practitioner's actions as blunders or deliberate willful disregard of certain impending failure. But all practitioner actions are actually gambles, that is, acts that take place in the face of uncertain outcomes. The degree of uncertainty may change from moment to moment. That practitioner actions are gambles appears clear after accidents; in general, post hoc analysis regards these gambles as poor ones. But the converse: that successful outcomes are also the result of gambles; is not widely appreciated.

11. Actions at the sharp end resolve all ambiguity

Organizations are ambiguous, often intentionally, about the relationship between production targets, efficient use of resources, economy and costs of operations, and acceptable risks of low and high consequence accidents. All ambiguity is resolved by actions of practitioners at the sharp end of the system. After an accident, practitioner actions may be regarded as 'errors' or 'violations' but these evaluations are heavily biased by hindsight and ignore the other driving forces, especially production pressure.

12. Human practitioners are the adaptable element of complex systems

Practitioners and first line management actively adapt the system to maximize production and minimize accidents. These adaptations often occur on a moment by moment basis. Some of these adaptations include: (1) Restructuring the system in order to reduce exposure of vulnerable parts to failure. (2) Concentrating critical resources in areas of expected high demand. (3) Providing pathways for retreat or recovery from expected and unexpected faults. (4) Establishing means for early detection of changed system performance in order to allow graceful cutbacks in production or other means of increasing resiliency.

13. Human expertise in complex systems is constantly changing

Complex systems require substantial human expertise in their operation and management. This expertise changes in character as technology changes but it also changes because of the need to replace experts who leave. In every case, training and refinement of skill and expertise is one part of the function of the system itself. At any moment, therefore, a given complex system will contain practitioners and trainees with varying degrees of expertise. Critical issues related to expertise arise from (1) the need to use scarce expertise as a resource for the most difficult or demanding production needs and (2) the need to develop expertise for future use.

14. Change introduces new forms of failure

The low rate of overt accidents in reliable systems may encourage changes, especially the use of new technology, to decrease the number of low consequence but high frequency failures. These changes maybe actually create opportunities for new, low frequency but high consequence failures. When new technologies are used to eliminate well understood system failures or to gain high precision performance they often introduce new pathways to large scale, catastrophic failures. Not uncommonly, these new, rare catastrophes have even greater impact than those eliminated by the new technology. These new forms of failure are difficult to see before the fact; attention is paid mostly to the putative beneficial characteristics of the changes. Because these new, high consequence accidents occur at a low rate, multiple system changes may occur before an accident, making it hard to see the contribution of technology to the failure.

15. Views of 'cause' limit the effectiveness of defenses against future events

Post-accident remedies for "human error" are usually predicated on obstructing activities that can "cause" accidents. These end-of-the-chain measures do little to reduce the likelihood of further accidents. In fact that likelihood of an identical accident is already extraordinarily low because the pattern of latent failures changes constantly. Instead of increasing safety, post-accident remedies usually increase the coupling and complexity of the system. This increases the potential number of latent failures and also makes the detection and blocking of accident trajectories more difficult.

16. Safety is a characteristic of systems and not of their components

Safety is an emergent property of systems; it does not reside in a person, device or department of an organization or system. Safety cannot be purchased or manufactured; it is not a feature that is separate from the other components of the system. This means that safety cannot be manipulated like a feedstock or raw material. The state of safety in any system is always dynamic; continuous systemic change insures that hazard and its management are constantly changing.

17. People continuously create safety

Failure free operations are the result of activities of people who work to keep the system within the boundaries of tolerable performance. These activities are, for the most part, part of normal operations and superficially straightforward. But because system operations are never trouble free, human practitioner adaptations to changing conditions actually create safety from moment to moment. These adaptations often amount to just the selection of a well-rehearsed routine from a store of available responses; sometimes, however, the adaptations are novel combinations or de novo creations of new approaches.

18. Failure free operations require experience with failure

Recognizing hazard and successfully manipulating system operations to remain inside the tolerable performance boundaries requires intimate contact with failure. More robust system performance is likely to arise in systems where operators can discern the "edge of the envelope". This is where system performance begins to deteriorate, becomes difficult to predict, or cannot be readily recovered. In intrinsically hazardous systems, operators are expected to encounter and appreciate hazards in ways that lead to overall performance that is desirable. Improved safety depends on providing operators with calibrated views of

the hazards. It also depends on providing calibration about how their actions move system performance towards or away from the edge of the envelope.

Here is a video of Richard talking about how complex systems don't fail.

80. Ruth Chang: How to Make Hard Choices

Ruth Chang is a philosopher at Rutgers University with an interesting background. After graduating with a J.D. from Harvard Law School and dipping her toe into the legal world, she went off to Oxford University to study philosophy. Her work focuses on how we make the decisions that shape our lives.

In her recent [TED talk](#) (video below), she talks about how we make hard choices and in the process offers a framework for making decisions consistent with who we truly are.

“Far from being sources of agony and dread, hard choices are precious opportunities for us to celebrate what is special about the human condition, that the reasons that govern our choices as correct or incorrect sometimes run out, and it is here, in the space of hard choices, that we have the power to create reasons for ourselves to become the distinctive people that we are. And that’s why hard choices are not a curse but a godsend.”

— Ruth Chang

How to Make Hard Choices

What makes a hard choice hard is the way alternatives relate.

In any easy choice, one alternative is better than the other. In a hard choice, one alternative is better in some ways, the other alternative is better in other ways, and neither is better than the other overall. You agonize over whether to stay in your current job in the city or uproot your life for more challenging work in the country because staying is better in some ways, moving is better in others, and neither is better than the other overall. We shouldn’t think that all hard choices are big. Let’s say you’re deciding what to have for breakfast. You could have high fiber bran cereal or a chocolate donut. Suppose what matters in the choice is tastiness and healthfulness. The cereal is better for you, the donut tastes way better, but neither is better than the other overall, a hard choice. Realizing that small choices can also be hard may make big hard choices seem less intractable. After all, we manage to figure out what to have for breakfast, so maybe we can figure out whether to stay in the city or uproot for the new job in the country.

In hard choices we tend to prefer the safest option.

... I can tell you that fear of the unknown, while a common motivational default in dealing with hard choices, rests on a misconception of them. It’s a mistake to think that in hard choices, one alternative really is better than the other, but we’re too stupid to know which, and since we don’t know which, we might as well take the least risky option. Even taking two alternatives side by side with full information, a choice can still be hard. Hard choices are hard not because of us or our ignorance; they’re hard because there is no best option. Now, if there’s no best option, if the scales don’t tip in favor of one alternative over another, then surely the alternatives must be equally good, so maybe the right thing to say in hard choices is that they’re between equally good options. That can’t be right. If alternatives are equally good, you should just flip a coin between them, and it seems a mistake to think, here’s how you should decide between careers, places to live, people to marry: Flip a coin. There’s another reason for thinking that hard choices aren’t choices between equally good options.

Our search for physics like exactitude and our desire to quantify everything into scientific thinking combine to lead us astray.

We unwittingly assume that values like justice, beauty, kindness, are akin to scientific quantities, like length, mass and weight. Take any comparative question not involving value, such as which of two suitcases is heavier? There are only three possibilities. The weight of one is greater, lesser or equal to the weight of the other. Properties like weight can be represented by real numbers — one, two, three and so on — and there are only three possible comparisons between any two real numbers. One number is greater, lesser, or equal to the other. Not so with values. As post-Enlightenment creatures, we tend to

assume that scientific thinking holds the key to everything of importance in our world, but the world of value is different from the world of science. The stuff of the one world can be quantified by real numbers. The stuff of the other world can't.

Another way to see things is that they are in the same ball-park. This is what happens in hard choices, the alternatives are "on a par."

When alternatives are on a par, it may matter very much which you choose, but one alternative isn't better than the other. Rather, the alternatives are in the same neighborhood of value, in the same league of value, while at the same time being very different in kind of value. That's why the choice is hard.

We create reasons.

Understanding hard choices in this way uncovers something about ourselves we didn't know. Each of us has the power to create reasons. Imagine a world in which every choice you face is an easy choice, that is, there's always a best alternative. If there's a best alternative, then that's the one you should choose, because part of being rational is doing the better thing rather than the worse thing, choosing what you have most reason to choose. ... A world full of only easy choices would enslave us to reasons. ... (However) when alternatives are on a par, the reasons given to us, the ones that determine whether we're making a mistake, are silent as to what to do. It's here, in the space of hard choices, that we get to exercise our normative power, the power to create reasons for yourself ... When we choose between options that are on a par, we can do something really rather remarkable. We can put our very selves behind an option. ... This response in hard choices is a rational response, but it's not dictated by reasons given to us. Rather, it's supported by reasons created by us. When we create reasons for ourselves to become this kind of person rather than that, we wholeheartedly become the people that we are. You might say that we become the authors of our own lives.

When you face hard choices you need to look inside yourself.

... Instead of looking for reasons out there, we should be looking for reasons in here: Who am I to be? You might decide to be a pink sock-wearing, cereal-loving, country-living banker, and I might decide to be a black sock-wearing, urban, donut-loving artist. What we do in hard choices is very much up to each of us.

If you don't exercise your normative powers you become a drifter.

Drifters allow the world to write the story of their lives. They let mechanisms of reward and punishment — pats on the head, fear, the easiness of an option — to determine what they do. So the lesson of hard choices reflect on what you can put your agency behind, on what you can be for, and through hard choices, become that person.

Hard choices are part of what makes us human.

Far from being sources of agony and dread, hard choices are precious opportunities for us to celebrate what is special about the human condition, that the reasons that govern our choices as correct or incorrect sometimes run out, and it is here, in the space of hard choices, that we have the power to create reasons for ourselves to become the distinctive people that we are. And that's why hard choices are not a curse but a godsend.

81. Kyle Bass: How Freediving Enables Better Decision Making

Below find an excerpt taken from an interview between Raoul Pal and Kyle Bass (a hedge fund manager based out of Texas.)

What resonates with me here is the need to find a way out of a world where we are pulled in a thousand different directions and find an internal quiet. In turn these quiet and intimate moments with ourselves enable us to excel.

Pal was asking about how Bass keeps balance in his life.

Kyle Bass: I've searched for that my whole life. I found it about six years ago. My favorite thing in the world is to do freediving and spearfishing. I know you live on an island. I could do that if I wasn't running this firm, meaning as a lifestyle choice. I have a little Hemingway in me.

Raoul Pal: What is it about spearfishing and freediving that you like? I don't spearfish. Freediving, I've had lessons in, and it's a fascinating thing because it's very internal.

Kyle: It's internal. It's a beautiful thing. It's like when you think about the greatest battles in the world, they've always been civil wars, just like I think the greatest battles you and I fight are in our head. It's between ourselves. The biggest battles that most people fight are with themselves.

When I was in college, I helped pay for college through ... I had a diving and an academic scholarship. I was, primarily, a springboard diver. That was, I would say, 80 percent mental, 20 percent physical, even though it looks all physical. It's you versus yourself. It's you convincing yourself that you can do this, and do it as well or better than anyone else. Freediving, very similar. It's you knowing yourself. It's you teaching yourself how to regulate your heart rate. It's how to control your emotions. It's made me better at controlling my emotions in the office.

Raoul: It's kind of where I was going to get to this.

Kyle: The beautiful part of freediving for me and spearfishing is the day-to-day "grind" that we go through. My phone rings 24/7. I take that back. I turn my phone off at night, so there's only a select few that can get through at night.

But during the day, I'm pulled in a thousand different directions. Regardless of how much I try to control my path through the day, things pop up. You have people everywhere pulling you 50 different ways.

The moment I go underwater in the ocean, it's Zen-like for me. My phone can't ring. No one can bother me. I'm typically there with people that I want to be there with, my team. I always dive with a team. Then it's me versus myself. It literally is Zen-like, and I've gotten so much better at being calm that I go 8-10 hours a day.

Raoul: Wow. Because a lot of people do the similar thing with yoga, and actually, yoga and freediving have a lot in common.

Kyle: Do they?

Raoul: Yeah. Lots of the great freedivers now learn yoga to understand how to control their body and control their minds.

Kyle: I have a problem with yoga. My mind drifts. When I'm freediving, I'm focused. I'm focused on the potential threats, because I primarily do it all in the Bahamas, so we see sharks every day. I'm not that afraid of sharks. I respect them.

The difference, for me, between yoga and freediving is in yoga you're sitting there, and you're in a solitary moment, and you're trying to focus on things mentally. But — I don't know, I need the freediving aspect of it to be really centered. ... That's how I get centered.

Raoul: Yeah, you have a physical focus then, as well.

Kyle: Yeah. I'm always searching for the next great hogfish, or grouper, or lobster to eat that night. We eat what we shoot. It's a beautiful, beautiful cycle that I go through, and I can do it for weeks on end.

Raoul: When did you take up freediving, and how did it change you in terms of how you work?

Kyle: It didn't, initially. It was just something I'd always wanted to do. I found a young man on an island in the Bahamas. I asked around and said, "Who's the best spearfisherman on the island?" Everybody said, "It's Dave. It's Dave. It's Dave."

This 17-year-old kid who had been bitten by sharks on his hand. He had been cut up on his foot by a propeller, and he's just a great kid. Over the years, he's become my boat captain. He's now, I guess, 23 years old. We've been partners now for six years. Every moment, every chance I get for vacation, that's where I go.

Raoul: As I said, you've actually noticed that whole process of learning that spill into your work, and it makes you calmer in how think about things?

Kyle: Yeah. You have to stay focused. If you trade on emotion, you lose every time. Every time. If you can divorce yourself of that, especially those real extreme and extremist, those emotions you feel, you have to go the other way. You have to.

82. The Inside View and Making Better Decisions

When we don't think about the process we use to make decisions, they tend to get worse over time as we fail to learn from experience. Often, we make decisions based on the information that is easiest to access. Let's learn how to take the outside view and make better decisions.

In his book Think Twice: Harnessing the Power of Counterintuition, Michael Mauboussin discusses how we can “fall victim to simplified mental routines that prevent us from coping with the complex realities inherent in important judgment calls.” One of those routines is the inside view, which we're going to talk about in this article but first let's get a bit of context.

No one wakes up thinking, “I am going to make bad decisions today.” Yet we all make them. What is particularly surprising is some of the biggest mistakes are made by people who are, by objective standards, very intelligent. Smart people make big, dumb, and consequential mistakes.

[...]

Mental flexibility, introspection, and the ability to properly calibrate evidence are at the core of rational thinking and are largely absent on IQ tests. Smart people make poor decisions because they have the same factory settings on their mental software as the rest of us, and that software isn't designed to cope with many of today's problems.

We don't spend enough time thinking and learning from the process. Generally, we're pretty ambivalent about the process by which we make decisions.

... typical decision makers allocate only 25 percent of their time to thinking about the problem properly and learning from experience. Most spend their time gathering information, which feels like progress and appears diligent to superiors. But information without context is falsely empowering.

That reminds me of what Daniel Kahneman wrote in Thinking, Fast and Slow:

A remarkable aspect of your mental life is that you are rarely stumped ... The normal state of your mind is that you have intuitive feelings and opinions about almost everything that comes your way. You like or dislike people long before you know much about them; you trust or distrust strangers without knowing why; you feel that an enterprise is bound to succeed without analyzing it.

Context comes from broad understanding — looking at the problem from the outside in and not the inside out. When we make a decision, we're not really gathering and contextualizing information as much as trying to satisfy our existing intuition; The very thing a good decision process should help root out. Think about it this way, every time you make a decision, you're saying you understand something. Most of us stop there. But understanding is not enough; you need to test that your understanding is correct, which comes through feedback and reflection. Then you need to update your understanding. This is the learning loop.

So why are we so quick to assume we understand?

Ego Induced Blindness

We tend to favor the inside view over the outside view.

An inside view considers a problem by focusing on the specific task and by using information that is close at hand, and makes predictions based on that narrow and unique set of inputs. These inputs may include anecdotal evidence and fallacious perceptions.

This is the approach that most people use in building models of the future and is indeed common for all forms of planning.

[...]

The outside view asks if there are similar situations that can provide a statistical basis for making a decision. Rather than seeing a problem as unique, the outside view wants to know if others have faced comparable problems and, if so, what happened. The outside

view is an unnatural way to think, precisely because it forces people to set aside all the cherished information they have gathered.

When the inside view is more positive than the outside view, you're saying (knowingly or, more likely, unknowingly) that this time is different. Our brains are all too happy to help us construct this argument.

Mauboussin argues that we embrace the inside view for a few primary reasons. First, we're optimistic by nature. Second, is the "illusion of optimism" (we see our future as brighter than that of others). Finally, it is the illusion of control (we think that chance events are subject to our control).

One interesting point is that while we're bad at looking at the outside view when it comes to ourselves, we're better at it when it comes to other people.

In fact, the planning fallacy embodies a broader principle. When people are forced to look at similar situations and see the frequency of success, they tend to predict more accurately. If you want to know how something is going to turn out for you, look at how it turned out for others in the same situation. Daniel Gilbert, a psychologist at Harvard University, ponders why people don't rely more on the outside view, "Given the impressive power of this simple technique, we should expect people to go out of their way to use it. But they don't." The reason is most people think of themselves as different, and better, than those around them.

So it's mostly ego. I'm better than the people tackling this problem before me. We see the differences between situations and use those as rationalizations as to why things are different this time.

Consider this:

We incorrectly think that differences are more valuable than similarities.

After all, anyone can see what's the same but it takes true insight to see what's different, right? We're all so busy trying to find differences that we forget to pay attention to what is the same.

Incorporating the Outside View

In Think Twice, Mauboussin distills the work of Kahneman and Tversky into four steps and adds some commentary.

1. Select a Reference Class

Find a group of situations, or a reference class, that is broad enough to be statistically significant but narrow enough to be useful in analyzing the decision that you face. The task is generally as much art as science, and is certainly trickier for problems that few people have dealt with before. But for decisions that are common—even if they are not common for you—identifying a reference class is straightforward. Mind the details. Take the example of mergers and acquisitions. We know that the shareholders of acquiring companies lose money in most mergers and acquisitions. But a closer look at the data reveals that the market responds more favorably to cash deals and those done at small premiums than to deals financed with stock at large premiums. So companies can improve their chances of making money from an acquisition by knowing what deals tend to succeed.

2. Assess the distribution of outcomes.

Once you have a reference class, take a close look at the rate of success and failure. ... Study the distribution and note the average outcome, the most common outcome, and extreme successes or failures.

[...]

Two other issues are worth mentioning. The statistical rate of success and failure must be reasonably stable over time for a reference class to be valid. If the properties of the system change, drawing inference from past data can be misleading. This is an important issue in personal finance, where advisers make asset allocation recommendations for their clients

based on historical statistics. Because the statistical properties of markets shift over time, an investor can end up with the wrong mix of assets.

Also keep an eye out for systems where small perturbations can lead to large-scale change. Since cause and effect are difficult to pin down in these systems, drawing on past experiences is more difficult. Businesses driven by hit products, like movies or books, are good examples. Producers and publishers have a notoriously difficult time anticipating results, because success and failure is based largely on social influence, an inherently unpredictable phenomenon.

3. Make a prediction.

With the data from your reference class in hand, including an awareness of the distribution of outcomes, you are in a position to make a forecast. The idea is to estimate your chances of success and failure. For all the reasons that I've discussed, the chances are good that your prediction will be too optimistic.

Sometimes when you find the right reference class, you see the success rate is not very high. So to improve your chance of success, you have to do something different than everyone else.

4. Assess the reliability of your prediction and fine-tune.

How good we are at making decisions depends a great deal on what we are trying to predict. Weather forecasters, for instance, do a pretty good job of predicting what the temperature will be tomorrow. Book publishers, on the other hand, are poor at picking winners, with the exception of those books from a handful of best-selling authors. The worse the record of successful prediction is, the more you should adjust your prediction toward the mean (or other relevant statistical measure). When cause and effect is clear, you can have more confidence in your forecast.

The main lesson we can take from this is that we tend to focus on what's different whereas the best decisions often focus on just the opposite: what's the same. While this situation seems a little different, it's almost always the same.

As Charlie Munger has said: "if you notice, the plots are very similar. The same plot comes back time after time."

Particulars may vary but, unless those particulars are the variables that govern the outcome of the situation, the pattern remains. If we're going to focus on what's different rather than what's the same, you'd best be sure the variables you're clinging to matter.

Article Summary

- *"You can reduce the number of mistakes you make by thinking about problems more clearly."*
- Most decision-makers don't spend enough time on the process of making decisions or learning from their mistakes.
- Feedback and reflection are necessary components to learn from experience.
- When you think this time is different, you're saying you will succeed where others have failed.
- To better incorporate a broader view, you can select a reference class, assess the distribution of outcomes, make a prediction, and calibrate your accuracy.
- We tend to focus on what's different, whereas many of the best decisions focus on what's the same.

83. The Mind's Search Algorithm: Sorting Mental Models

Mental models are tools for the mind.

In his talk: Academic Economics: Strengths and Weaknesses, after Considering Interdisciplinary Needs, at the University of California at Santa Barbara, in 2003, Charlie Munger honed in on why we like to specialize.

The big general objection to economics was the one early described by Alfred North Whitehead when he spoke of the fatal unconnectedness of academic disciplines, wherein each professor didn't even know of the models of the other disciplines, much less try to synthesize those disciplines with his own ... The nature of this failure is that it creates what I always call 'man with a hammer' syndrome. To a man with only a hammer, every problem looks pretty much like a nail. And that works marvellously to gum up all professions, and all departments of academia, and indeed most practical life. So, what do we do, Charlie? The only antidote for being an absolute klutz due to the presence of a man with a hammer syndrome is to have a full kit of tools. You don't have just a hammer. You've got all the tools.

The more models you have from outside your discipline and the more you iterate through them when faced with a challenge in a checklist sort of fashion, the better you'll be able to solve problems.

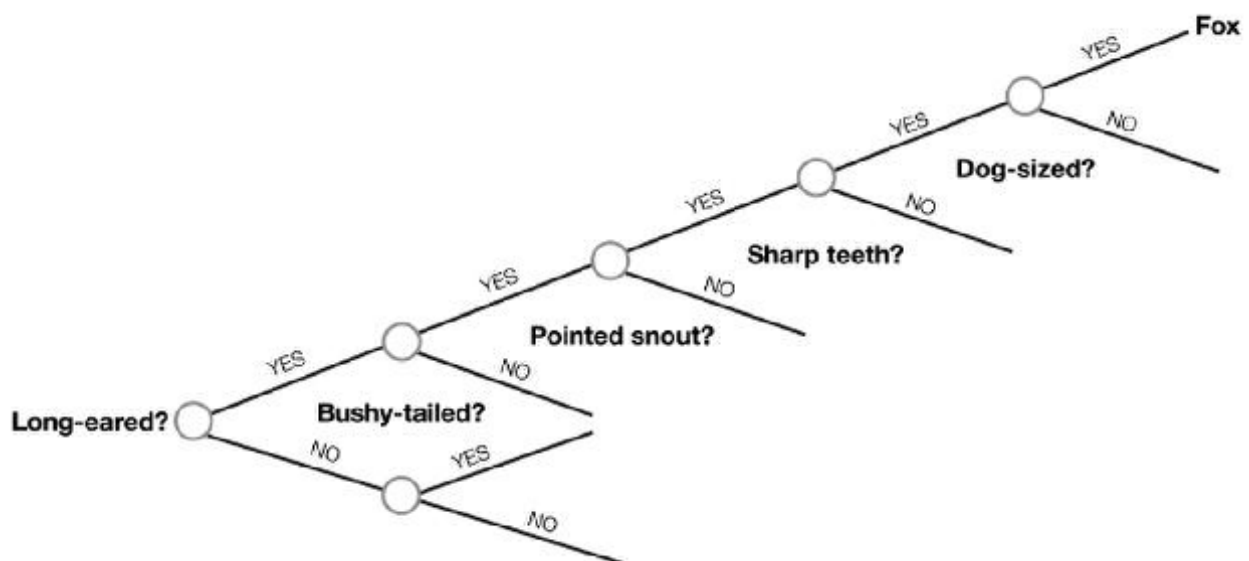
Models are additive. Like LEGO. The more you have the more things you can build, the more connections you can make between them and the more likely you are to be able to determine the relevant variables that govern the situation.

And when you learn these models you need to ask yourself under what conditions will this tool fail? That way you're not only looking for situations where the tool is useful but also situations where something interesting is happening that might warrant further attention.

The Mind's Search Engine

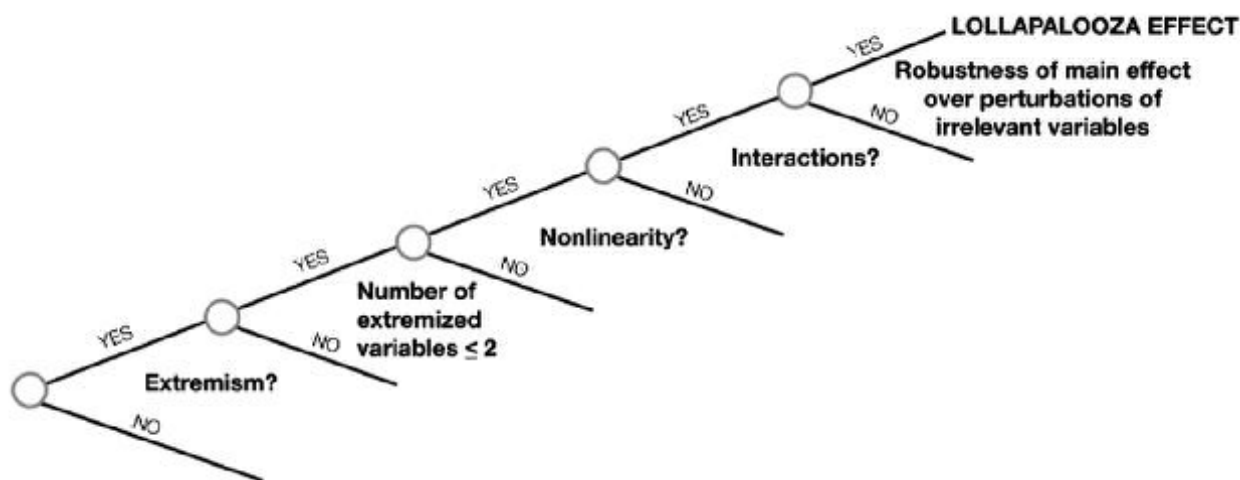
In Diaminds: Decoding the Mental Habits of Successful Thinkers, Roger Martin looks at our mental search engine.

Now for the final step in the design of the mentally choiceful stance: the search engine, as in 'How did I solve these problems?' 'Obviously,' you will answer yourself, 'I was using a simple search engine in my mind to go through checklist style, and I was using some rough algorithms that work pretty well in many complex systems.' What does a search engine do? It searches. And how do you organize an efficient search? Well, algorithm designers tell us you have to have an efficient organization of the contents of whatever it is you are searching. And a tree structure allows you to search more efficiently than most alternative structures.



How a tree structure helps simplify search: A detection algorithm for 'Fox.'
 So what's Munger's search algorithm?
 (from an interview with Munger via Diamonds: Decoding the Mental Habits of Successful Thinkers.)

Extreme success is likely to be caused by some combination of the following factors: a) Extreme maximization or minimization of one or two variables. Example[:] Costco, or, [Berkshire Hathaway's] furniture and appliance store. b) Adding success factors so that a bigger combination drives success, often in nonlinear fashion, as one is reminded of the concept of breakpoint or the concept of critical mass in physics. You get more mass, and you get a lollapalooza result. And of course I've been searching for lollapalooza results all my life, so I'm very interested in models that explain their occurrence. [Remember the Black Swan?] c) an extreme of good performance over many factors. Examples: Toyota or Les Schwab. d) Catching and riding some big wave.



Charlie Munger's lollapalooza detection algorithm represented as a tree search.
 (via Diamonds: Decoding the Mental Habits of Successful Thinkers)

A good search algorithm allows you to make your mental choices clear. It makes it easier for you to be mentally choiceful and to understand the reasons why you're making these mental choices.

Now, what should go on the branches of your tree of mental models? Well, how about basic mental models from a whole bunch of different disciplines? Such as: physics (non-linearity, criticality), economics (what Munger calls the 'super-power' of incentives), the multiplicative effects of several interacting causes (biophysics), and collective phenomena – or 'catching the wave' (plasma physics). How's that for a science that rocks, by placing at the disposal of the mind a large library of forms created by thinkers across hundreds of years and marshalling them for the purpose of detecting, building, and profiting from Black Swans?

The 'tree trick' has one more advantage – a big one: it lets you quickly visualize interactions among the various models and identify cumulative effects. Go northwest in your search, starting from the '0' node, and the interactions double with every step. Go southwest, on the other hand, and the interactions decrease in number at the same rate. Seen in this rather sketchy way, Black Swan hunting is no longer as daunting a sport as it might seem at first sight.

84. 13 Practical Ideas That Have Helped Me Make Better Decisions

This article is a collaboration between Mark Steed and myself. He did most of the work. Mark was a participant at the last Re:Think Decision Making event as well as a member of the Good Judgment Project. I asked him to put together something on making better predictions. This is the result.

We all face decisions. Sometimes we think hard about a specific decision, other times, we make decisions without thinking. If you've studied the genre you've probably read Taleb, Tversky, Kahneman, Gladwell, Ariely, Munger, Tetlock, Mauboussin and/or Thaler. These pioneers write a lot about "rationality" and "biases".

Rationality dictates the selection of the best choice among however many options. Biases of a cognitive or emotional nature creep in and are capable of preventing the identification of the "rational" choice. These biases can exist in our DNA or can be formed through life experiences. The mentioned authors consider biases extensively, and, lucky for us, their writings are eye-opening and entertaining.

Rather than rehash what brighter minds have discussed, I'll focus on practical ideas that have helped me make better decisions. I think of this as a list of "lessons learned (so far)" from my work in asset management and as a forecaster for the Good Judgment Project. I've held back on submitting this given the breadth and depth of the FS readers, but, rather than expect perfection, I wanted to put something on the table because I suspect many of you have useful ideas that will help move the conversation forward.

1. This is a messy business. Studying decision science can easily motivate self-loathing. There are over one-hundred cognitive biases that might prevent us from making calculated and "rational" decisions. What, you can't create a decision tree with 124 decision nodes, complete with assorted probabilities in split seconds? I asked around, and it turns out, not many people can. Since there is no way to eliminate all the potential cognitive biases and I don't possess the mental faculties of Dr. Spock or C-3PO, I might as well live with the fact that some decisions will be more elegant than others.

2. We live and work in dynamic environments. Dynamic environments adapt. The opposite of dynamic environments are static environments. Financial markets, geopolitical events, team sports, etc. are examples of dynamic "environments" because relationships between agents evolve and problems are often unpredictable. Changes from one period are conditional on what happened the previous period. Casinos are more representative of static environments. Not casinos necessarily, but the games inside. If you play Roulette, your odds of winning are always the same and it doesn't matter what happened the previous turn.

3. Good explanatory models are not necessarily good predictive models. Dynamic environments have a habit of desecrating rigid models. While blindly following an elegant model may be ill-advised, strong explanatory models are excellent guideposts when paired with sound judgment and intuition. Just as I'm not comfortable with the automatic pilot flying a plane without a human in the cockpit, I'm also not comfortable with a human flying a plane without the help of technology. It has been said before, people make models better and models make people better.

4. Instinct is not always irrational. The rule of thumb, otherwise known as heuristics, provide better results than more complicated analytical techniques. Gerd Gigerenzer, is the thought leader and his book Risk Savvy: How to Make Good Decisions is worth reading. Most literature despises heuristics, but he asserts intuition proves superior because optimization is sometimes mathematically impossible or exposed to sampling error. He often uses the example of Harry Markowitz, who won a Nobel Prize in Economics in 1990 for his work on Modern Portfolio Theory. Markowitz discovered a method for determining the "optimal" mix of assets. However, Markowitz himself did not

follow his Nobel prize-winning mean-variance theory but instead used a $1/N$ heuristic by spreading his dollars equally across N number of investments. He concluded that his $1/N$ strategy would perform better than a mean-optimization application unless the mean-optimization model had 500 years to compete. Our intuition is more likely to be accurate if it is preceded by rigorous analysis and introspection. And simple rules are more effective at communicating winning strategies in complex environments. When coaching a child's soccer team, it is far easier teaching a few basic principles, than articulating the nuances of every possible situation.

5. Decisions are not evaluated in ways that help us reduce mistakes in the future. Our tendency is to only critique decisions where the desired outcome was not achieved while uncritically accepting positive outcomes even if luck, or another factor, produced the desired result. At the end of the day I understand all we care about are results, but good processes are more indicative of future success than good results.

6. Success is ill-defined. In some cases this is relatively straightforward. If the outcome is binary, either it did, or did not happen, success is easy to identify. But this is more difficult in situations where the outcome can take a range of potential values, or when individuals differ on what the values should be.

7. We should care a lot more about calibration. Confidence, not just a decision, should be recorded (and to be clear, decisions should be recorded). Next time you have a major decision, ask yourself how confident you are that the desired outcome will be achieved. Are you 50% confident? 90%? Write it down. This helps with calibration. For all decisions in which you are 50% confident, half should be successes. And you should be right nine out of ten times for all decisions in which you are 90% confident. If you are 100% confident, you should never be wrong. If you don't know anything about a specific subject then you should be no more confident than a coin flip. It's amazing how we will assign high confidence to an event we know nothing about. Turns out this idea is pretty helpful. Let's say someone brings an idea to you and you know nothing about it. Your default should be 50/50; you might as well flip a coin. Then you just need to worry about the costs/payouts.

8. Probabilities are one thing, payouts are another. You might feel 50/50 about your chances but you need to know your payouts if you are right. This is where the expected value comes in handy. It's the probability of being right multiplied by the payout if you are right, plus the probability of being wrong multiplied by the cost. $E = .50(x) + .50(y)$. Say someone on your team has an idea for a project and you decided there is a 50% chance that it succeeds and, if it does, you double your money, if it doesn't, you lose what you invested. If the project required \$10mm, then the expected outcome is calculated as $.50*20 + .50*0 = 10$, or \$10mm. If you repeat this process a number of times, approving only projects with a 2:1 payout and 50% probability of success you would likely end up with the same amount you started with. Binary outcomes that have a 50/50 probability should have a double-or-nothing payout. This is even more helpful given #7 above. If you were tracking this employee's calibration you would have a sense as to whether their forecasts are accurate. As a team member or manager, you would want to know if a specific employee is 90% confident all the time but only 50% accurate. More importantly, you would want to know if a certain team member is usually right when they express 90% or 100% confidence. Use a Brier Score to track colleagues but provide an environment to encourage discussion and openness.

9. We really are overconfident. Starting from the assumption that we are probably only 50% accurate is not a bad idea. Phil Tetlock, a professor at UPenn, Team Leader for the Good Judgment Project and author of Expert Political Judgment: How Good Is It? How Can We Know?, suggested political pundits are about 53% accurate regarding political forecasts while CXO Advisory tracks investment gurus and finds they are, in aggregate, about 48% accurate. These are experts making predictions about their core area of expertise. Consider the rate of divorce in the U.S., currently around 40%-50%, as

additional evidence that sometimes we don't know as much as we think. Experts are helpful in explaining a specific discipline but they are less helpful in dynamic environments. If you need something fixed, like a car, a clock or an appliance then experts can be very helpful. Same for tax and accounting advice. It's not because this stuff is simple, it's because the environment is static.

10. Improving estimations of probabilities and payouts is about polishing our 1) subject matter expertise and 2) cognitive processing abilities. Learning more about a given subject reduces uncertainty and allows us to move from the lazy 50/50 forecast. Say you travel to Arizona and get stung by a scorpion. Rather than assume a 50% probability of death you can do a quick internet search and learn no one has died from a scorpion bite in Arizona since the 1960s. Overly simplistic, but, you get the picture. Second, data needs to be interpreted in a cogent way. Let's say you work in asset management and one of your portfolio managers has made three investments that returned -5%, -12% and 22%. What can you say about the manager (other than two of the three investments lost money)? Does the information allow you to claim the portfolio manager is a bad manager? Does the information allow you to claim you can confidently predict his/her average rate of return? Unless you've had some statistics, it might not be entirely clear what clinical conclusions you can draw. What if you flipped a coin three times and came up with tails on two of them? That wouldn't seem so strange. Two-thirds is the same as 66%. If you tossed the coin one-hundred times and got 66 tails, that would be a little more interesting. The more observations, the higher our confidence should be. A 95% confidence interval for the portfolio manager's average return would be a range between -43% and 45%. Is that enough to take action?

11. Bayesian analysis is more useful than we think. Bayesian updating helps direct given false/true positives and false/true negatives. It's the probability of a hypothesis given some observed data. For example, what's the likelihood of X (this new hire will place in the top 10% of the firm) given Y (they graduated from an Ivy League school)? A certain percentage of employees are top-performing employees, some Ivy League grads will be top-performers (others not) and some non-Ivy League grads will be top-performers (others not). If I'm staring at a random employee trying to guess whether they are a top-performing employee all I have are the starting odds, and, if only the top 10% qualify, I know my chances are 1 in 10. But I can update my odds if supplied information regarding their education. Here's another example. What is the likelihood a project will be successful (X) given it missed one of the first two milestones (Y)? There are lots of helpful resources online if you want to learn more but think of it this way (hat tip to Kalid Azad at Better Explained); original odds x the evidence adjustment = your new odds. The actual equation is more complicated but that is the intuition behind it. Bayesian analysis has its naysayers. In the examples provided, the prior odds of success are known, or could easily be obtained, but this isn't always true. Most of the time subjective prior probabilities are required and this type of tomfoolery is generally discouraged. There are ways around that, but no time to explain it here.

12. A word about crowds. Is there a wisdom of crowds? Some say yes, others say no. My view is that crowds can be very useful if individual members of the crowd are able to vote independently or if the environment is such that there are few repercussions for voicing disagreement. Otherwise, I think signaling effects from seeing how others are "voting" is too much evolutionary force to overcome with sheer rational willpower. Our earliest ancestors ran when the rest of the tribe ran. Not doing so might have resulted in an untimely demise.

13. Analyze your own motives. Jonathan Haidt, author of The Righteous Mind: Why Good People Are Divided by Politics and Religion, is credited with teaching that logic isn't used to find truth, it's used to win arguments. Logic may not be the only source of truth (and I

have no basis for that claim). Keep this in mind as it has to do with the role of intuition in decision making.

Just a few closing thoughts.

We are pretty hard on ourselves. My process is to make the best decisions I can, realizing not all of them will be optimal. I have a method to track my decisions and to score how accurate I am. Sometimes I use heuristics, but I try to keep those to within my area of competency, as Munger says. I don't do lists of pros and cons because I feel like I'm just trying to convince myself, either way.

If I have to make a big decision, in an unfamiliar area, I try to learn as much as I can about the issue on my own and from experts, assess how much randomness could be present, formulate my thesis, look for contradictory information, try and build downside protection (risking as little as possible) and watch for signals that may indicate a likely outcome.

Many of my decisions have not worked out, but most of them have. As the world changes, so will my process, and I look forward to that.

85. The Wisdom of Crowds and The Expert Squeeze

As networks harness the wisdom of crowds, the ability of experts to add value in their predictions is steadily declining. This is the expert squeeze.

In Think Twice: Harnessing the Power of Counterintuition, Michael Mauboussin, the first guest on my podcast, The Knowledge Project, explains the expert squeeze and its implications for how we make decisions.

As networks harness the wisdom of crowds and computing power grows, the ability of experts to add value in their predictions is steadily declining. I call this the expert squeeze, and evidence for it is mounting. Despite this trend, we still pine for experts— individuals with special skill or know-how— believing that many forms of knowledge are technical and specialized. We openly defer to people in white lab coats or pinstripe suits, believing they hold the answers, and we harbor misgivings about computergenerated outcomes or the collective opinion of a bunch of tyros.

The expert squeeze means that people stuck in old habits of thinking are failing to use new means to gain insight into the problems they face. Knowing when to look beyond experts requires a totally fresh point of view, and one that does not come naturally. To be sure, the future for experts is not all bleak. Experts retain an advantage in some crucial areas. The challenge is to know when and how to use them.

Domain description	Rule based; limited range of outcomes	Rule based; wide range of outcomes	Probabilistic; limited range of outcomes	Probabilistic; wide range of outcomes
Expert performance	Worse than computers	Generally better than computers	Equal to or worse than collectives	Worse than collectives
Expert agreement	High	Moderate	Moderate/Low	Low
Examples	• Credit scoring • Simple medical diagnosis	• Chess • Go	• Admissions officers • Poker	• Stock market • Economy

The Value of Experts

So how can we manage this in our role as the decision-maker? The first step is to classify the problem.

(The figure above — The Value of Experts) helps to guide this process. The second column from the left covers problems that have rules-based solutions with limited possible outcomes. Here, someone can investigate the problem based on past patterns and write down rules to guide decisions. Experts do well with these tasks, but once the principles are clear and well defined, computers are cheaper and more reliable. Think of tasks such as credit scoring or simple forms of medical diagnosis. Experts agree about how to approach these problems because the solutions are transparent and for the most part tried and true. [...]

Now let's go to the opposite extreme, the column on the far right that deals with probabilistic fields with a wide range of outcomes. Here are no simple rules. You can only express possible outcomes in probabilities, and the range of outcomes is wide. Examples

include economic and political forecasts. The evidence shows that collectives outperform experts in solving these problems.

[...]

The middle two columns are the remaining province for experts. Experts do well with rules-based problems with a wide range of outcomes because they are better than computers at eliminating bad choices and making creative connections between bits of information.

Once you've classified the problem, you can turn to the best method for solving it.

... computers and collectives remain underutilized guides for decision making across a host of realms including medicine, business, and sports. That said, experts remain vital in three capacities. First, experts must create the very systems that replace them. ... Of course, the experts must stay on top of these systems, improving the market or equation as need be.

Next, we need experts for strategy. I mean strategy broadly, including not only day-to-day tactics but also the ability to troubleshoot by recognizing interconnections as well as the creative process of innovation, which involves combining ideas in novel ways. Decisions about how best to challenge a competitor, which rules to enforce, or how to recombine existing building blocks to create novel products or experiences are jobs for experts.

Finally, we need people to deal with people. A lot of decision making involves psychology as much as it does statistics. A leader must understand others, make good decisions, and encourage others to buy in to the decision.

So what are the practical tips you can do to make the expert squeeze work for you instead of against you? Here Mauboussin offers 3 tips.

1. Match the problem you face with the most appropriate solution.

What we know is that experts do a poor job in many settings, suggesting that you should try to supplement expert views with other approaches.

2. Seek diversity.

(Philip) Tetlock's work shows that while expert predictions are poor overall, some are better than others. What distinguishes predictive ability is not who the experts are or what they believe, but rather how they think. Borrowing from Archilochus— through Isaiah Berlin — Tetlock sorted experts into hedgehogs and foxes. Hedgehogs know one big thing and try to explain everything through that lens. Foxes tend to know a little about a lot of things and are not married to a single explanation for complex problems. Tetlock finds that foxes are better predictors than hedgehogs. Foxes arrive at their decisions by stitching "together diverse sources of information," lending credence to the importance of diversity. Naturally, hedgehogs are periodically right— and often spectacularly so— but do not predict as well as foxes over time. For many important decisions, diversity is the key at both the individual and collective levels.

3. Use technology when possible. Leverage technology to side-step the squeeze when possible.

Flooded with candidates and aware of the futility of most interviews, Google decided to create algorithms to identify attractive potential employees. First, the company asked seasoned employees to fill out a three-hundred-question survey, capturing details about their tenure, their behavior, and their personality. The company then compared the survey results to measures of employee performance, seeking connections. Among other findings, Google executives recognized that academic accomplishments did not always correlate with on-the-job performance. This novel approach enabled Google to sidestep problems with ineffective interviews and to start addressing the discrepancy.

Learning the difference between when experts help or hurt can go a long way toward avoiding stupidity. This starts with identifying the type of problem you're facing and then considering the various approaches to solve the problem with pros and cons.

86. Simple Rules: How to Thrive in a Complex World



"Decision rules—boundary, prioritizing, and stopping—provide clear guidelines for making better decisions across many situations and in the most challenging circumstances."

"Simple rules work because they do three things well.

First, they allow for flexibility in the pursuit of new opportunities, avoiding the rigidity of too many rules and the chaos of none at all. They are particularly effective when the situation is in flux, flexibility trumps consistency, and the benefits of seizing opportunities exceed the cost of making mistakes. Second, simple rules can produce decisions that match or outperform more sophisticated decision models across a wide variety of possible scenarios, and do so quickly, with limited data requirements, and when cause and effect are imperfectly understood. Their simplicity, in addition, increases the odds that people will remember them, act on them, and stick with them over time. Finally, collective action, like the honeybees' choice of nest, can emerge from simple rules even when individuals' mental capacity is limited and no one member understands the situation in its entirety."

Simple Rules: How to Thrive in a Complex World

The 4 common traits that define simple rules ...

1. "Simple rules consist of a handful of guidelines applied to a specific activity or decision..."
2. "Simple rules are tailored to the situations of the particular people who will use them, versus one-size-fits-all rules that apply to everyone."
3. "Simple rules are most effective when they apply to critical activities or decisions that represent bottlenecks to accomplishing an important goal."
4. "simple rules give concrete guidance without being overly prescriptive."

"A hammer is just the thing for nails, but useless when it comes to sawing a plank. The same is true of simple rules: to be effective, they must fit the task at hand. Simple rules work best when flexibility matters more than consistency."

"Simple rules are shortcut strategies that save time and effort by focusing our attention and simplifying the way we process information. The rules aren't universal—they're tailored to the particular situation and the person using them."

We use simple rules to guide decision making every day.

In fact, without them, we'd be paralyzed by the sheer mental brainpower required to sift through the complicated messiness of our world. You can think of them as heuristics. Like heuristics, most of the time they work yet some of the time they don't.

Simple Rules: How to Thrive in a Complex World, a book by Donald Sull and Kathleen Eisenhardt, explores the understated power that comes from using simple rules. As they define them, simple rules refer to "a handful of guidelines tailored to the user and the task at hand, which balance concrete guidance with the freedom to exercise judgment." These rules "provide a powerful weapon against the complexity that threatens to overwhelm individuals, organizations, and society as a whole. Complexity arises whenever a system—technical, social, or natural—has multiple interdependent parts."

They work, the authors argue, because they do three things well.

First, they confer the flexibility to pursue new opportunities while maintaining some consistency. Second, they can produce better decisions. When information is limited and time is short, simple rules make it fast and easy for people, organizations, and governments to make sound choices. They can even outperform complicated decision-

making approaches in some situations. Finally, simple rules allow the members of a community to synchronize their activities with one another on the fly.

Effective simple rules share four common traits ...

First, they are limited to a handful. Capping the number of rules makes them easy to remember and maintains a focus on what matters most. Second, simple rules are tailored to the person or organization using them. College athletes and middle-aged dieters may both rely on simple rules to decide what to eat, but their rules will be very different. Third, simple rules apply to a well-defined activity or decision, such as prioritizing injured soldiers for medical care. Rules that cover multiple activities or choices end up as vague platitudes, such as “Do your best” and “Focus on customers.” Finally, simple rules provide clear guidance while conferring the latitude to exercise discretion.

Simple Rules for a Complex World

People often attempt to address complex problems with complex solutions. For example, governments tend to manage complexity by trying to anticipate every possible scenario that might arise, and then promulgate regulations to cover every case.

Consider how central bankers responded to increased complexity in the global banking system. In 1988 bankers from around the world met in Basel, Switzerland, to agree on international banking regulations, and published a 30-page agreement (known as Basel I). Sixteen years later, the Basel II accord was an order of magnitude larger, at 347 pages, and Basel III was twice as long as its predecessor. When it comes to the sheer volume of regulations generated, the U.S. Congress makes the central bankers look like amateurs. The Glass-Steagall Act, a law passed during the Great Depression, which guided U.S. banking regulation for seven decades, totaled 37 pages. Its successor, Dodd-Frank, is expected to weigh in at over 30,000 pages when all supporting legislation is complete. Meeting complexity with complexity can create more confusion than it resolves. The policies governing U.S. income taxes totaled 3.8 million words as of 2010. Imagine a book that is seven times as long as War and Peace, but without any characters, plot points, or insight into the human condition. That book is the U.S. tax code.

[...]

Applying complicated solutions to complex problems is an understandable approach, but flawed. The parts of a complex system can interact with one another in many different ways, which quickly overwhelms our ability to envision all possible outcomes.

[...]

Complicated solutions can overwhelm people, thereby increasing the odds that they will stop following the rules. A study of personal income tax compliance in forty-five countries found that the complexity of the tax code was the single best predictor of whether citizens would dodge or pay their taxes. The complexity of the regulations mattered more than the highest marginal tax rate, average levels of education or income, how fair the tax system was perceived to be, and the level of government scrutiny of tax returns.

Simple Rules Focus on the Critical Variables

Simple rules do not trump complicated ones all the time but they work more often than we think. Gerd Gigerenzer is a key contributor in this space. He thinks that simple rules can allow for better decision making.

Why can simpler models outperform more complex ones? When underlying cause-and-effect relationships are poorly understood, decision makers often look for patterns in historical data under the assumption that past events are a good indicator of future trends. The obvious problem with this approach is that the future may be genuinely different from the past. But a second problem is subtler. Historical data includes not only useful signal, but also noise—happenstance correlations between variables that do not reveal an enduring cause-and-effect relationship. Fitting a model too closely to historical data hardwires error into the model, which is known as overfitting. The result is a precise prediction of the past that may tell us little about what the future holds.

Simple rules focus on the critical variables that govern a situation and help you ignore the peripheral ones. Of course, in order to identify the key variables, you need to be operating in your circle of competence. When we pay too much attention to irrelevant or otherwise unimportant information, we fail to grasp the power of the most important ones and give them the weighting they deserve. Simple rules also make it more likely people will act on them. This is something Napoleon intuitively understood.

When instructing his troops, Napoleon realized that complicated instructions were difficult to understand, explain, and execute. So, rather than complicated strategies he passed along simple ones, such as: Attack.

Making Better Decisions

The book mentions three types of rules that “improve decision making by structuring choices and centering on what to do (and what not to do): boundary, prioritizing, and stopping rules.

Boundary Rules cover what to do ...

Boundary rules guide the choice of what to do (and not do) without requiring a lot of time, analysis, or information. Boundary rules work well for categorical choices, like a judge’s yes-or-no decision on a defendant’s bail, and decisions requiring many potential opportunities to be screened quickly. These rules also come in handy when time, convenience, and cost matter.

Prioritizing rules rank options to help decide which of multiple paths to pursue.

Prioritizing rules can help you rank a group of alternatives competing for scarce money, time, or attention. ... They are especially powerful when applied to a bottleneck, an activity or decision that keeps individuals or organizations from reaching their objectives.

Bottlenecks represent pinch-points in companies, where the number of opportunities swamps available resources, and prioritizing rules can ensure that these resources are deployed where they can have the greatest impact. In business settings, prioritizing rules can be used to assign engineers to new-product-development projects, focus sales representatives on the most promising customers, and allocate advertising expenditure across multiple products, to name only a few possibilities.

Stopping rules help you learn when to reverse a decision. Nobel Prize-winning economist Herbert Simon argued that we lack the information, time, and mental engine to determine the single best path when faced with a slew of options. Instead, we rely on a heuristic to help us stop searching when we find something that’s good enough. Simon called this satisficing. If you think that’s hard, it’s even hard to stop doing something we’re already doing. Yet when it comes to our key investments of time, money, and energy we have to know when to pull the plug.

Sometimes we pursue goals at all costs and ignore our self-imposed stopping rule.

This goal induced blindness can be deadly.

A cross-continental team of researchers matched 145 Chicagoans with demographically similar Parisians. Both the Chicagoans and Parisians used stopping rules to decide when to finish eating, but the rules themselves were very different. The Parisians employed rules like “Stop eating when I start feeling full,” linking their decision to internal cues about satiation. The Chicagoans, in contrast, were more likely to follow rules linked to external factors, such as “Stop eating when I run out of a beverage,” or “Stop eating when the TV show I’m watching is over.” Stopping rules that rely on internal cues— like when the food stops tasting good or you feel full— decrease the odds that people eat more than their body needs or even wants.

Stopping rules are particularly critical in situations when people tend to double down on a losing hand.

These three decision rules—boundary, prioritizing, and stopping—help provide guidelines on what to do—“what is acceptable to do, what is more, important to do, and what to stop doing.”

Doing Things Better

Process rules, in contrast to boundary rules, focus on how to do things better.

Process rules work because they steer a middle path between the chaos of too few rules that can result in confusion and mistakes, and the rigidity of so many rules that there is little ability to adapt to the unexpected or take advantage of new opportunities. Simply put, process rules are useful whenever flexibility trumps consistency.

The most widely used process rule is the how-to rule. How-to rules guide the basics of executing tasks, from playing golf to designing new products. The other process rules, coordination and timing, are special cases of how-to rules that apply in particular situations. Coordination rules center on getting something done when multiple actors—people, organizations, or nations—have to work together. These rules orchestrate the behaviors of, for example, schooling fish, Zipcar members, and content contributors at Wikipedia. In contrast, timing rules center on getting things done in situations where temporal factors such as rhythms, sequences, and deadlines are relevant. These rules set the timing of, for example, when to get up every day and when dragonflies migrate.

87. Billy Beane on Making Better Decisions, Challenging Entrenched Thinking, and Avoiding Biases

Billy Beane was put in the spotlight when Brad Pitt played him in the movie rendition of Moneyball: The Art of Winning an Unfair Game.

Sports fans, however, knew long before Moneyball that Beane was special. He's the guy credited with taking a low budget team and turning them around by challenging the fundamental notions of a sport that had been around 150 years.

In a fascinating interview given on stage at the RSA conference in April 2015, Beane offered advice on how to make good decisions by challenging organizational norms, effectively using data, and avoiding biases.

When asked about pushing through entrenched thinking, Beane replied:

I sort of represented that entrenched thinking in some respect, because I was the guy who came up in the business – a business that was 150 years old – as a former player. Quite frankly, I had a great mentor, a gentleman who didn't come up in the industry, in Sandy Alderson.

When I hired, I made sure I looked outside at somebody who didn't have the experience bias with my first, and maybe even one of the best hires I ever had was Paul DePodesta, who was a Harvard Econ major, didn't play sports, and really, was able to come in and look at things with an eye that wasn't biased.

We also took ideas from people outside the industry, guys like Bill James and Sean Cook and applied them.

On how biases creep into our thought process no matter how old we are or in what industry we operate, Beane commented on taking the emotion out of the decision-making process and making it more rational.

Your own experiences, particularly in sports, where that experience may also be tied to an emotion as well, you tend to say, in football or soccer, in soccer there's a goal, and not all goals are created in terms of how you emotionally react to them. Baseball's a little bit the same way. So you kind of have to take a blind eye and look at things from the start and not make assumptions.

For us, we ultimately wanted to take all the emotion out of our decision making, and that came, many times, with your own experience.

One way to do that is to let data help you make decisions.

But data is everywhere and cheap. How can we leverage data analytics and extract meaningful information? On this Beane advocates an approach that makes sure you have cognitive diversity in the room – in other words, people that wouldn't normally be there.

[T]he book was really based on public information, as I said. Bill James had been writing for years, but because they didn't come up in the industry, it really was never applied.

Again, sports is very emotional. Very much, you have to come pass the eye test. What we wanted to do was make sure our eyes weren't fooling us.

As far as today, the game and sports has changed dramatically. In fact, looking at the book now, it feels like you're watching an episode of "The Flintstones" a little bit when you see some of this stuff. The only thing that I haven't changed is making sure that I bring in guys that normally wouldn't be in this room. The advantage I have is I have access to intellectual capital that normally would be in this room, but want to work for a sports team. We have access to data, everything ... was being measured, thrown into this huge vat of data, and it's up to my staff to sift through what has relevance and which doesn't as it applies to predicting player performance.

One of the keys to looking at data is to bring different lenses to it to gain insight. You also need to put processes and systems in place with respective feedback loops to make sure you're not a sucker—that is, you can distinguish between luck and skill.

You're constantly evaluating. Sometimes, even when you have success, there's an assumption that that success was based on your process. Actually, you're always analyzing your process, making sure that the reason you weren't correct wasn't through serendipity, but the reason was because you have a good process and you're doing things properly.

It's challenging because the business of sports has become very, very intelligent. Baseball teams, football teams, basketball teams, they're all using this, and hiring, once again, guys that normally would probably be in this room.

The world is always changing as its a dynamic system. Your processes need to be adaptive. Static processes in a dynamic world lead to extinction.

[T]here's so many variables in sports, too. We try and quantify things that you don't think you can quantify, things that people... Once again, when you talk about challenging assumptions, things that people assume can't be quantified.

You try and quantify them so, at least, you're creating a process that, more than anything, when you are right or wrong, you can at least go back and look and see why you were right or wrong, similar to a mathematical equation.

Beane found a way to challenge assumptions and in so doing gain insight that he had the courage (and authority) to put into practice. How did he change the way things were done? *Well, sometimes you don't. Early on in our process, we lost employees because there certainly wasn't a belief. Now, understand, when we started out we had a great platform. We were challenged from revenue standpoint, so it was an opportunity in some sense, and we really had no other way to operate.*

Through the course of doing things this way, we certainly lost people, but in the same sense, another year later we would gain two more people who were interested in going down this road. For us, it was rational. It made sense, and we really had no other choice. But, as Keynes so aptly put it "Worldly wisdom teaches us that it is better for the reputation to fail conventionally than to succeed unconventionally." And that path was not a linear story to success. There were moments when he doubted himself and operating in a cut-throat industry probably didn't make things easier. All eyes were on him. Was there pressure to go back to the way things were always done?

Unfortunately, probably for some A's fans. They probably doubted me more than I (did). I think the one thing about the process, it was like a math equation. At least we knew why we were doing something. Our other option, to us, didn't make much sense. Certainly, you're hoping you're going in the right direction, and the assumption is that you are. We felt like that was the best road that we could travel.

I think, if anything, we certainly didn't fear failure, because we felt like going a traditional path was certainly the surest of failure, based on our revenues and the payroll that we were on. We had a lot of autonomy, too. Autonomy within, we were given a budget. The only limitations we had in terms of our intellectual curiosity was really making sure we stayed in the budget our ownership gave us. "Listen, hey, do what you want to do, but make sure you stay within the lines a little bit."

But again, the fear... We knew going down another subjective path, we were certain to fail. We weren't going to consistently put something together that was on a year by year basis. The fear of going that route, there was greater fear going that route than going an objective route.

As a leader, it was Beane's job to make sure the strategy they were using to find under-rated players was embedded throughout the organization.

At times it was challenging, because we hired some really... I was a former baseball player, and a lot of guys who had come up in the business, the guys we were bringing in were guys with PhDs in behavioral economics and Harvard masters in statistics, and things like that. Bridging that gap initially was challenging because most, certainly a baseball player like myself, my default position isn't to run a regression log.

We operate in a world with tremendous amounts of data and information, but we're not challenging the platform that we're starting with to the extent we should be.

Even with a very young and progressive group of thinkers that are around me, with a little bit of experience, you will always start at a platform that you assume to be true based on previous success. We always have to analyze our foundation because very quickly a culture and a tradition of doing things can get ingrained in a very short period of time. If you assume from a false platform that you're correct, you can go really awry. For us, it is constantly...Also, not being wrapped up in your own hubris with success and understanding that even with an objective based decision making, you are not going to be right 100 percent of the time.

88. How Situations Influence Decisions

Michael Mauboussin, the first guest on our podcast, [The Knowledge Project](#), explains how our situations influence our decisions enormously in [Think Twice: Harnessing the Power of Counterintuition](#).

Mistakes born out of situations are difficult to avoid, in part because the influences on us are operating at a subconscious level. “Making good decisions in the face of subconscious pressure,” Mauboussin writes, “requires a very high degree of background knowledge and self-awareness.”

How do you feel when you read the word “treasure”? Do you feel good? What images come to mind? If you are like most people, just ruminating on “treasure” gives you a little lift. Our minds naturally make connections and associate ideas. So if someone introduces a cue to you— a word, a smell, a symbol— your mind often starts down an associative path. And you can be sure the initial cue will color a decision that waits at the path’s end. All this happens outside of your perception.

People around us also influence our decisions, often with good reason. Social influence arises for a couple of reasons. The first is asymmetric information, a fancy phrase meaning someone knows something you don’t. In those cases, imitation makes sense because the information upgrade allows you to make better decisions.

Peer pressure, or the desire to be part of the in-group, is a second source of social influence. For good evolutionary reasons, humans like to be part of a group— a collection of interdependent individuals— and naturally spend a good deal of time assessing who is “in” and who is “out.” Experiments in social psychology have repeatedly confirmed this. We explain behavior based on an individual’s choices and disposition and not the situation. That is, we associate bad behavior with the person and not the situation. Unless, of course, we’re talking about ourselves. This is “the fundamental attribution error”, a phrase coined by Lee Ross, a social psychologist at Stanford University.

There are two sides to this sword as the power of situations can work for good and evil. “Some of the greatest atrocities known to mankind,” Mauboussin writes, “resulted from putting normal people into bad situations.”

We believe our choices are independent of circumstance, however, the evidence points in another direction.

Some Wine With Your Music?

Consider how something as simple as the music playing in a store influences what wine we purchase.

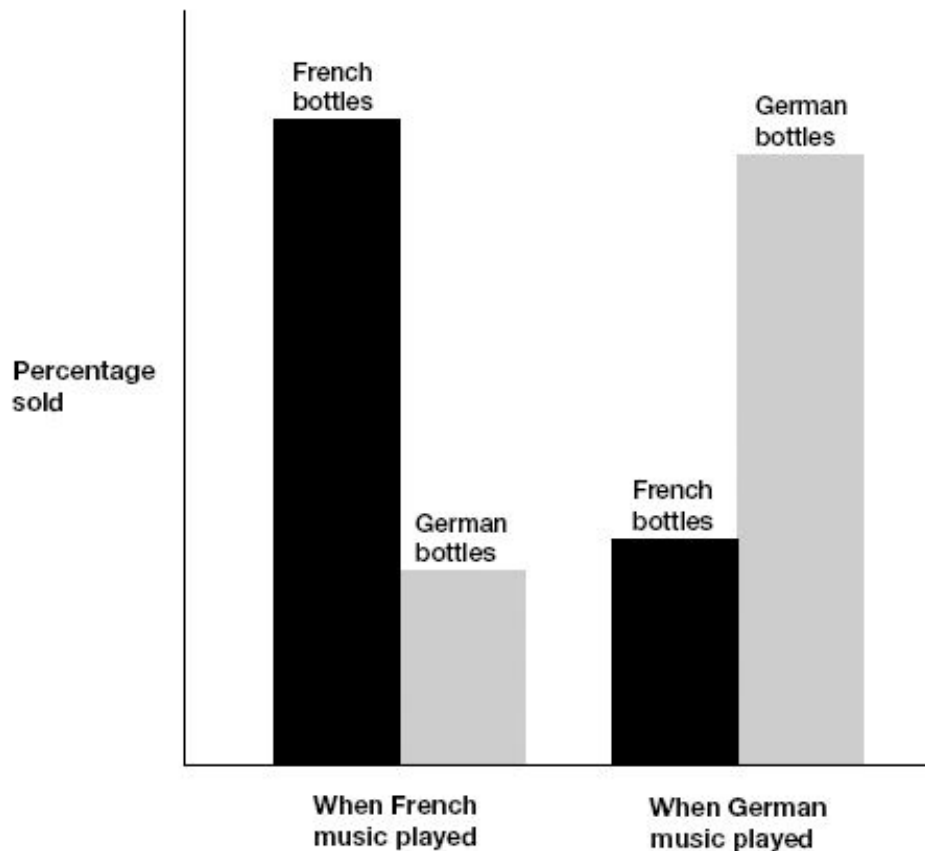
Imagine strolling down the supermarket aisle and coming upon a display of French and German wines, roughly matched for price and quality. You do some quick comparisons, place a German wine in your cart, and continue shopping. After you check out, a researcher approaches and asks why you bought the German wine. You mention the price, the wine’s dryness, and how you anticipate it will go nicely with a meal you are planning. The researcher then asks whether you noticed German music playing and whether it had any bearing on your decision. Like most, you would acknowledge hearing the music and avow that it had nothing to do with your selection.

But this isn’t a hypothetical, it’s an actual study and the results affirm that the environment influences our decisions.

In this test, the researchers placed the French and German wines next to each other, along with small national flags. Over two weeks, the scientists alternated playing French accordion music and German Bierkeller pieces and watched the results. When French music played, French wines represented 77 percent of the sales. When German music played, consumers selected German wines 73 percent of the time. (See the image below) The music made a huge difference in shaping purchases. But that’s not what the shoppers thought.

While the customers acknowledged that the music made them think of either France or Germany, 86 percent denied the tunes had any influence on their choice.

Music subconsciously shaped purchase decisions



Source: Based on data from Adrian C. North, David J. Hargreaves, and Jennifer McKendrick, "In-store Music Affects Product Choice," *Nature* 390 (November 13, 2007), 13.

This is an example of priming, which psychologists formally define as “the incidental activation of knowledge structures by the current situational context.”¹ and priming happens all the time. For priming to be most effective it must have a strong connection to our situation’s goals.

Another example of how situations influence us is the default. In a fast moving world of non-stop bits and bytes the default is the path of least resistance — that is, it’s the system one option. To move away from the default is labor-intensive on our brains. Studies have repeatedly shown that most people go with defaults.

This applies to a wide array of choices, from insignificant issues like the ringtone on a new cell phone to consequential issues like financial savings, educational choice, and medical alternatives. Richard Thaler, an economist, and Cass Sunstein, a law professor, call the relationship between choice presentation and the ultimate decision “choice architecture.” They convincingly argue that we can easily nudge people toward a particular decision based solely on how we arrange the choices for them.

One context for decision making is how choices are structured. Knowing that many people opt for the default option, we can influence (for better or worse) large groups of people. Mauboussin relates a story about a prominent psychologist popular on the speaking circuit that “underscores how underappreciated choice architecture remains.”

When companies call to invite him to speak, he offers them two choices. Either they can pay him his set fee and get a standard presentation, or they can pay him nothing in exchange for the opportunity to work with him on an experiment to improve choice

architecture (e.g., redesign a form or Web site). Of course, the psychologist benefits by getting more real-world results on choice architecture, but it seems like a pretty good deal for the company as well, because an improved architecture might translate into financial benefits vastly in excess of his speaking fee. He noted ruefully that so far not one company has taken him up on his experiment offer.

(As a brief aside, I engage in public speaking on a fairly regular basis. I've toyed with similar ideas. Once I even went as far as offering to speak for no pre-set fee, only "value added" as judged by the client. They opted for the fee.)

Another great example of how environments affect behavior is Stanley Milgram's famous experiment on obedience to authority. "Ordinary people, simply doing their jobs, and without any particular hostility on their part, can become agents in a terrible destructive process," wrote Stanley Milgram.

[quote]Situations are generally more powerful than we think[/quote]

The key point is that situations are generally more powerful than we think and we can do things to resist the pull of "unwelcome social influence."

Mauboussin offers four tips:

1. Be aware of your situation.

You can think of this in two parts. There is the conscious element, where you can create a positive environment for decision making in your own surroundings by focusing on process, keeping stress to an acceptable level, being a thoughtful choice architect, and making sure to diffuse the forces that encourage negative behaviors.

Then there is coping with the subconscious influences. Control over these influences requires awareness of the influence, motivation to deal with it, and the willingness to devote attention to address possible poor decisions. In the real world, satisfying all three control conditions is extremely difficult, but the path starts with awareness.

2. Consider the situation first and the individual second.

This concept, called attributional charity, insists that you evaluate the decisions of others by starting with the situation and then turning to the individuals, not the other way around. While easier for Easterners than Westerners, most of us consistently underestimate the role of the situation in assessing the decisions we see others make. Try not to make the fundamental attribution error.

3. Watch out for the institutional imperative.

Warren Buffett, the celebrated investor and chairman of Berkshire Hathaway, coined the term institutional imperative to explain the tendency of organizations to "mindlessly" imitate what peers are doing. There are typically two underlying drivers of the imperative. First, companies want to be part of the in-group, much as individuals do. So if some companies in an industry are doing mergers, chasing growth, or expanding geographically, others will be tempted to follow. Second are incentives. Executives often reap financial rewards by following the group. When decision makers make money from being part of the crowd, the draw is nearly inescapable.

One example comes from a Financial Times interview with the former chief executive officer of Citigroup Chuck Prince in 2007, before the brunt of the financial crisis. "When the music stops, things will be complicated," offered Prince, demonstrating that he had some sense of what was to come. "But as long as the music is playing, you've got to get up and dance." The institutional imperative is rarely a good dance partner.

4. Avoid inertia.

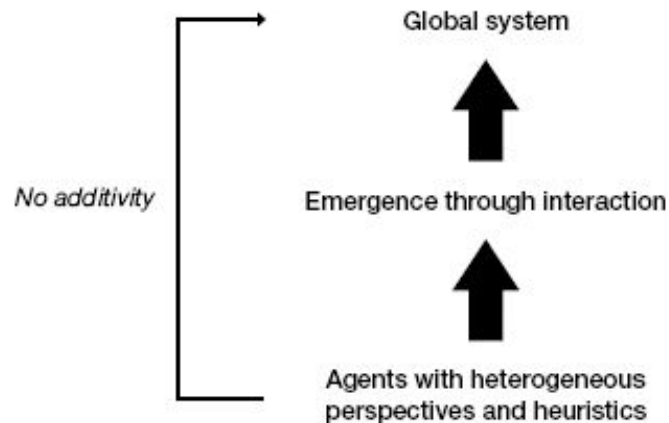
Periodically revisit your processes and ask whether they are serving their purpose.

Organizations sometimes adopt routines and structures that become crystallized, impeding positive change. Efforts to reform education in the United States, for example, have been met with resistance from teachers and administrators who prefer the status quo.

We like to think that we're better than the situation, that we follow the decision-making process and rationally weigh the facts, consider alternatives, and determine the best course of action. While others are easily influenced, we are not. This is how we're wrong. Decision making is fundamentally a social exercise, something I cover in my Re:Think Decision Making workshop.

89. Making Decisions in a Complex Adaptive System

Simple description of a complex adaptive system



In Think Twice: Harnessing the Power of Counterintuition, Mauboussin does a good job adding to the work we've already done on complex adaptive systems:

You can think of a complex adaptive system in three parts (see the image at the top of this post). First, there is a group of heterogeneous agents. These agents can be neurons in your brain, bees in a hive, investors in a market, or people in a city. Heterogeneity means each agent has different and evolving decision rules that both reflect the environment and attempt to anticipate change in it. Second, these agents interact with one another, and their interactions create structure—scientists often call this emergence. Finally, the structure that emerges behaves like a higher-level system and has properties and characteristics that are distinct from those of the underlying agents themselves. ... The whole is greater than the sum of the parts.

The inability to understand the system based on its components prompted Nobel Prize winner and physicist Philip Anderson, to draft the essay, "More Is Different." Anderson wrote, "The behavior of large and complex aggregates of elementary particles, it turns out, is not to be understood in terms of the simple extrapolation of the properties of a few particles. Instead, at each level of complexity entirely new properties appear."

Mauboussin comments that we are fooled by randomness:

The problem goes beyond the inscrutable nature of complex adaptive systems. Humans have a deep desire to understand cause and effect, as such links probably conferred humans with evolutionary advantage. In complex adaptive systems, there is no simple method for understanding the whole by studying the parts, so searching for simple agent-level causes of system-level effects is useless. Yet our minds are not beyond making up a cause to relieve the itch of an unexplained effect. When a mind seeking links between cause and effect meets a system that conceals them, accidents will happen.

Misplaced Focus on the Individual

One mistake we make is extrapolating the behaviour of an individual component, say an individual, to explain the entire system. Yet when we have to solve a problem dealing with a complex system, we often address an individual component. In so doing, we ignore Garrett Hardin's first law of Ecology, you can never do merely one thing and become a fragilista.

That unintended system-level consequences arise from even the best-intentioned individual-level actions has long been recognized. But the decision-making challenge remains for a couple of reasons. First, our modern world has more interconnected systems

than before. So we encounter these systems with greater frequency and, most likely, with greater consequence. Second, we still attempt to cure problems in complex systems with a naïve understanding of cause and effect.

When I speak with executives from around the world going through a period of poor performance, it doesn't take long for them to mention they want to hire a star from another company. "If only we had Kate," they'll say, "we could smash the competition and regain our footing."

At first, poaching stars from competitors or even teams within the same organization seems like a winning strategy. But once the star comes over the results often fail to materialize.

What we fail to grasp is that their performance is part of an ecosystem and removing them from that ecosystem — that is isolating the individual performance — is incredibly hard without properly considering the entire ecosystem. (Reversion to the mean also likely accounts for some of the star's fading as well).

Three Harvard professors concluded, "When a company hires a star, the star's performance plunges, there is a sharp decline in the functioning of the group or team the person works with, and the company's market value falls."

If it sounds like a lot of work to think this through at many levels, it should be. Why should it be easy?

Another example of this at an organizational level has to do with innovation. Most people want to solve the innovation problem. Ignoring for a second that that is the improper framing, how do most organizations go about this? They copy what the most successful organizations do. I can't count the number of times the solution to an organization's "innovation problem" is to be more like Google. Well-intentioned executives blindly copy approaches by others such as 20% innovation time, without giving an ounce of thought to the role the ecosystem plays.

Isolating and focusing on an individual part of a complex adaptive system without an appreciation and understanding of that system itself is sure to lead to disaster.

What Should We Do?

So this begs the question, what should we do when we find ourselves dealing with a complex adaptive system? Mauboussin provides three pieces of advice:

1. Consider the system at the correct level.

Remember the phrase "more is different." The most prevalent trap is extrapolating the behavior of individual agents to gain a sense of system behavior. If you want to understand the stock market, study it at the market level. Consider what you see and read from individuals as entertainment, not as education. Similarly, be aware that the function of an individual agent outside the system may be very different from that function within the system. For instance, mammalian cells have the same metabolic rates in vitro, whether they are from shrews or elephants. But the metabolic rate of cells in small mammals is much higher than the rate of those in large mammals. The same structural cells work at different rates, depending on the animals they find themselves in.

2. Watch for tightly coupled systems.

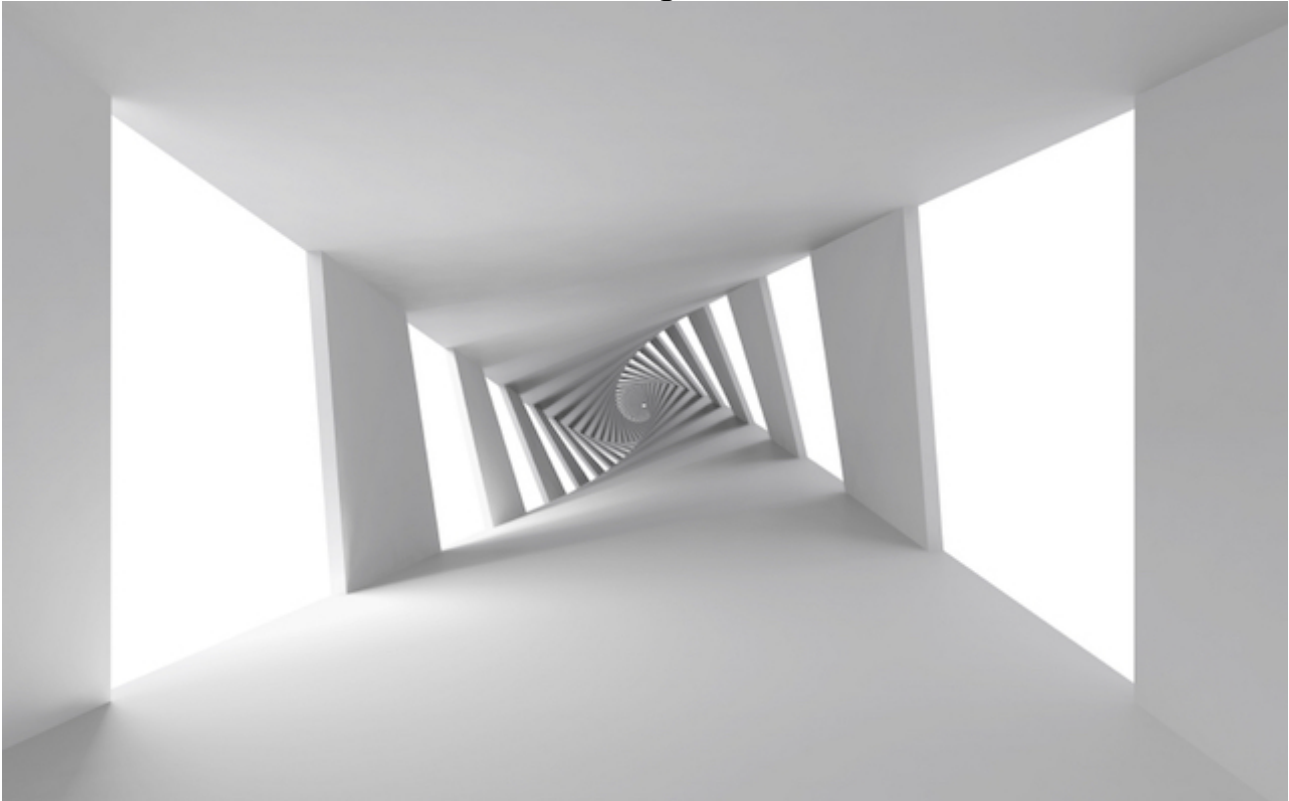
A system is tightly coupled when there is no slack between items, allowing a process to go from one stage to the next without any opportunity to intervene. Aircraft, space missions, and nuclear power plants are classic examples of complex, tightly coupled systems. Engineers try to build in buffers or redundancies to avoid failure, but frequently don't anticipate all possible contingencies. Most complex adaptive systems are loosely coupled, where removing or incapacitating one or a few agents has little impact on the system's performance. For example, if you randomly remove some investors, the stock market will continue to function fine. But when the agents lose diversity and behave in a coordinated

fashion, a complex adaptive system can behave in a tightly coupled fashion. Booms and crashes in financial markets are an illustration.

3. Use simulations to create virtual worlds.

Dealing with complex systems is inherently tricky because the feedback is equivocal, information is limited, and there is no clear link between cause and effect. Simulation is a tool that can help our learning process. Simulations are low cost, provide feedback, and have proved their value in other domains like military planning and pilot training.

90. Focusing Illusions



My favorite chapter in the book Rapt: Attention and the Focused Life by Winifred Gallagher is called 'Decisions: Focusing Illusions.' It's a really great summary of how focusing on the wrong things affects the weights we use to make decisions. There is a lot of great content packed into this chapter but I'll attempt to highlight a few points.

Bounded Rationality

According to the principle of 'bounded rationality,' which (Daniel) Kahneman first applied to economic decisions and more recently to choices concerning quality of life, we are reasonable-enough beings but sometimes liable to focus on the wrong things. Our thinking gets befuddled not so much by our emotions as by our 'cognitive illusions,' or mistaken intuitions, and other flawed, fragmented mental constructs.

Loss/Risk Aversion

If you're pondering a choice that involves risk, you might focus too much on the threat of possible loss, thereby obscuring an even likelier potential benefit. Where this common scenario is concerned, research shows that we aren't so much risk-averse as loss-averse, in that we're generally much more sensitive to what we might have to give up than to what we might gain.

The Focusing Illusion

The key to understanding why you pay more attention to your thoughts about living than to life itself is neatly summed up by what Kahneman proudly calls his 'fortune cookie maxim' (a.k.a the focusing illusion): 'Nothing in life is as important as you think it is while you are thinking about it.' Why? 'Because you're thinking about it!'

In one much-cited illustration of the focusing illusion, Kahneman asked some people if they would be happier if they lived in California. Because the climate is often delightful there, most subjects thought so. For the same reason, even Californians assume they're happier than people who live elsewhere. When Kahneman actually measured their well-being however, Michiganders and others are just as contented as Californians. The reason is

that 99 percent of the stuff of life – relationships, work, home, recreation – is the same no matter where you are, and once you settle in a place, no matter how salubrious, you don't think about it's climate very much. If you're prompted to evaluate it, however, the weather immediately looms large, simply because you're paying attention to it. This illusion inclines you to accentuate the difference between Place A and Place B, making it seem to matter much more than it really does, which is marginal.

To test the fortune cookie rule, you have only to ask yourself how happy you are. The question automatically summons your remembering self, which will focus on any recent change in your life – marriage or divorce, new job or home. You'll then think about this novel event, which in turn will increase its import and influence your answer. If you're pleased that you've just left the suburbs for the city, say, you'll decide that life is pretty good. If you regret the move, you'll be dissatisfied in general. Fifteen years on, however, the change that looms so large now will pale next to a more recent event – a career change, perhaps or becoming a grandparent – which will draw your focus and, simply because you're thinking about it, bias your evaluation of your general well-being.

The Effects of Adaptation

Like focusing too much on the opinions of your remembering self, overlooking the effects of adaptation – the process of becoming used to a situation – can obstruct wise decisions about how to live. As Kahneman says, 'when planning for the future, we don't consider that we will stop paying attention to a thing.'

The tendency to stop focusing on a particular event or experience over time, no matter how wonderful or awful, helps explain why the differences in well-being between groups of people in very different circumstances tend to be surprisingly small – sometimes astoundingly so. The classic examples are paraplegics and lottery winners, who respectively aren't nearly as miserable or happy as you'd think. 'That's where attention comes in,' says Kahneman. 'People think that if they win the lottery, they'll be happy forever. Of course, they will not. For a while, they are happy because of the novelty, and because they think about winning all the time. Then they adapt and stop paying attention to it.' Similarly, he says, 'Everyone is surprised by how happy paraplegics can be, but they are not paraplegic full-time. They do other things. They enjoy their meals, their friends, the newspaper. It has to do with the allocation of attention.'

Like couples who've just fallen in love, professionals starting a career, or children who go to camp for the first time, paraplegics and lottery winners initially pay a lot of attention to their new situation. Then, like everybody else, they get used to it and shift their focus to the next big thing. Their seemingly blase attitude surprises us, because when we imagine ourselves in their place, we focus on how we'd feel at the moment of becoming paralyzed or wildly rich, when such an event utterly monopolizes one's focus. We forget that we, too, would get used to wealth, a wheelchair, and most other things under the sun, then turn our attention elsewhere.

Good Enough

Finally, don't worry if the choice you made wasn't the absolute best, as long as it meets your needs. Offering the single most important lesson from his research, Schwartz says, 'Good enough is almost always good enough. If you have that attitude, many problems about decisions and much paralysis melt away.'

91. The Pursuit of Worldly Wisdom

Charlie Munger, the billionaire business partner of Warren Buffett and a major inspiration behind this site, is not only one of the best investors the world has witnessed, but he's also one of the best thinkers. A quick recap is in order.

Munger has illuminated timeless wisdom in the minds' search algorithm, Academic Economics, stretch goals, mental models, the value of thinking backward and forward, problem-solving, partnerships, and inversion among others.

What is elementary, worldly wisdom? Well, the first rule is that you can't really know anything if you just remember isolated facts and try and bang 'em back. If the facts don't hang together on a latticework of theory, you don't have them in a usable form.

— Charlie Munger

He's even offered two sets of book recommendations.

In his book, *Charlie Munger: The Complete Investor*, which has become my new go-to recommendation for people interested in an introduction to Munger's thinking, Tren Griffin lays out Munger's path to worldly wisdom.

Munger has adopted an approach to business and life that he refers to as worldly wisdom. Munger believes that by using a range of different models from many different disciplines—psychology, history, mathematics, physics, philosophy, biology, and so on—a person can use the combined output of the synthesis to produce something that has more value than the sum of its parts. Robert Hagstrom wrote a wonderful book on worldly wisdom entitled Investing: The Last Liberal Art, in which he states that “each discipline entwines with, and in the process strengthens, every other. From each discipline the thoughtful person draws significant mental models, the key ideas that combine to produce a cohesive understanding. Those who cultivate this broad view are well on their way to achieving worldly wisdom.”

It is clear that Munger loves to learn. He actually has fun when he is learning, and that makes the worldly wisdom investing process enjoyable for him. This is important because many people do not find investing enjoyable, especially when compared to gambling, which science has shown can generate pleasure via chemicals (e.g., dopamine) even though it is an activity with a negative net present value. What Munger has done is created a system—worldly wisdom—that allows him to generate the same chemical rewards in an activity that has a positive net present value. When you learn something new, your brain gives itself a chemical reward, which motivates you to do the work necessary to be a successful investor. If you do this work and adopt a worldly wisdom mindset, Munger believes you will create an investing edge over other investors.

You've got to have models in your head. And you've got to array your experience—both vicarious and direct—on this latticework of models.

— charlie munger

Munger used a latticework of mental models in developing his approach. Herbert Simon, in his autobiography, *Models of My Life*, captured the idea of a mental model when he said: *A large part of the difference between the experienced decision maker and the novice in these situations is not any particular intangible like “judgment” or “intuition.” If one could open the lid, so to speak, and see what was in the head of the experienced decision maker, one would find that he had at his disposal repertoires of possible actions; that he had checklists of things to think about before he acted; and that he had mechanisms in his mind to evoke these, and bring these to his conscious attention when the situations for decisions arose.*

Latticework of Mental Models

Munger carefully chose the latticework model, to convey the idea that things are interconnected. We need more than a deep understanding of one segment, we need a working knowledge of all of them and how they interact and link. This is conveyed by the Japanese proverb “The frog in a well knows nothing of the mighty ocean.”

In *Charlie Munger: The Complete Investor*, Griffin continues:

Understanding the worldly wisdom methodology is made easier if you see it applied in an example. To illustrate the method, Munger gave the example of a business that raises the price of its product and yet sells more of that product. This would appear to violate the rule of supply and demand as taught in economics. However, if one thinks about the discipline of psychology, one might conclude that the product is a Giffen good, which people desire more of at higher prices. Or one could conclude that low prices signal poor quality to buyers and that raising prices will result in more sales. Alternatively, you can look for bias caused by incentives and discover that what has actually happened in his example is that the seller has bribed the purchasing agents of the purchasers.

Munger described a situation in which this actually happens:

Suppose you're the manager of a mutual fund, and you want to sell more. People commonly come to the following answer: You raise the commissions which, of course, reduces the number of units of real investments delivered to the ultimate buyer, so you're increasing the price per unit of real investment that you're selling the ultimate customer. And you're using that extra commission to bribe the customer's purchasing agent. You're bribing the broker to betray his client and put the client's money into the high-commission product.

While we can't know everything, we can know the big ideas from multiple disciplines. We don't want to be the frog. This is one way we can add value in the decision-making process and it allows for the effective use of what I call the Munger two-step.

“Simply put,” Griffin writes, “Munger believes that people who think very broadly and understand many different models from many different disciplines make better decisions.”

In a 2003 speech at UCB Business School entitled Academic Economics — Strengths and Weaknesses, after Considering Interdisciplinary Needs, Munger said:

You've got a complex system and it spews out a lot of wonderful numbers that enable you to measure some factors. But there are other factors that are terribly important, [yet] there's no precise numbering you can put to these factors. You know they're important, but you don't have the numbers. Well, practically (1) everybody overweighs the stuff that can be numbered, because it yields to the statistical techniques they're taught in academia, and (2) doesn't mix in the hard-to-measure stuff that may be more important. That is a mistake I've tried all my life to avoid, and I have no regrets for having done that.

Worldly Wisdom

Griffin continues:

In Munger's view, it is better to be worldly wise than to spend lots of time working with a single model that is precisely wrong.

A multiple-model approach that is only approximately right will produce a far better outcome in anything that involves people or a social system. While making the case for a lattice of mental models approach (described here shortly), Robert Hagstrom pointed out that Munger is providing support for those who advocate for a wide-ranging liberal arts education.

Munger would be what the poet Archilochus calls a fox. The ancient Greeks said “The fox knows many things; the hedgehog one great thing.”

The theory of modern education is that you need a general education before you specialize. And I think to some extent, before you're going to be a great stock picker, you need some general education.

— Charlie Munger

Commenting on Munger, former Microsoft CEO Bill Gates said, “(he) is truly the broadest thinker I have ever encountered.” Buffett added that Munger has “the best 30-second mind in the world. He goes from A to Z in one move. He sees the essence of everything before you even finish the sentence.”

How does Munger do this? That’s a question worth slowing down and thinking about.

You have to realize the truth of biologist Julian Huxley’s idea that ‘Life is just one damn relatedness after another.’ So you must have the models, and you must see the relatedness and the effects from the relatedness.

— Charlie Munger

Where do we get these ideas?

We let history be our guide. If one way to ensure you make poor decisions is to use a small sample size, we can reason that we should seek out the biggest sample sizes we can.

What crosses most of history? Biology, Chemistry, Physics. And of course, throw in some Psychology so we can better understand how we are led astray.

Thinking

Griffin continues:

Munger’s breadth of knowledge is something that is naturally part of his character but also something that he intentionally cultivates. In his view, to know nothing about an important subject is to invite problems. Both Munger and Buffett set aside plenty of time each day to just think. Anyone reading the news is provided with constant reminders of the consequences of not thinking. Thinking is a surprisingly underrated activity. Researchers published a study in 2014 that revealed that approximately a quarter of women and two-thirds of men chose electric shocks over spending time alone with their own thoughts.

If you can’t be alone with your thoughts, you don’t deserve them. We try to run away from the pain of thinking. Instead, we turn to the instant gratification of Netflix.

Munger’s speeches and essays are filled with the thoughts of great people from the past and present from many different domains. Munger is also careful to set aside a lot of time in his schedule for reading. To say he loves books is an understatement. Buffett has said that Munger has read hundreds of biographies, as just one example. He is very purposeful in his approach to worldly wisdom, preferring not to fill his calendar with appointments and meetings.

When talking about how to get smarter, Buffett said: “You could hardly find a partnership in which two people settle on reading more hours of the day than in ours.” Adding, “Look, my job is essentially just corralling more and more and more facts and information, and occasionally seeing whether that leads to some action.”

This is where we go astray so easily. It’s easy to think about our own discipline, the one we live in on a daily basis. This comes naturally. However, it’s likely to lead to problems. We become the proverbial man with a hammer, “To the man with a hammer everything looks like a nail. If you only have one model you will fit whatever problem you face to the model you have.” It’s hard work to think. That’s why so few people seem to take this passage. But it should be hard, otherwise, it would be too easy.

I believe in the discipline of mastering the best that other people have ever figured out. I don’t believe in just sitting down and trying to dream it all up yourself. Nobody’s that smart.

— Charlie Munger

A Multidisciplinary Approach

The tagline for this website: Mastering the best of what other people have already figured out, comes from the Munger quote above.

Griffin continues:

It is critical for a person who desires to be wise to think broadly and learn from others. Munger has said many times that someone who is really smart but has devoted all of their time to being an expert in a narrow area may be dangerous to themselves and others. Examples of this include macroeconomists who study the economy but are disastrous when investing their own portfolios and marketing experts who may think that most all business problems can be solved through marketing. Financiers tend to think similarly about their own profession. Too many people believe that what they do at work is hard and what others do is easy.

The best approach is the multi-disciplinary one, Munger argues:

You may say, "My God, this is already getting way too tough." But, fortunately, it isn't that tough—because eighty or ninety important models will carry about 90 percent of the freight in making you a worldly wise person. And, of those, only a mere handful really carry very heavy freight.

"This reference to eighty or ninety important models" Griffin writes, "has caused people to ask Munger for a complete list of these important models."

While Munger identified many models in the discipline of psychology in his famous The Psychology of Human Misjudgment speech and mentioned other models on an ad-hoc basis, he has never prepared a complete list covering all disciplines.

Munger believes that by learning to recognize certain dysfunctional decision-making processes, an investor can learn to make fewer mistakes. He also believes that no matter how hard someone works and learns, mistakes cannot be completely eliminated. The best one can hope for is to reduce their frequency and, hopefully, their magnitude.

Munger elaborates in a 1995 speech at Harvard University:

Man's imperfect, limited-capacity brain easily drifts into working with what's easily available to it. And the brain can't use what it can't remember or when it's blocked from recognizing because it's heavily influenced by one or more psychological tendencies bearing strongly on it ... the deep structure of the human mind requires that the way to full scope competency of virtually any kind is to learn it all to fluency—like it or not.

In a 2007 speech at USC law school, Munger says:

I constantly see people rise in life who are not the smartest, sometimes not even the most diligent, but they are learning machines. They go to bed every night a little wiser than they were when they got up, and boy, does that help, particularly when you have a long run ahead of you. ... So if civilization can progress only with an advanced method of invention, you can progress only when you learn the method of learning. Nothing has served me better in my long life than continuous learning. I went through life constantly practicing (because if you don't practice it, you lose it) the multidisciplinary approach and I can't tell you what that's done for me. It's made life more fun, it's made me more constructive, it's made me more helpful to others, and it's made me enormously rich. You name it, that attitude really helps.

Back to Griffin, writing in Charlie Munger: The Complete Investor, who says:

In looking at a decision, Munger believes that it is wise to ask questions. Have dysfunctional decision-making heuristics from psychology caused an error? Are there approaches one can use to find those mistakes? Munger likes to use a model from algebra and invert problems to find a solution. Looking for models that can reveal and explain mistakes so one can accumulate worldly wisdom is actually lots of fun. It is like a puzzle to be solved.

A lattice approach is, in effect, a double-check on the investing process. But instead of just two checks, you are checking the result over and over. Munger believes that by going over your decision-making process and carefully using skills, ideas, and models from many disciplines, you can more consistently not be stupid. You will always make some bone-

headed mistakes even if you're careful, but his process is designed to decrease the probability of those mistakes.

Munger likes checklists to ensure he is taking advantage of as many models as possible. At the 2002 Berkshire Hathaway annual meeting, Munger said: "You need a different checklist and different mental models for different companies. I can never make it easy by saying, "Here are three things." You have to derive it yourself to ingrain it in your head for the rest of your life."

Learning From Mistakes

An aspect of Munger's approach is learning from your mistakes. I've made more than my fair share of them.

I like people admitting they were complete stupid horses' asses. I know I'll perform better if I rub my nose in my mistakes. This is a wonderful trick to learn.

— Charlie Munger

Griffin writes:

Munger has said repeatedly that he made more mistakes earlier in life than he is making now. One of his early mistakes was to own a company that made electrical transformers. He has also said that he has found himself in real estate ventures that would only be enjoyed by a masochist. He seems to have more tolerance for mistakes in real estate than other areas of business. The idea of building things as opposed to just trading stocks has a particular appeal to Munger.

Munger believes that one great way to avoid mistakes is to own a business that is simple to understand, given your education and experience. He pointed out: "Where you have complexity, by nature you can have fraud and mistakes." This approach echoes the view of Buffett, who likes challenges that are the business equivalent of netting fish in a barrel. Buffett has said that if you cannot explain why you failed after you have made a mistake, the business was too complex for you. In other words, Munger and Buffett like to understand why they made a mistake so they can learn from the experience. If you cannot understand the business, then you cannot determine what you did wrong. If you cannot determine what you did wrong, then you cannot learn. If you cannot learn, you will not know what you're doing, which is the real cause of risk.

Forgetting your mistakes is a terrible error if you're trying to improve your cognition. Reality doesn't remind you. Why not celebrate stupidities in both categories?

— Charlie munger

Griffin concludes:

Munger has chosen the word wisdom purposefully because he believes that mere knowledge, especially from only one domain, is not enough. To be wise, one must also have experience, common sense, and good judgment. How one actually applies these things in life is what makes a person wise.

92. Keeping Things Simple and Tuning out Folly

Keeping things simple makes a huge difference and yet we are drawn to the sexiness of complexity. Einstein was a master of sifting the essential from the non-essential.

And consider this from Charlie Munger: The Complete Investor:

Peter Bevelin's book Seeking Wisdom: From Darwin to Munger has a section on the importance of simplicity.

Bevelin advised: "Turn complicated problems into simple ones. Break down a problem into its components, but look at the problem holistically." Keeping things as simple as possible, but no more so, is a constant theme in Munger's public statements. In a joint letter to shareholders, Munger and Buffett once wrote: "Simplicity has a way of improving performance through enabling us to better understand what we are doing."

[...]

By focusing on finding decisions and bets that are easy, avoiding what is hard, and stripping away anything that is extraneous, Munger believes that an investor can make better decisions. By "tuning out folly" and swatting away unimportant things "so your mind isn't cluttered with them ... you're better able to pick up a few sensible things to do," said Munger. Focus enables both simplicity and clarity of thought, which in Munger's view leads to a more positive investing result.

"If something is too hard, we move on to something else. What could be simpler than that?"

— Charlie Munger

There is a compelling advantage in life to be found in exploiting unrecognized simplicities, something Peter Thiel tries to tease out in interviews. Essential to recognizing simplicity is scheduling time to think.

"We have three baskets: in, out, and too tough... We have to have a special insight, or we'll put it in the too tough basket."

— Charlie Munger

Simplicity is Filtering

William James said: "The art of being wise is the art of knowing what to overlook." And there are no truer words that have been spoken.

In Arthur Conan Doyle's The Reigate Puzzle, Sherlock Holmes says: "It is of the highest importance in the art of detection to be able to recognize, out of a number of facts, which are incidental and which vital."

And part of filtering is understanding what you know and what you don't know, that is, understanding your circle of competence.

"We have a passion for keeping things simple."

— Charlie Munger

In an interview with Jason Zweig, Munger said:

Confucius said that real knowledge is knowing the extent of one's ignorance. Aristotle and Socrates said the same thing. Is it a skill that can be taught or learned? It probably can, if you have enough of a stake riding on the outcome. Some people are extraordinarily good at knowing the limits of their knowledge, because they have to be. Think of somebody who's been a professional tightrope walker for 20 years—and has survived. He couldn't survive as a tightrope walker for 20 years unless he knows exactly what he knows and what he doesn't know. He's worked so hard at it, because he knows if he gets it wrong he won't survive. The survivors know.

Another time he offered:

Part of that [having uncommon sense], I think, is being able to tune out folly, as distinguished from recognizing wisdom. You've got whole categories of things you just bat away so your brain isn't cluttered with them. That way, you're better able to pick up a few sensible things to do.

Warren Buffett, the CEO of Berkshire Hathaway agrees:

Yeah, we don't consider many stupid things. I mean, we get rid of 'em fast.. Just getting rid of the nonsense — just figuring out that if people call you and say, "I've got this great, wonderful idea", you don't spend 10 minutes once you know in the first sentence that it isn't a great, wonderful idea... Don't be polite and go through the whole process.

And Peter Bevelin, writing in Seeking Wisdom, offers:

Often we try to get too much information, including misinformation, or information of no use to explain or predict. We also focus on details and what's irrelevant or unknowable and overlook the obvious truths. Dealing with what's important forces us to prioritize. There are often just a few actions that produce most of what we are trying to achieve. There are only a few decisions of real importance.

More information doesn't equal more knowledge or better decisions. And remember that today we not only have access to more information, but also misinformation.

And the harder we work at something the more confident we become.

It's worth pausing to reflect on three things at this point: 1) understanding and seeking simplicity; 2) dealing with the easy problems first; and 3) honing your skills by learning what to overlook and getting rid of bad ideas quickly (how many organizations do that!?)... this goes hand in hand with understanding your circle of competence.

92. The Biological Bases of Human Resilience

In Stronger: Develop the Resilience You Need to Succeed there is a section on the Biological Bases of Human Resilience that is fascinating.

It turns out the key to developing resilience at the biological level is to interpret experience in a way that increases performance and facilitates homeostasis. Changing attitudes and developing resilience through training is key. Optimism is your friend.

In 1975, neurologist Paul MacLean coined the term triune brain to describe its three functional levels: The neocortex is the most sophisticated component of the human brain, representing its highest functioning level. Not only does the neocortex interpret sensory signals, communications, and gross proprioceptive-based control of motor (musculoskeletal) behaviors, but part of it—the ventromedial prefrontal cortex (vmPFC)—presides over imagination, logic, decision making, problem solving, planning, apprehension, and, most important, the interpretation of experience.

It is the vmPFC that labels an experience (real or imagined) as threatening, punishing, or rewarding. It finds solutions to problems, it sees the opportunity in danger, and it sees the glass as half full rather than half empty. Based on the nature of the interpretation of experience, the vmPFC then activates the second level of the triune brain: the limbic system.

The limbic system is relevant in any discussion of stress and resilience because of its role as the human brain's emotional control center. The limbic system is believed to be just that, a system, consisting of numerous highly connected neural structures, for example, the hypothalamus, hippocampus, septum, cingulate gyrus, and the amygdala. The amygdala is the primary anatomic center for fear, anger, trauma, and aggression. It's also the center of the fight-or-flight response, a term coined by psychologist Walter Cannon in 1915. The amygdala serves as the primary survival mechanism in the human body. Thus, it's a key anatomic component in the biology of resilience.

The brain stem and spinal cord represent the lowest level of the triune brain. The major functions of this level are the maintenance of so-called vegetative roles such as heartbeat, respiration, vasomotor activity, and the conduction of impulses to many higher levels of the brain. The spinal cord represents the central pathway for neurons as they conduct signals to and from the brain. The brain stem is the basic engine that drives the machinery of the human body.

Human resilience represents a most elegant and ongoing dance between the vmPFC and the amygdala. When faced with danger, the vmPFC activates the amygdala so as to prepare you to fight, flee, or otherwise resolve the threat. Highly resilient people appear to be able to effectively regulate the amygdala so as to benefit from its activation but then allow it to quickly recover its baseline activity. This process of recovery to a steady state is what Cannon called "the reestablishment of homeostasis."

Consequently, the bodies of resilient people are supercharged with moderate increases in hormones such as adrenalin, noradrenalin, gamma-Aminobutyric acid, neuropeptide Y and Cortisol, which allow you to do "superhuman" things for short periods of time. When these hormones surge, your strength and perception

increase, your memory improves, your eyesight may get better, your tolerance for pain increases, and you react to stimuli faster. In other words, you're better prepared to meet any challenge success fully.

The person who is not resilient experiences homeostatic failure, during which the vmPFC interpretations either overstimulate or understimulate the limbic system. The result of overstimulation can be anxiety, panic attacks, confusion, reduced problem-solving capacity, irritability, anger, even violence (for example, road rage, airline rage), and seizures. The result of under stimulation may be hopelessness, depression, resentment, and a lack of motivation. With highly frequent or chronic overstimulation the amygdala can

develop a state of chronic hypersensitivity at the cellular level. Amygdaloid nerve cells literally become highly irritable and will over-respond to experiences that would have not otherwise caused excitation. It's like having 10 cups of coffee.

93. How People Make Big Decisions

We all go through psychological steps when we make big decisions. Some people call this the “existential cycle,” which really has four stages: doing, contemplating, preparing, and experimenting.

Echoing Tolstoy on regret avoidance, Sebastian Bailey and Octavius Black write in Mind Gym: Achieve More by Thinking Differently:

These four stages are much like exercises in risk management. No one wants to look back on his or her life at some point and say I wish I would have or If only I had.

While there are other ways, the existential cycle helps us make life changing decisions — like who to marry, where to work, and where to live.

The first stage, “doing,” is where you spend most of your life: It is your settled, equilibrium position. The doing may be all sorts of things— writing emails, riding horses, reading books, washing up, going to meetings, listening to lectures, cooking, dancing, running, sharing stories with friends, telling jokes, or making love. Of course, these are not done all at the same time (not unless you’re really talented). Whatever the activity may be, and however enjoyable or dull it is, you are doing it and it tends to keep you occupied.

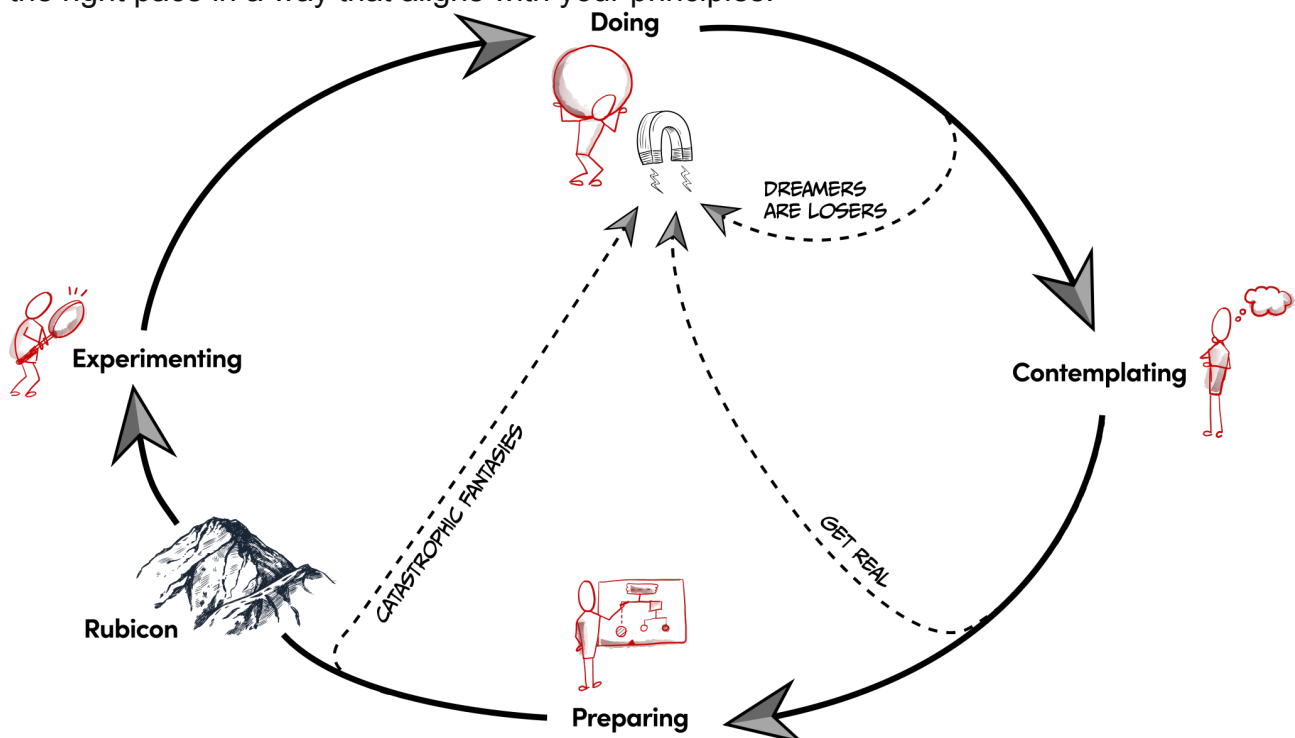
Sometimes we get to “contemplating,” where we consider whether or how things would be different. What would life be like if you move to California? (Hint: It won’t make you happier.)

Then occasionally we move to “preparing.”

You search on the web for real estate agents in San Diego or Key West, find out what property prices are, check weather patterns, possibly even visit your preferred destination on your next vacation. You have moved beyond imagining how things could be different to investigating the practical options for how to make them different.

Finally you make the change.

You leave your job, buy a house, and move all your possessions. This stage is called “experimenting.” After you’ve settled in and started the beachside bar you’d dreamed about, this becomes your normal way of living, and you are once again in a state of doing. The process isn’t overly complicated or hard. The challenge becomes moving through it at the right pace in a way that aligns with your principles.



The Doing Magnet

As you travel around your cycle, you will have conversations with yourself that stop you from moving on to the next stage and instead take you back to doing.

Sometimes these thoughts can be very sensible and prevent you from wasting time or following the wrong path. But sometimes, unfortunately, they prevent you from both spotting and taking opportunities that could dramatically improve your life. The trick lies in recognizing the internal conversations and being able to make an informed decision about whether to listen to them or to ignore them and move on.

When the Doing Magnet is Weak

Irrational exuberance are those people who are forever saying things like I wish I hadn't rushed into that or If only I'd thought about it first. Rather than never crossing the Rubicon, they're happy to head over far too easily— without ever considering the size of the army on the other side. In terms of the existential cycle, their doing magnet is relatively weak—the centrifugal momentum of the next new thing is stronger than the gravitational force of the status quo.

If you find that you can't hold down a job, you can't keep a relationship, you spend money on a whim, or you haven't gotten around to making your home into a place you like living in, and you regret it, then you may be suffering from a form of irrational exuberance. The best advice in this situation is this: spend longer at the preparing stage before wading across your Rubicon.

For example, consider one of these choices:

- Think through all the possible disadvantages of taking this course of action as well as the advantages— really make an effort to present the case for caution on this occasion.*
- Contrast the allure of the new situation with how your existing life might improve even if you don't make this big change. People who are always moving on to new jobs often fail to consider how their current jobs could get better. A new job may be attractive, but it is wrong to assume the old one will stay the same. New possibilities could open up. What happens when your boss moves on?*
- Contemplate the bigger and better gains and pleasures you could have if you didn't always go for instant gratification. Could the gratification get more gratifying?*
- Consider any decisions you made in the past that led to situations you later regretted. What can you learn from these that will help you make a wiser decision this time.*

If you Want to Improve, you have to Cross the Rubicon

“Do. Or do not. There is no try.” — Yoda

You have a choice in how you run your life. There is no “can't,” only “will” and “won't.” The trick is knowing why you are, or aren't, moving around the existential cycle and, in particular, crossing your Rubicon. Like we've said, the right thing isn't to always cross or always not cross. The right thing is to understand why you want to cross or don't want to cross, and then make your decision.

Nevertheless, none of us want to live our lives in a constant state of doing. I might not be in good enough shape today to swim 2.4 miles, but that doesn't mean I won't be in the future. Plus, our reasons for remaining in one state may not be strong. At some point, in certain aspects of our lives, if we want to progress, we must cross the Rubicon.

A decision to not cross the Rubicon based on the wrong reasons— when catastrophic fantasies rule our mind-sets— is what causes people to look back on their lives and think If

only. ... All of us who have looked back and been proud of what we have done have crossed the Rubicon at least once and maybe many times.

There's a famous Latin maxim, carpe diem, which translated means "seize the day." The question you have to ask yourself is, When it comes to crossing Rubicons, just how much of a Caesar am I prepared to be?

94. Biases and Blunders

You would be hard pressed to come across a reading list on behavioral economics that doesn't mention Nudge: Improving Decisions About Health, Wealth, and Happiness by Richard Thaler and Cass Sunstein.

It is a fascinating look at how we can create environments or 'choice architecture' to help people make better decisions. But one of the reasons it's been so influential is because it helps us understand why people sometimes make bad decisions in the first place. If we really want to understand how we can nudge people into making better choices, it's important to understand why they often make such poor ones.

Let's take a look at how Thaler and Sunstein explain some of our common mistakes in a chapter aptly called 'Biases and Blunders.'

Anchoring and Adjustment

Humans have a tendency to put too much emphasis on one piece of information when making decisions. When we overweigh one piece of information and make assumptions based on it, we call that an anchor. Say I borrow a 400-page-book from a friend and I think to myself, the last book I read was about 300 pages and I read it in 5 days so I'll let my friend know I'll have her book back to her in 7 days. Problem is, I've only compared one factor related to me reading books and now I've made a decision without taking into account many other factors which could affect the outcome. For example, is the new book a topic I will digest at the same rate? Will I have the same time over those 7 days for reading? I have looked at number of pages but are the number of words per page similar?

As Thaler and Sunstein explain:

This process is called 'anchoring and adjustment.' You start with some anchor, the number you know, and adjust in the direction you think is appropriate. So far, so good. The bias occurs because the adjustments are typically insufficient.

Availability Heuristic

This is the tendency of our mind to overweigh information that is recent and readily available. What did you think about the last time you read about a plane crash? Did you start thinking about you being in a plane crash? Imagine how much it would weigh on your mind if you were set to fly the next day.

We assess the likelihood of risks by asking how readily examples come to mind. If people can easily think of relevant examples, they are far more likely to be frightened and concerned than if they cannot.

Accessibility and salience are closely related to availability, and they are important as well. If you have personally experienced a serious earthquake, you're more likely to believe that an earthquake is likely than if you read about it in a weekly magazine. Thus, vivid and easily imagined causes of death (for example, tornadoes) often receive inflated estimates of probability, and less-vivid causes (for example, asthma attacks) receive low estimates, even if they occur with a far greater frequency (here, by a factor of twenty). Timing counts too: more recent events have a greater impact on our behavior, and on our fears, than earlier ones.

Representativeness Heuristic

Use of the representativeness heuristic can cause serious misperceptions of patterns in everyday life. When events are determined by chance, such as a sequence of coin tosses, people expect the resulting string of heads and tails to be representative of what they think of as random. Unfortunately, people do not have accurate perceptions of what random sequences look like. When they see the outcomes of random processes, they often detect patterns that they think have great meaning but in fact are just due to chance.

It would seem as though we have issues with randomness. Our brains automatically want to see patterns when none may exist. Try a coin toss experiment on yourself. Simply flip a coin and keep track if it's heads or tails. At some point you will hit 'a streak' of either heads

or tails and you will notice that you experience a sort of cognitive dissonance; you know that 'a streak' at some point is statistically probable but you can't help but thinking the next toss has to break the streak because for some reason in your head it's not right. That unwillingness to accept randomness, our need for a pattern, often clouds our judgement when making decisions.

Unrealistic Optimism

We have touched upon optimism bias in the past. Optimism truly is a double-edged sword. On one hand it is extremely important to be able to look past a bad moment and tell yourself that it will get better. Optimism is one of the great drivers of human progress. On the other hand, if you never take those rose-coloured glasses off, you will make mistakes and take risks that could have been avoided. When assessing the possible negative outcomes associated with risky behaviour we often think 'it won't happen to me.' This is a brain trick: We are often insensitive to the base rate.

Unrealistic optimism is a pervasive feature of human life; it characterizes most people in most social categories. When they overestimate their personal immunity from harm, people may fail to take sensible preventive steps. If people are running risks because of unrealistic optimism, they might be able to benefit from a nudge.

Loss Aversion

When they have to give something up, they are hurt more than they are pleased if they acquire the very same thing.

We are familiar with loss aversion in the context described above but Thaler and Sunstein take the concept a step further and explain how it plays a role in 'default choices.' Loss aversion can make us so fearful of making the wrong decision that we don't make any decision. This explains why so many people settle for default options.

The combination of loss aversion with mindless choosing implies that if an option is designated as the 'default,' it will attract a large market share. Default options thus act as powerful nudges. In many contexts defaults have some extra nudging power because consumers may feel, rightly or wrongly, that default options come with an implicit endorsement from the default setter, be it the employer, government, or TV scheduler.

Of course, this is not the only reason default options are so popular. "Anchoring," which we mentioned above, plays a role here. Our mind anchors immediately to the default option, especially in unfamiliar territory for us.

We also have the tendency towards inertia, given that mental effort is tantamount to physical effort – thinking hard requires physical resources. If we don't know the difference between two 401(k) plans and they both seem similar, why expend the mental effort to switch away from the default investment option? You may not have that thought consciously; it often happens as a "click, whirr."

State of Arousal

Our preferred definition requires recognizing that people's state of arousal varies over time. To simplify things we will consider just the two endpoints: hot and cold. When Sally is very hungry and appetizing aromas are emanating from the kitchen, we can say she is in a hot state. When Sally is thinking abstractly on Tuesday about the right number of cashews she should consume before dinner on Saturday, she is in a cold state. We will call something 'tempting' if we consume more of it when hot than when cold. None of this means that decisions made in a cold state are always better. For example, sometimes we have to be in a hot state to overcome our fears about trying new things. Sometimes dessert really is delicious, and we do best to go for it. Sometimes it is best to fall in love. But it is clear that when we are in a hot state, we can often get into a lot of trouble.

For most of us, however, self-control issues arise because we underestimate the effect of arousal. This is something the behavioral economist George Loewenstein (1996) calls the 'hot-cold empathy gap.' When in a cold state, we do not appreciate how much our desires

and our behavior reflects a certain naivete about the effects that context can have on choice.

The concept of arousal is analogous to mood. At the risk of stating the obvious, our mood can play a definitive role in our decision making. We all know it, but how many among us truly use that insight to make better decisions?

This is one reason we advocate decision journals when it comes to meaningful decisions (probably no need to log in your cashew calculations); a big part of tracking your decisions is your *mood* when you make them. A zillion contextual clues go into your state of arousal, but taking a quick pause to note which state you're in as you make a decision can make a difference over time.

Mood is also affected by chemicals. This one may be familiar to you coffee (or tea) addicts out there. Do you recall the last time you felt terrible or uncertain about a decision when you were tired, only to feel confident and spunky about the same topic after a cup of java? Or, how about alcohol? There's a reason it's called a "social lubricant" – our decision making changes when we've consumed enough of it.

Lastly, the connection between *sleep* and mood goes deep. Need we say more?

Peer Pressure

Peer pressure is another tricky nudge that can be both positive or negative. We can be nudged to make better decisions when we think that our peer group is doing the same. If we think our neighbors conserve more energy or recycle more, we start making a better effort to reduce our consumption and recycle. If we think the people around us are eating better and exercising more we tend to do the same. Information we get from peer groups can also help us make better decisions because of 'collaborative filtering'; the choices of our peer groups help us filter out and narrow down our choices. If your friends who share similar views and tastes as you recommend book X, then you may like it as well. (Google, Amazon and Netflix are built on this principle).

However, if we are all reading the same book because we constantly see people with it, but none of us actually like it, then we all lose. We run off the mountain with the other lemmings.

Social influences come in two basic categories. The first involves information. If many people do something or think something, their actions and their thoughts convey information about what might be best for you to do or think. The second involves peer pressure. If you care about what other people think about you (perhaps in the mistaken belief that they are paying some attention to what you are doing), then you might go along with the crowd to avoid their wrath or curry their favor.

An important problem here is 'pluralistic ignorance' – that is, ignorance, on the part of all or most, about what other people think. We may follow a practice or a tradition not because we like it, or even think it defensible, but merely because we think that most other people like it. Many social practices persist for this reason, and a small shock, or nudge, can dislodge them.

How do we beat social influence? It's very difficult, and not always desirable: If you are about to enter a building a lot of people are running away from, there's a better than good chance you should too. But this useful instinct leads us awry.

A simple algorithm, when you feel yourself acting out of social proof, is to ask yourself: Would I still do this if everyone else was not?

95. Nassim Taleb on the Notion of Alternative Histories

We see what's visible and available. Often this is nothing more than randomness and yet we wrap a narrative around it. The trader who is rich must know what he is doing. A good outcome means we made the right decisions, right? Not so quick. If we were wise we would not judge the quality of a decision on its outcome. There are alternative histories worth considering.

Writing in *Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets*, Nassim Taleb hits on the notion of alternative histories.

Taleb argues that we should judge people by the costs of the alternative, that is if history played out in another way. These “substitute courses of events are called alternative histories.”

Taleb writes:

Clearly, the quality of a decision cannot be solely judged based on its outcome, but such a point seems to be voiced only by people who fail (those who succeed attribute their success to the quality of their decision).

[...]

One can illustrate the strange concept of alternative histories as follows. Imagine an eccentric (and bored) tycoon offering you \$ 10 million to play Russian roulette, i.e., to put a revolver containing one bullet in the six available chambers to your head and pull the trigger. Each realization would count as one history, for a total of six possible histories of equal probabilities. Five out of these six histories would lead to enrichment; one would lead to a statistic, that is, an obituary with an embarrassing (but certainly original) cause of death. The problem is that only one of the histories is observed in reality; and the winner of \$ 10 million would elicit the admiration and praise of some fatuous journalist (the very same ones who unconditionally admire the Forbes 500 billionaires). Like almost every executive I have encountered during an eighteen-year career on Wall Street (the role of such executives in my view being no more than a judge of results delivered in a random manner), the public observes the external signs of wealth without even having a glimpse at the source (we call such source the generator.) Consider the possibility that the Russian roulette winner would be used as a role model by his family, friends, and neighbors. While the remaining five histories are not observable, the wise and thoughtful person could easily make a guess as to their attributes. It requires some thoughtfulness and personal courage. In addition, in time, if the roulette-betting fool keeps playing the game, the bad histories will tend to catch up with him. Thus, if a twenty-five-year-old played Russian roulette, say, once a year, there would be a very slim possibility of his surviving until his fiftieth birthday— but, if there are enough players, say thousands of twenty-five-year-old players, we can expect to see a handful of (extremely rich) survivors (and a very large cemetery).

[...]

The reader can see my unusual notion of alternative accounting: \$ 10 million earned through Russian roulette does not have the same value as \$ 10 million earned through the diligent and artful practice of dentistry. They are the same, can buy the same goods, except that one's dependence on randomness is greater than the other.

Reality is different than roulette. Consider that in the example above, while the result is unknown you know the odds, most of life is dealing with uncertainty. Bullets are infrequent, “like a revolver that would have hundreds, even thousands, of chambers instead of six.” After a while you forget about the bullet. You can't see the chamber and we generally think of risk in terms of what is visible.

Interestingly this is the core of the black swan, which is really the induction problem. No amount of evidence can allow the inference that something is true whereas one

counterexample can refute a conclusion. This idea is also related to the “denigration of history,” where we think things that happen to others would not happen to us.

96. Choosing your Choice Architect(ure)

*“Nothing will ever be attempted
if all possible objections must first be overcome.”*

— Samuel Johnson

In the book Nudge by Richard Thaler and Cass Sunstein they coin the terms ‘*Choice Architecture*’ and ‘*Choice Architect*’. For them, if you have an ability to influence the choices other people make, you are a choice architect.

Considering the number of interactions we have everyday, it would be quite easy to argue that we are all *Choice Architects* at some point. But this also makes the inverse true; we are also wandering around someone else’s *Choice Architecture*.

Let’s take a look at a few of the principles of good choice architecture, so we can get a better idea of when someone is trying to nudge us.

This information can then be used/weighed when making decisions.

Defaults

Thaler and Sunstein start with a discussion on “defaults” that are commonly offered to us: *For reasons we have discussed, many people will take whatever option requires the least effort, or the path of least resistance. Recall the discussion of inertia, status quo bias, and the ‘yeah, whatever’ heuristic. All these forces imply that if, for a given choice, there is a default option — an option that will obtain if the chooser does nothing — then we can expect a large number of people to end up with that option, whether or not it is good for them. And as we have also stressed, these behavioral tendencies toward doing nothing will be reinforced if the default option comes with some implicit or explicit suggestion that it represents the normal or even the recommended course of action.*

When making decisions people will often take the option that requires the least effort or the path of least resistance. This makes sense: It’s not just a matter of laziness, we also only have so many hours in a day. Unless you feel particularly strongly about it, if putting little to no effort towards something leads you forward (or at least doesn’t noticeably kick you backwards) this is what you are likely to do. Loss aversion plays a role as well. If we feel like the consequences of making a poor choice are high, we will simply decide to do nothing.

Inertia is another reason: If the ship is currently sailing forward, it can often take a lot of time and effort just to slightly change course.

You have likely seen many examples of inertia at play in your work environment and this isn’t necessarily a bad thing.

Sometimes we need that ship to just steadily move forward. The important bit is to realize when this is factoring into your decisions, or more specifically, when this knowledge is being used to nudge you into making specific choices.

Let’s think about some of your monthly recurring bills. While you might not be *reading* that magazine or *going* to the gym, you’re still *paying* for the ability to use that good or service. If you weren’t being auto-renewed monthly, what is the chance that you would put the effort into renewing that subscription or membership? Much lower, right? Publishers and gym owners know this, and they know you don’t want to go through the hassle of cancelling either, so they make that difficult, too. (They understand well our tendency to want to travel the path of least resistance and avoid conflict.)

This is also where they will imply that the default option is the *recommended* course of action. It sounds like this:

“We’re sorry to hear you no longer want the magazine Mr. Smith. You know, more than half of the fortune 500 companies have a monthly subscription to magazine X, but we understand if it’s not something you’d like to do at the moment.”

or

"Mr. Smith we are sorry to hear that you want to cancel your membership at GymX. We understand if you can't make your health a priority at this point but we'd love to see you back sometime soon. We see this all the time, these days everyone is so busy. But I'm happy to say we are noticing a shift where people are starting to make time for themselves, especially in your demographic..."

(Just cancel them. You'll feel better. We promise.)

The Structure of Complex Choices

We live in a world of reviews. Product reviews, corporate reviews, movie reviews... When was the last time you bought a phone or a car before checking the reviews? When was the last time that you hired an employee without checking out their references?

Thaler and Sunstein call this Collaborative Filtering and explain it as follows:

You use the judgements of other people who share your tastes to filter through the vast number of books or movies available in order to increase the likelihood of picking one you like. Collaborative filtering is an effort to solve a problem of choice architecture. If you know what people like you tend to like, you might well be comfortable in selecting products you don't know, because people like you tend to like them. For many of us, collaborative filtering is making difficult choices easier.

While collaborative filtering does a great job of making difficult choices easier we have to remember that companies also know that you will use this tool and will try to manipulate it. We just have to look at the information critically, compare multiple sources and take some time to review the reviewers.

These techniques can be useful for decisions of a certain scale and complexity: when the alternatives are understood and in small enough numbers. However, once we reach a certain size we require additional tools to make the right decision.

One strategy to use is what Amos Tversky (1972) called 'elimination by aspects.' Someone using this strategy first decides what aspect is most important (say, commuting distance), establishes a cutoff level (say, no more than a thirty-minute commute), then eliminates all the alternatives that do not come up to this standard. The process is repeated, attribute by attribute (no more than \$1,500 per month; at least two bedrooms; dogs permitted), until either a choice is made or the set is narrowed down enough to switch over to a compensatory evaluation of the 'finalists.'"

This is a very useful tool if you have a good idea of which attributes are of most value to you.

When using these techniques, we have to be mindful of the fact that the companies trying to sell us goods have spent a lot of time and money figuring out what attributes are important to you as well.

For example, if you were to shop for an SUV you would notice that there are a specific number of variables they all seem to have in common now (engine options, towing options, seating options, storage options). They are trying to nudge you not to eliminate them from your list. This forces you to do the tertiary research or better yet, this forces you to walk into dealerships where they will try to inflate the importance of those attributes (which they do best).

They also try to call things new names as a means to differentiate themselves and get onto *your* list. What do you mean our competitors don't have FLEXfuel?

Incentives

Incentives are so ubiquitous in our lives that it's very easy to overlook them. Unfortunately, this can influence us to make poor decisions.

Thaler and Sunstein believe this is tied into how *salient* the incentive is.

The most important modification that must be made to a standard analysis of incentives is salience. Do the choosers actually notice the incentives they face? In free markets, the answer is usually yes, but in important cases the answer is no.

Consider the example of members of an urban family deciding whether to buy a car. Suppose their choices are to take taxis and public transportation or to spend ten thousand dollars to buy a used car, which they can park on the street in front of their home. The only salient costs of owning this car will be the weekly stops at the gas station, occasional repair bills, and a yearly insurance bill. The opportunity cost of the ten thousand dollars is likely to be neglected. (In other words, once they purchase the car, they tend to forget about the ten thousand dollars and stop treating it as money that could have been spent on something else.) In contrast, every time the family uses a taxi the cost will be in their face, with the meter clicking every few blocks. So behavioral analysis of the incentives of car ownership will predict that people will underweight the opportunity costs of car ownership, and possibly other less salient aspects such as depreciation, and may overweight the very salient costs of using a taxi.

The problems here are *relatable* and *easily solved*: If the family above had written down all the numbers related to either taxi, public transportation, or car ownership, it would have been a lot more difficult for them to undervalue the salient aspects of any of their choices. (At least if the highest value attribute is cost).

This isn't an exhaustive list of all the daily nudges we face but it's a good start and some important, translatable, themes emerge.

- Realize when you are wandering around someone's choice architecture.
- Do your homework
- Develop strategies to help you make decisions when you are being nudged.

97. Simple Rules for Business Strategy

The book Simple Rules by Donald Sull and Kathleen Eisenhardt has a very interesting chapter on strategy, which tries to answer the following question: How do you translate your broad objectives into a strategy that can provide guidelines for your employees from day to day?

It's the last bit there which is particularly important — getting everyone on the same page. Companies don't seem to have a problem creating broad objectives (which isn't really a strategy). Your company might not call them that, they might call them “mission statements” or simply “corporate goals.” They sound all well and good, but very little thought is given to how we will actually implement these lofty goals.

As Sull and Eisenhardt put it:

Developing a strategy and implementing it are often viewed as two distinct activities — first you come up with the perfect plan and then you worry about how to make it happen. This approach, common through it is, creates a disconnect between what a company is trying to accomplish and what employees do on a day-to-day basis.

The authors argue that companies can bridge this gap between strategic intent and actual implementation by following three steps:

1. Figure out what will move the needles.
2. Choose a bottleneck.
3. Craft the rules.

1. Moving the Needles

The authors use a dual needle metaphor to visualize corporate profits. They see it as two parallel needles: an upper needle which represents revenues and a lower needle which represents costs. The first critical step is to identify which actions will drive a wedge between the needles causing an increase in profits, a decrease in costs, and sustain this over time.

In other words, as simple as it sounds, we need *an actual set of steps* to get from figure a. to figure b.

Fig. a

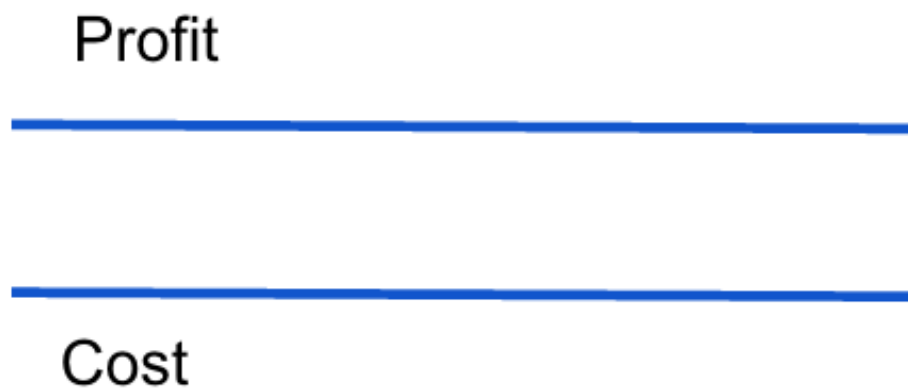
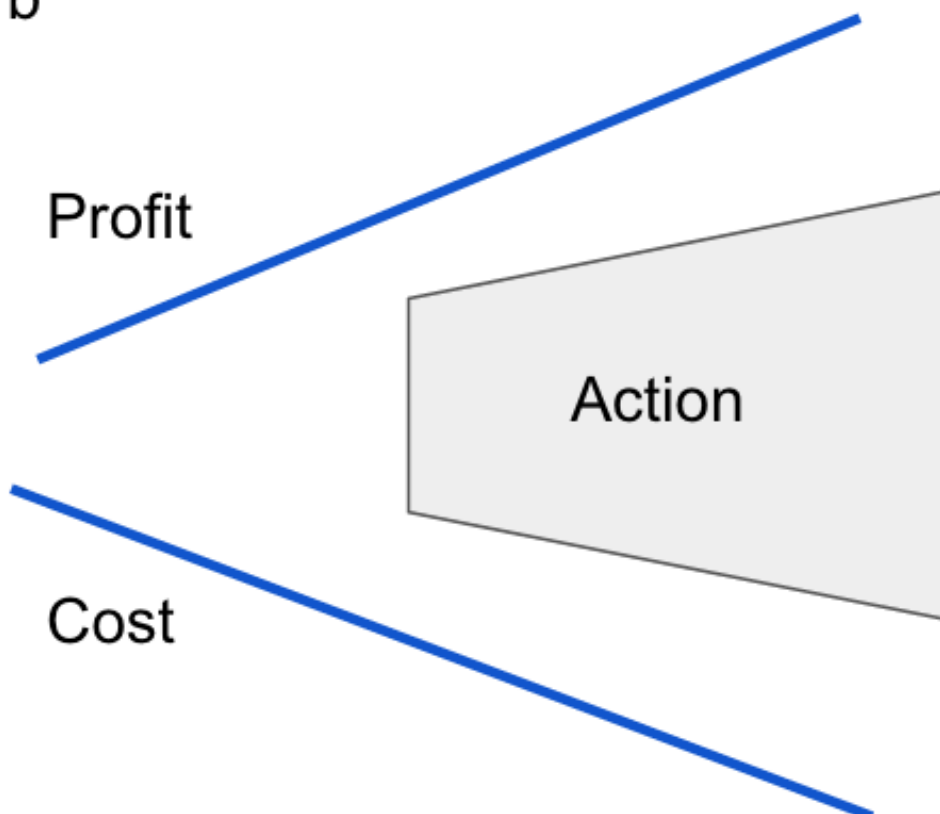


Fig. b



What action will become the wedge that will move the needles?

The authors believe the best way to answer this is to sit down with your management team and ask them to work as a group to answer the following three questions:

1. Who will we target as customers?

2. What product or service will we offer?
3. How will we provide this product at a profit?

When you are trying to massage out these answers remember to use inversion as well. *Equally important are the choices on who not to serve and what not to offer.*

Steve Jobs once pointed out that Apple was defined as much by what it didn't do as by what it did.

2. Bottlenecks

Speaking of *inversion*, in order to complete our goal we must also figure out what's holding us back from moving the needles — the bottlenecks standing in our way.

When it comes to implementing a strategy of simple rules, pinpointing the precise decision or activity where rules will have the most impact is half the battle. We use the term bottleneck to describe a specific activity or decision that hinders a company from moving the needles.

You may be surprised at the amount of bottlenecks you come across, so you'll have to practice some "triage" of your issues, sorting what's important from what's *really* important. The authors believe that the best bottlenecks to focus your attention on share three characteristics:

1. They have a direct and significant impact on value creation.
2. They should represent recurrent decisions (as opposed to 'one off' choices).
3. They should be obstacles that arise when opportunities exceed available resources.

Once we've established what the bottlenecks *are*, it's time to craft the rules which will provide you a framework in which to remove them.

3. Craft the Rules

Developing rules from the top down is a big mistake. When leaders rely on their gut instincts, they overemphasize recent events, build in their personal biases, and ignore data that doesn't fit with their preconceived notions. It is much better to involve a team, typically ranging in size from four to eight members, and use a structured process to harness members' diverse insights and points of view. When drafting the dream team to develop simple rules, it is critical to include some of the people who will be using them on a day-to-day basis.

This probably seems like common sense but we're guessing you have worked at least one place where all information and new initiatives came from above, and much of it seemingly came out of nowhere because you weren't likely involved.

In these situations it's very hard to get buy-in from the employees — yet they are the ones doing the work, implementing the rules. So we need to think about their involvement from the beginning.

Having users make the rules confers several advantages. First, they are closest to the facts on the ground and best positioned to codify experience into usable rules. Because they will make decisions based on the rules, they can strike the right balance between guidance and discretion, avoiding rules that are overly vague or restrictive. User can also phrase the rules in language that resonates for them, rather than relying on business jargon. By actively participating in the process, users are more likely to buy into the final rules and therefore apply them in practice. Firsthand knowledge also makes it easier to explain the rules, and their underlying rationale, to colleagues who did not participate in the process.

It's important to note here that this is a process, a process in which you are never done — *there is no real finish line*. You must always plan to learn and to *iterate* as you learn —

keep changing the plan as new information comes in. Rigidity to a plan is not a virtue; learning and adapting are virtues.

There's nothing wrong with strategy. In fact, without a strategy, it's hard to figure out what to do; some strategy or another must guide your actions as an organization. But it's simply not enough: *Detailed execution, at the employee level, is what gets things done*. That's what the *Simple Rules* are all about.

Strategy, in our view, lives in the simple rules that guide an organization's most important activities. They allow employees to make on-the-spot decisions and seize unexpected opportunities without losing sight of the big picture.

The process you use to develop simple rules matters as much as the rules themselves. Involving a broad cross-section of employees, for example, injects more points of view into the discussion, produces a shared understanding of what matters for value creation, and increases buy-in to the simple rules. Investing the time up front to clarify what will move the needles dramatically increases the odds that simple rules will be applied where they can have the greatest impact.

97. Blog Posts, Book Reviews, and Abstracts: On Shallowness

We're quite glad that you read Farnam Street, and we hope we're always offering you a massive amount of value. (If not, email us and tell us what we can do more effectively.) But there's a message all of our readers should appreciate: Blog posts are not enough to generate the deep fluency you need to truly understand or get better at something. We offer a starting point, not an end point.

This goes just as well for book reviews, abstracts, cliff's notes, and a good deal of short-form journalism.

This is a hard message for some who want a shortcut. They want the "gist" and the "high level takeaways", without doing the work or eating any of the broccoli. They think that's all it takes: Check out a 5-minute read, and instantly their decision making and understanding of the world will improve right-quick. Most blogs, of course, encourage this kind of shallowness. Because it makes you feel that the whole thing is pretty easy.

Here's the problem: The world is more complex than that. It doesn't actually work this way. The nuanced detail behind every "high level takeaway" gives you the context needed to use it in the real world. The exceptions, the edge cases, and the contradictions.

Let me give you an example.

A high-level takeaway from reading Kahneman's Thinking Fast, and Slow would be that we are subject to something he and Amos Tversky call the Representativeness Heuristic. We create models of things in our head, and then fit our real-world experiences to the model, often over-fitting drastically. A very useful idea.

However, that's not enough. There are so many follow-up questions. Where do we make the most mistakes? Why does our mind create these models? Where is this generally useful? What are the nuanced examples of where this tendency fails us? And so on. Just knowing about the Heuristic, knowing that it exists, won't perform any work for you.

Or take the rise of human species as laid out by Yuval Harari. It's great to post on his theory; how myths laid the foundation for our success, how "natural" is probably a useless concept the way it's typically used, and how biology is the great enabler.

But Harari's book itself contains the relevant detail that fleshes all of this out. And further, his bibliography is full of resources that demand your attention to get even more backup. How did he develop that idea? You have to look to find out.

Why do all this? Because without the massive, relevant detail, your mind is built on a house of cards.

What Farnam Street and a lot of other great resources give you is something like a brief map of the territory.

Welcome to Colonial Williamsburg! Check out the re-enactors, the museum, and the theatre. Over there is the Revolutionary City. Gettysburg is 4 hours north. Washington D.C. is closer to 2.5 hours.

Great – now you have a lay of the land. Time to dig in and actually learn about the American Revolution. (This book is awesome, if you actually want to do that.)

Going back to Kahneman, one of his and Tversky's great findings was the concept of the Availability Heuristic. Basically, the mind operates on what it has close at hand.

As Kahneman puts it, "An essential design feature of the associative machine is that it represents only activated ideas. Information that is not retrieved (even unconsciously) from memory might as well not exist. System 1 excels at constructing the best possible story that incorporates ideas currently activated, but it does not (cannot) allow for information it does not have."

That means that in the moment of decision making, when you're thinking hard on some complex problem you face, it's unlikely that your mind is working all that successfully without the details. It doesn't have anything to draw on. It'd be like a chess player who

read a book about great chess players, but who hadn't actually studied all of their moves. Not very effective.

The great difficulty, of course, is that we lack the time to dig deep into everything. Opportunity costs and trade-offs are quite real.

That's why you must develop excellent filters. What's worth learning this deeply? We think it's the first-principle style mental models. The great ideas from physical systems, biological systems, and human systems. The new-new thing you're studying is probably either A. Wrong or B. Built on one of those great ideas anyways. Farnam Street, in a way, is just a giant filtering mechanism to get you started down the hill.

But don't stop there. Don't stop at the starting line. Resolve to increase your depth and stop thinking you can have it all in 5 minutes or less. Use our stuff, and whoever else's stuff you like, as an entrée to the real thing.

98. Creating a Decision Journal: Template And Example Included

We all make decisions. And yet few of us think about what we can learn from our past decisions to make smarter decisions in the future. A decision journal helps you learn from past decisions, think through current decisions, and avoid problems before they happen. In this article we'll cover:

- Your Product is Decisions
- What is a Decision Journal
- A Decision Journal Template
- An Example Decision
- Tips on Using a Decision Journal

Ok, let's dig in.

Your Product is Decisions

In most organizations your product is decisions. By and large, your success will be the sum of the decisions you make over your career. The problem is it's not easy to get better at making decisions.

Bosses would be the easy solution to helping you improve. After all, they have the best view of the problem and you. They should be able to point out strengths and weaknesses in your decision process as well as your judgment. All of this is known at the time you made the decision. This is hard and subjective and requires people doing a lot of thinking. So bosses tend to default to resulting, a process by which the outcome of the decision is attached to the process used to make that decision. Under resulting good outcomes are the product of good decisions and bad outcomes are the product of bad decisions. The problem isn't that people don't want to get better at decisions, it's the system that's preventing them from doing so.

Even if we can't get our boss to help us make better decisions we can take things into our own hands. The way to test the quality of your decisions is to test the process by which you make them. Daniel Kahneman, Nobel Prize winner and dean of biases, argues that using a decision journal is the best solution. Kahneman said:

Go down to a local drugstore and buy a very cheap notebook and start keeping track of your decisions. And the specific idea is whenever you're making a consequential decision, something going in or out of the portfolio, just take a moment to think, write down what you expect to happen, why you expect it to happen and then actually, and this is optional, but probably a great idea, is write down how you feel about the situation, both physically and even emotionally. Just, how do you feel? I feel tired. I feel good, or this stock is really draining me. Whatever you think.

The key to doing this is that it prevents something called hindsight bias, which is no matter what happens in the world, we tend to look back on our decision-making process, and we tilt it in a way that looks more favorable to us, right? So we have a bias to explain what has happened.

A decision journal helps you collect accurate and honest feedback on what you were thinking at the time you made the decision. This feedback helps you see when you were stupid and lucky as well as when you were smart and unlucky. Finally, you can get the feedback you need to make better decisions.

The key to understanding the limits to our knowledge (see circle of competence) is to check the results of our decisions against what we thought was going to happen and why we thought it was going to happen. That feedback loop is incredibly powerful because our minds won't provide it by themselves.

I'll give you the spoiler right now. We don't know as much as we think we know. We're fooled into thinking that we understand something when we don't and we have no means to correct ourselves.

Our minds revise history to preserve our view of ourselves. The story that we tell ourselves conflates the cause and effect of a decision we made and the actual outcome. The best cure for this revising is the decision journal.

What is a Decision Journal?

You can think of a decision journal as quality control for our thinking — something like what we'd find in a manufacturing plant or a restaurant. Using a decision journal is simple but not easy. Implementing one requires discipline and humility.

Not all decisions need to be journaled. Decisions of consequence should be logged with the basics of the situation, what you expect to happen, and why.

You should write in your decision journal before you make the decision official. Writing is the process where you realize that you don't know what you think you know. Writing about your decision forces you to explain your thinking. If we write about the decision after we make it, it's often too late to do anything about it.

Write your decision down sleep on it and read it with fresh eyes in the morning. Often you'll find that what you wrote doesn't make sense. Catching mistakes before you make a decision saves you time and money.

A Decision Journal Template

The key question is what information to include in your decision journal. Here's the template we use at FS.

Decision No: _____

Date: _____

Time: _____

Decision: _____

Mental/Physical State (check boxes)

Energized ☐ Focused ☐ Relaxed ☐

Confident ☐ Tired ☐ Accepting ☐

Accommodating ☐ Anxious ☐ Resigned ☐

Frustrated ☐ Angry ☐

The situation/context:

The problem statement or frame:

The variables that govern the situation include:

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Whenever you're making a consequential decision, either individually or as part of a group, you take a moment and write down:

1. The situation or context
2. The problem statement or frame
3. The variables that govern the situation
4. The complications or complexity as you see it
5. Alternatives that were seriously considered and why they were not chosen (think: the work required to have an opinion)
6. A paragraph explaining the range of outcomes
7. A paragraph explaining what you expect to happen and the reasoning and actual probabilities you assign to each projected outcome (The degree of confidence matters, a lot.)

8. The time of day you're making the decision and how you feel physically and mentally (If you're tired, for example, write it down.)

You have to make this part your own. I've seen others include:

- What's the primary thesis
- What is the expected outcome(s)
- What are the second and third-order consequences
- What is the worst-case scenario and why that's ok
- What is the potential upside beyond the core thesis
- What emotions am I experiencing
- What is the opportunity cost (by doing this what am I not doing)
- What unique advantages or insights do I have in this situation
- Who is the best person to make this decision
- What does this look like in 5 weeks, 5 months, 5 years?

An Example Decision

Perhaps an example will help illustrate. Here's a real decision that I made using the FS decision journal template.

Tips on Using a Decision Journal

Here are some tips to keep in mind as you implement your decision journal.

Your decision journal can be tailored to the situation and context. Specific decisions might include trade-offs, second-order effects, weighting criteria, or other relevant factors. These examples are only to get you started.

We can't improve our thinking if we can't see it. Don't spend too much time on the brief and obvious insights. Often our first thoughts represent the thinking of someone else and not our own thinking.

Any decision you're journaling is inherently complex and may involve non-linear systems. In such a world, small effects can cause disproportionate responses whereas bigger ones might have no impact. Remember that causality is complex, especially in complex domains.

Two common ways people wiggle out of their own decisions are hindsight bias and jargon. It's hard to remember what we knew at the time and what we were thinking. Hindsight makes things far more explainable and changes our story. A decision journal helps combat this by recording what you knew and what you thought at the time. When you look at your own handwriting you come face to face with the person you were when you made the decision. There is nowhere to hide.

The words we use are also important. When we use vague terms, we give ourselves wiggle room. If we want to get better at making decisions we can't give ourselves wiggle room. Be clear. Be direct. Be simple. An 8-year-old should understand what decision you're making and why.

A decision journal that sits on the shelf is less useful than one that gets reviewed. Every six months or so pick it up and look at your past decisions, update entries with what actually happened, and spend time thinking about your process.

Realizing where you make mistakes, how you make them, what types of decisions you're bad at, etc., helps you make better decisions going forward. When you start to identify patterns, you can change your decision process to help account for the things you miss. Just because you had a bad outcome doesn't mean you made a bad decision. You might have made the right decision (which, in our sense, means that used a good process) and still had a bad outcome. We call that a bad break.

When you use a decision journal, you'll discover two things right away. First, you're right a lot of the time. Second, it's often for the wrong reasons. Discovering how lucky you are can be somewhat humbling. This is where the learning begins.

99. Making Compassionate Decisions: The Role of Empathy in Decision Making

“The biggest deficit that we have in our society and in the world right now is an empathy deficit. We are in great need of people being able to stand in somebody else’s shoes and see the world through their eyes.”

— Barack Obama

You don’t have to look hard to find quotes expounding the need for more empathy in society. As with Barack Obama’s quote above, we are encouraged to actively build empathy with others — especially those who are different from us. The implicit message in these pleas is that empathy will make us treat each other with more respect and caring and will help reduce violence. But is this true? Does empathy make us appreciate others, help us behave in moral ways, or help us make better decisions?

These are questions Paul Bloom tackles in his book *Against Empathy: The Case for Rational Compassion*. As the title suggests, Bloom’s book makes a case against empathy as an inherent force for good and takes a closer look at what empathy is (and is not), how empathy works in our brains, how empathy can lead to immoral outcomes despite our best intentions, and how we can improve our ability to have a positive impact by strengthening our intelligence, compassion, self-control, and ability to reason.

To explore these questions, we first need to define what we’re talking about.

What Is Empathy?

Empathy is an often-used word that can mean different things. Bloom quotes one team of empathy researchers who joke that “there are probably nearly as many definitions of empathy as people working on this topic.” For his part, Bloom defines empathy as “the act of coming to experience the world as you think someone else does.” This type of empathy was explored by philosophers of the Scottish Enlightenment. Bloom writes:

As Adam Smith put it, we have the capacity to think about another person and “place ourselves in his situation and become in some measure the same person with him, and thence form some idea of his sensations, and even feel something which, though weaker in degree, is not altogether unlike them.”

This is the definition and view of empathy that Bloom devotes most of the book to exploring. This is the “standing in another man’s shoes” type of empathy from Barack Obama’s quote above, which Bloom calls *emotional empathy*.

[quote]“I feel your pain” is more than a metaphor. It’s literal.[/quote]

With emotional empathy, you actually experience a weaker degree of what somebody else feels. Researchers in recent years have been able to show that empathic responses of pain occur in the same area of the brain where real pain is experienced.

So “I feel your pain” isn’t just a gooey metaphor; it can be made neurologically literal: Other people’s pain really does activate the same brain area as your own pain, and more generally, there is neural evidence for a correspondence between self and other.

To make the shoe metaphor literal, imagine that you see somebody drop something heavy on their foot — you flinch because you know what this feels like and the parts of your brain that experience pain (the anterior insula and the cingulate cortex) react. You don’t feel the same degree of pain, of course — you didn’t drop anything on your foot after all — but it is likely that you have an involuntary physical reaction like a flinch, a facial grimace, or an audible outburst. This is an emotionally empathic response.

But there is another form of empathy that Bloom wants us to be aware of and consider differently. It relates to our ability to understand what is going on in the minds of others.

Bloom refers to this form as *cognitive empathy*:

... if I understand that you are in pain without feeling it myself, this is what psychologists describe as social cognition, social intelligence, mind reading, theory of mind, or mentalizing. It's also sometimes described as a form of empathy—"cognitive empathy" as opposed to "emotional empathy."

In this sense, cognitive empathy speaks to our capacity to understand what is going on in the minds of others. In the case of pain, which is where a lot of empathy research is done, we're not talking about feeling any degree of pain, as we might with emotional empathy, but instead, we simply understand that the other person is feeling pain without feeling it ourselves. Cognitive empathy goes beyond pain — our ability to understand what is going on in somebody else's mind is an important part of being human and is necessary for us to relate to each other.

[quote]Empathy and compassion are synonyms in many dictionaries and used interchangeably by many, but they have different characteristics.[/quote]

The brain is, of course, very complicated, so it is plausible that these two types of empathy could take place in the same part of the brain. So far, though, the research seems to indicate that they are largely separate:

In a review article, Jamil Zaki and Kevin Ochsner note that hundreds of studies now support a certain perspective on the mind, which they call "a tale of two systems." One system involves sharing the experience of others, what we've called empathy; the other involves inferences about the mental states of others—mentalizing or mind reading. While they can both be active at once, and often are, they occupy different parts of the brain. For instance, the medial prefrontal cortex, just behind the forehead, is involved in mentalizing, while the anterior cingulate cortex, sitting right behind that, is involved in empathy.

The difference between cognitive and emotional empathy is important for understanding Bloom's arguments. From Bloom's perspective, cognitive empathy is "...a useful and necessary tool for anyone who wishes to be a good person—but it is morally neutral." On the other hand, Bloom believes that emotional empathy is "morally corrosive," and the bulk of his attack is directed at highlighting the pitfalls of relying on emotional empathy while making the case for cultivating and practicing "rational compassion" instead.

I believe that the capacity for emotional empathy, described as "sympathy" by philosophers such as Adam Smith and David Hume, often simply known as "empathy" and defended by so many scholars, theologians, educators, and politicians, is actually morally corrosive. If you are struggling with a moral decision and find yourself trying to feel someone else's pain or pleasure, you should stop. This empathic engagement might give you some satisfaction, but it's not how to improve things and can lead to bad decisions and bad outcomes. Much better to use reason and cost-benefit analysis, drawing on a more distanced compassion and kindness.

Here again, the definition of the terms is important for understanding the argument. Empathy and compassion are synonyms in many dictionaries and used interchangeably by many, but they have different characteristics. Bloom outlines the difference:

... compassion and concern are more diffuse than empathy. It is weird to talk about having empathy for the millions of victims of malaria, say, but perfectly normal to say that you are concerned about them or feel compassion for them. Also, compassion and concern don't require mirroring of others' feelings. If someone works to help the victims of torture and does so with energy and good cheer, it doesn't seem right to say that as they do this, they are empathizing with the individuals they are helping. Better to say that they feel compassion for them.

Bloom references a review paper written by Tania Singer and Olga Klimecki to help make the distinction clear. Singer and Klimecki write:

In contrast to empathy, compassion does not mean sharing the suffering of the other: rather, it is characterized by feelings of warmth, concern and care for the other, as well as

a strong motivation to improve the other's well-being. Compassion is feeling for and not feeling with the other.

To summarize, emotional empathy could be simply described as “feeling what others feel,” cognitive empathy as “understanding what others feel,” and compassion as “caring about how others feel.”

[quote]Emotional empathy could be simply described as “feeling what others feel,” cognitive empathy as “understanding what others feel,” and compassion as “caring about how others feel.”[/quote]

Empathy and Morality

Many people believe that our ability to empathize is the basis for morality because it causes us to consider our actions from another's perspective. “Treat others as you would like to be treated” is the basic morality lesson repeated thousands of times to children all over the world.

In this way, empathy can lead us to rely on our self-centered nature. If this is true, Bloom suggests that the argument in its simplest form would go like this:

Everyone is naturally interested in him- or herself; we care most about our own pleasure and pain. It requires nothing special to yank one's hand away from a flame or to reach for a glass of water when thirsty. But empathy makes the experiences of others salient and important—your pain becomes my pain, your thirst becomes my thirst, and so I rescue you from the fire or give you something to drink. Empathy guides us to treat others as we treat ourselves and hence expands our selfish concerns to encompass others.

In this way, the willful exercise of empathy can motivate kindness that would never have otherwise occurred. Empathy can make us care about a slave, or a homeless person, or someone in solitary confinement. It can put us into the mind of a gay teenager bullied by his peers, or a victim of rape. We can empathize with a member of a despised minority or someone suffering from religious persecution in a faraway land. All these experiences are alien to me, but through the exercise of empathy, I can, in some limited way, experience them myself, and this makes me a better person.

When we consider the plight of others by imagining ourselves in their situation, we experience an empathic response that can cause us to evaluate the morality of our actions.

[quote]When we consider the plight of others by imagining ourselves in their situation, we experience an empathic response that can cause us to evaluate the morality of our actions.[/quote]

In an interview, Steven Pinker hypothesizes that it was an increase in empathy, made possible by the technology of the printing press and the resulting increase in literacy, that led to the Humanitarian Revolution during the Enlightenment. The increase in empathy brought about by our ability to read accounts of violent punishments like disembowelment and mutilation caused us to reconsider the morality of treating other human beings in such ways.

So in certain instances, empathy can play a role in motivating us to take moral action. But is an empathic response required to do so?

To use a classic example from philosophy—first thought up by the Chinese philosopher Mencius—imagine that you are walking by a lake and see a young child struggling in shallow water. If you can easily wade into the water and save her, you should do it. It would be wrong to keep walking.

What motivates this good act? It is possible, I suppose, that you might imagine what it feels like to be drowning, or anticipate what it would be like to be the child's mother or father hearing that she drowned. Such empathic feelings could then motivate you to act. But that is hardly necessary. You don't need empathy to realize that it's wrong to let a child drown. Any normal person would just wade in and scoop up the child, without bothering with any of this empathic hoo-ha.

And so there has to be more to morality than empathy. Our decisions about what's right and what's wrong, and our motivations to act, have many sources. One's morality can be rooted in a religious worldview or a philosophical one. It can be motivated by a more diffuse concern for the fates of others—something often described as concern or compassion...

I hope most people reading this would agree that failing to attempt to save a drowning child or supporting or perpetrating violent punishments like disembowelment would be at the very least morally reprehensible, if not outright evil.

But what motivates people to be “evil”? For researchers like Simon Baron-Cohen, evil is defined as “empathy erosion” — truly evil people lack the capacity to empathize, and it is this lack of empathy that causes them to act in evil ways. Bloom looks at the question of what causes people to be evil from a slightly different angle:

Indeed, some argue that the myth of pure evil gets things backward. That is, it's not that certain cruel actions are committed because the perpetrators are self-consciously and deliberately evil. Rather it is because they think they are doing good. They are fueled by a strong moral sense.

When the perpetrators of violence or cruelty believe that their actions are morally justified, what motivates them? Bloom suggests that it can be empathy. Empathy often causes us to choose sides, to choose whom to empathize with. We see this tendency play out in politics all the time.

[quote]Empathy often causes us to choose sides, to choose whom to empathize with.[/quote]

Politicians representing one side believe they are saving the world, while representatives on the other side believe that their adversaries are out to destroy civilization as we know it. If I believe that I am protecting a person or group of people whom I choose to empathize with, then I may be motivated to act in a way I believe is morally justified, even though others may believe that I have harmed them.

Steven Pinker weighed in on this issue when he wrote the following in *The Better Angels of our Nature*:

If you added up all the homicides committed in pursuit of self-help justice, the casualties of religious and revolutionary wars, the people executed for victimless crimes and misdemeanors, and the targets of ideological genocides, they would surely outnumber the fatalities from amoral predation and conquest.

Bloom quotes Pinker and goes on to write:

Henry Adams put this in stronger terms, with regard to Robert E. Lee: “It's always the good men who do the most harm in the world.”

This might seem perverse. How can good lead to evil? One thing to keep in mind here is that we are interested in beliefs and motivations, not what's good in some objective sense. So the idea isn't that evil is good; rather, it's that evil is done by those who think they are doing good.

So from a moral perspective, empathy can lead us astray. We may believe we are doing good or that our actions are justified but this may not necessarily be true for all involved. This is especially troublesome when we consider how we are affected by a growing list of cognitive biases.

Empathy and Biases

While empathy may not be required to motivate us to save a drowning child, it can still help us consider the differing experiences or suffering of another person thus motivating us to consider things from their perspective or thus act to relieve their suffering:

I see the bullied teenager and might be tempted initially to join in with his tormenters, out of sadism or boredom or a desire to dominate or be popular, but then I empathize—I feel his pain, I feel what it's like to be bullied—so I don't add to his suffering. Maybe I even rise to his defense. Empathy is like a spotlight directing attention and aid to where it's needed.

On the surface this seems like an excellent case for the positive power of empathy; it shines a “spotlight” on a person in need and motivates us to help them. But what happens when we dig a little deeper into this metaphor? Bloom writes

... spotlights have a narrow focus, and this is one problem with empathy. It does poorly in a world where there are many people in need and where the effects of one's actions are diffuse, often delayed, and difficult to compute, a world in which an act that helps one person in the here and now can lead to greater suffering in the future.

He adds:

Further, spotlights only illuminate what they are pointed at, so empathy reflects our biases. Although we might intellectually believe that the suffering of our neighbor is just as awful as the suffering of someone living in another country, it's far easier to empathize with those who are close to us, those who are similar to us, and those we see as more attractive or vulnerable and less scary. Intellectually, a white American might believe that a black person matters just as much as a white person, but he or she will typically find it a lot easier to empathize with the plight of the latter than the former. In this regard, empathy distorts our moral judgments in pretty much the same way that prejudice does.

We are all predisposed to care more deeply for those we are close to. From a purely biological perspective, we will care for and protect our children and families before the children or families of strangers. Our decision making often falls victim to narrow framing, and our actions are affected by biases like Liking/Loving and Disliking/Hating and our tendency to discount the pain of people we don't like:

We are constituted to favor our friends and family over strangers, to care more about members of our own group than people from different, perhaps opposing, groups. This fact about human nature is inevitable given our evolutionary history. Any creature that didn't have special sentiments toward those that shared its genes and helped it in the past would get its ass kicked from a Darwinian perspective; it would falter relative to competitors with more parochial natures. This bias to favor those close to us is general—it influences who we readily empathize with, but it also influences who we like, who we tend to care for, who we will affiliate with, who we will punish, and so on.

There are many causes for human biases — empathy is only one — but taking a step back, we can see how the intuitive gut responses motivated by emotional empathy can negatively affect our ability to make rational decisions.

Empathy's narrow focus, specificity, and innumeracy mean that it's always going to be influenced by what captures our attention, by racial preferences, and so on. It's only when we escape from empathy and rely instead on the application of rules and principles or a calculation of costs and benefits that we can, to at least some extent, become fair and impartial.

While many of us are motivated to be good and to make good decisions, it isn't always cut and dry. Our preferences for whom to help or which organizations to support are affected by our biases. If we're not careful, empathy can affect our ability to see the potential impacts of our actions. However, considering these impacts takes much more than empathy and a desire to do good; it takes awareness of our biases and mental effort to combat their effects:

... doing actual good, instead of doing what feels good, requires dealing with complex issues and being mindful of exploitation from competing, sometimes malicious and greedy, interests. To do so, you need to step back and not fall into empathy traps. The conclusion is not that one shouldn't give, but rather that one should give intelligently, with an eye toward consequences.

In addition to biases like Liking/Loving and Disliking/Hating, empathy can lead to biases related to the Representative Heuristic. Actions motivated by empathy often fail to take the broader picture into account; the spotlight doesn't encourage us to consider base rates or

sample size when we make our decisions. Instead, we are motivated by positive emotions for a specific individual or small group:

Empathy is limited as well in that it focuses on specific individuals. Its spotlight nature renders it innumerate and myopic: It doesn't resonate properly to the effects of our actions on groups of people, and it is insensitive to statistical data and estimated costs and benefits.

Part of the challenge that exists with empathy is this innumeracy that Bloom describes. It is impossible for us to form genuine empathic connections with abstractions. Conversely, if we see the suffering of one, empathy can motivate us to help make it stop. As Mother Theresa said, "If I look at the mass, I will never act. If I look at the one, I will." This is what psychologists call "the identifiable victim effect."

[quote]While many of us are motivated to be good and to make good decisions, it isn't always cut and dry.[/quote]

Perhaps an example will help illustrate. On October 17, 1987, 18-month-old Jessica McClure fell 22 feet down an eight-inch-diameter well in the backyard of her home in Midland, Texas. Over the next 2 ½ days, fire, police, and volunteer rescuers worked around the clock to save her. Media coverage of the emergency was broadcast all over the world resulting in Jessica McClure becoming internationally known as "Baby Jessica" and prompting then-President Ronald Reagan to proclaim that "...everybody in America became the godmothers and godfathers of Jessica while this was going on." The intense coverage and global awareness led to an influx of donations, resulting in an \$800,000 trust being established in Jessica's name.

What prompted this massive outpouring of concern and support? There are millions of children in need every day all over the world. How many of the people who sent donations to Baby Jessica had ever tried to help these faceless children? In the case of Baby Jessica, they had an identifiable victim, and empathy motivated many of them to help Jessica and her family. They could imagine what it might feel like for those poor parents and they felt genuine concern for the child's future; all the other needy children around the world were statistical abstractions. This ability to identify and put a face on the suffering child and their family enables us to experience an empathic response with them, but the random children and their families remain empathically out of reach.

None of this is to say that rescuers should not have worked to save Jessica McClure — she was a real-world example of Mencius's proverbial drowning child — but there are situations every day where we choose to help individuals at the cost of the continued suffering of others. Our actions often have diffuse and unknowable impacts.

If our concern is driven by thoughts of the suffering of specific individuals, then it sets up a perverse situation in which the suffering of one can matter more than the suffering of a thousand.

Furthermore, not only are we more likely to empathize with the identifiable victim, our empathy has its limits in scale as well. If we hear that an individual in a faraway land is suffering, we may have an empathic response, but will that response be increased proportionally if we learned that thousands or millions of people suffered? Adam Smith got to the heart of this question in The Theory of Moral Sentiments when he wrote:

Let us suppose that the great empire of China, with all its myriads of inhabitants, was suddenly swallowed up by an earthquake, and let us consider how a man of humanity in Europe, who had no sort of connection with that part of the world, would be affected upon receiving intelligence of this dreadful calamity. He would, I imagine, first of all, express very strongly his sorrow for the misfortune of that unhappy people, he would make many melancholy reflections upon the precariousness of human life, and the vanity of all the labors of man, which could thus be annihilated in a moment. He would too, perhaps, if he was a man of speculation, enter into many reasonings concerning the effects which this disaster might produce upon the commerce of Europe, and the trade and business of the

world in general. And when all this fine philosophy was over, when all these humane sentiments had been once fairly expressed, he would pursue his business or his pleasure, take his repose or his diversion, with the same ease and tranquility, as if no such accident had happened.

Empathy can inadvertently motivate us to act to save the one at the expense of the many. While the examples provided are by no means clear-cut issues, it is worth considering how the morality or goodness of our actions to help the few may have negative consequences for the many.

Charlie Munger has written and spoken about the Kantian Fairness Tendency, in which he suggests that for certain systems to be moral to the many, they must be unfair to the few. [quote]For certain systems to be moral to the many, they must be unfair to the few.[/quote] Empathy and Reason

We are emotional creatures, then, but we are also rational beings, with the capacity for rational decision-making. We can override, deflect, and overrule our passions, and we often should do so. It's not hard to see this for feelings like anger and hate—it's clear that these can lead us astray, that we do better when they don't rule us and when we are capable of circumventing them.

While we need kindness and compassion and we should strive to be good people making good decisions, we are not necessarily well served by empathy in this regard; emotional empathy's negatives often outweigh its positives. Instead, we should rely on our capacity to reason and control our emotions. Empathy is not something that can be removed or ignored; it is a normal function of our brains after all, but we can and do combine reason with our natural instincts and intuitions:

The idea that human nature has two opposing facets—emotion versus reason, gut feelings versus careful, rational deliberation—is the oldest and most resilient psychological theory of all. It was there in Plato, and it is now the core of the textbook account of cognitive processes, which assumes a dichotomy between “hot” and “cold” mental processes, between an intuitive “System 1” and a deliberative “System 2.”

We know from Daniel Kahneman's Thinking, Fast and Slow that these two systems are not inherently separate in practice. They are both functioning in our brains at the same time. Some decisions are made faster due to heuristics and intuitions from experiences or our biology, while other decisions are made in a more deliberative and slow fashion using reason. Bloom writes:

We go through a mental process that is typically called “choice,” where we think about the consequences of our actions. There is nothing magical about this. The neural basis of mental life is fully compatible with the existence of conscious deliberation and rational thought—with neural systems that analyze different options, construct logical chains of argument, reason through examples and analogies, and respond to the anticipated consequences of actions.

We have an impulsive, emotional, and intuitive decision-making system in System 1 and a deliberative, reasoning, and (sometimes) rational decision-making system in System 2. [quote]We will always have emotional reactions, but on average our decision making will be better served by improving our ability to reason rather than leveraging our ability to empathize[/quote]

We will always have emotional reactions, but on average our decision making will be better served by improving our ability to reason rather than by leveraging our ability to empathize. One way to increase our ability to reason is to focus on improving our self-control:

Self-control can be seen as the purest embodiment of rationality in that it reflects the working of a brain system (embedded in the frontal lobe, the part of the brain that lies behind the forehead) that restrains our impulsive, irrational, or emotive desires.

While Bloom is unabashedly against empathy as an inherent force for good in the world, he is also a firm supporter of being and doing good. He believes that the “feeling with” nature of emotional empathy leads us to make biased and bad decisions despite our best intentions and that we should instead foster and encourage the “caring for” nature of compassion while combining it with our intelligence, self-control, and ability to reason: *... none of this is to deny the importance of traits such as compassion and kindness. We want to nurture these traits in our children and work to establish a culture that prizes and rewards them. But they are not enough. To make the world a better place, we would also want to bless people with more smarts and more self-control. These are central to leading a successful and happy life—and a good and moral one.*

100. OODA LOOP: What You Can Learn from Fighter Pilots About Making Fast and Accurate Decisions

“What is strategy? A mental tapestry of changing intentions for harmonizing and focusing our efforts as a basis for realizing some aim or purpose in an unfolding and often unforeseen world of many bewildering events and many contending interests.”

— John Boyd

What techniques do people use in the most extreme situations to make decisions? What can we learn from them to help us make more rational and quick decisions?

If these techniques work in the most drastic scenarios, they have a good chance of working for us. This is why military mental models can have such wide, useful applications outside their original context.

Military mental models are constantly tested in the laboratory of conflict. If they weren't agile, versatile, and effective, they would quickly be replaced by others. Military leaders and strategists invest a great deal of time in developing and teaching decision-making processes.

One strategy that I've found repeatedly effective is the OODA loop.

Developed by strategist and U.S. Air Force Colonel John Boyd, the OODA loop is a practical concept designed to be the foundation of rational thinking in confusing or chaotic situations. OODA stands for Observe, Orient, Decide, and Act.

Boyd developed the strategy for fighter pilots. However, like all good mental models, it can be extended into other fields. We used it at the intelligence agency I used to work at. I know lawyers, police officers, doctors, businesspeople, politicians, athletes, and coaches who use it.

Fighter pilots have to work fast. Taking a second too long to make a decision can cost them their lives. As anyone who has ever watched *Top Gun* knows, pilots have a lot of decisions and processes to juggle when they're in dogfights (close-range aerial battles). Pilots move at high speeds and need to avoid enemies while tracking them and keeping a contextual knowledge of objectives, terrains, fuel, and other key variables.

Dogfights are nasty. I've talked to pilots who've been in them. They want the fights to be over as quickly as possible. The longer they go, the higher the chances that something goes wrong. Pilots need to rely on their creativity and decision-making abilities to survive. There is no game plan to follow, no schedule or to-do list. There is only the present moment when everything hangs in the balance.

Forty-Second Boyd

Boyd was no armchair strategist. He developed his ideas during his own time as a fighter pilot. He earned the nickname “Forty-Second Boyd” for his ability to win any fight in under 40 seconds.

In a tribute written after Boyd's death, General C.C. Krulak described him as “a towering intellect who made unsurpassed contributions to the American art of war. Indeed, he was one of the central architects of the reform of military thought.... From John Boyd we learned about competitive decision making on the battlefield—compressing time, using time as an ally.”

Reflecting Robert Greene's maxim that everything is material, Boyd spent his career observing people and organizations. How do they adapt to changeable environments in conflicts, business, and other situations?

Over time, he deduced that these situations are characterized by uncertainty. Dogmatic, rigid theories are unsuitable for chaotic situations. Rather than trying to rise through the military ranks, Boyd focused on using his position as colonel to compose a theory of the universal logic of war.

Boyd was known to ask his mentees the poignant question, “Do you want to be someone, or do you want to do something?” In his own life, he certainly focused on the latter path and, as a result, left us ideas with tangible value. The OODA loop is just one of many.

The Four Parts of the OODA Loop

Let’s break down the four parts of the OODA loop and see how they fit together.

OODA stands for Observe, Orient, Decide, Act. The description of it as a loop is crucial.

Boyd intended the four steps to be repeated again and again until a conflict finishes.

Although most depictions of the OODA loop portray it as a superficial idea, there is a lot of depth to it. Using it should be simple, but it has a rich basis in interdisciplinary knowledge.

1: Observe

The first step in the OODA Loop is to observe. At this stage, the main focus is to build a comprehensive picture of the situation with as much accuracy as possible.

A fighter pilot needs to consider: What is immediately affecting me? What is affecting my opponent? What could affect us later on? Can I make any predictions, and how accurate were my prior ones? A pilot’s environment changes rapidly, so these observations need to be broad and fluid.

And information alone is not enough. The observation stage requires awareness of the overarching meaning of the information. It also necessitates separating the information which is relevant for a particular decision from that which is not. You have to add context to the variables.

The observation stage is vital in decision-making processes.

For example, faced with a patient in an emergency ward, a doctor needs to start by gathering as much foundational knowledge as possible. That might be the patient’s blood pressure, pulse, age, underlying health conditions, and reason for admission. At the same time, the doctor needs to discard irrelevant information and figure out which facts are relevant for this precise situation. Only by putting the pieces together can she make a fast decision about the best way to treat the patient. The more experienced a doctor is, the more factors she is able to take into account, including subtle ones, such as a patient’s speech patterns, his body language, and the absence (rather than presence) of certain signs.

2: Orient

Orientation, the second stage of the OODA loop, is frequently misunderstood or skipped because it is less intuitive than the other stages. Boyd referred to it as the *schwerpunkt*, a German term which loosely translates to “the main emphasis.” In this context, to orient is to recognize the barriers that might interfere with the other parts of the process.

Without an awareness of these barriers, the subsequent decision cannot be a fully rational one. Orienting is all about connecting with reality, not with a false version of events filtered through the lens of cognitive biases and shortcuts.

“Orientation isn’t just a state you’re in; it’s a process. You’re always orienting.”

— John Boyd

Including this step, rather than jumping straight to making a decision, gives us an edge over the competition. Even if we are at a disadvantage to begin with, having fewer resources or less information, Boyd maintained that the Orient step ensures that we can outsmart an opponent.

For Western nations, cyber-crime is a huge threat — mostly because for the first time ever, they can’t outsmart, outspend, or out-resource the competition. Boyd has some lessons for them.

Boyd believed that four main barriers prevent us from seeing information in an unbiased manner:

1. Our cultural traditions

2. Our genetic heritage
3. Our ability to analyze and synthesize
4. The influx of new information — it is hard to make sense of observations when the situation keeps changing

Boyd was one of the first people to discuss the importance of building a toolbox of mental models, prior to Charlie Munger's popularization of the concept among investors.

Boyd believed in “destructive deduction” — taking note of incorrect assumptions and biases and then replacing them with fundamental, versatile mental models. Only then can we begin to garner a reality-oriented picture of the situation, which will inform subsequent decisions.

Boyd employed a brilliant metaphor for this — a snowmobile. In one talk, he described how a snowmobile comprises elements of different devices. The caterpillar treads of a tank, skis, the outboard motor of a boat, the handlebars of a bike — each of those elements is useless alone, but combining them creates a functional vehicle.

As Boyd put it: “A loser is someone (individual or group) who cannot build snowmobiles when facing uncertainty and unpredictable change; whereas a winner is someone (individual or group) who can build snowmobiles, and employ them in an appropriate fashion, when facing uncertainty and unpredictable change.”

To orient ourselves, we have to build a metaphorical snowmobile by combining practical concepts from different disciplines.

Although Boyd is regarded as a military strategist, he didn't confine himself to any particular discipline. His theories encompass ideas drawn from various disciplines, including mathematical logic, biology, psychology, thermodynamics, game theory, anthropology, and physics. Boyd described his approach as a “scheme of pulling things apart (analysis) and putting them back together (synthesis) in new combinations to find how apparently unrelated ideas and actions can be related to one another.”

3. Decide

No surprises here. Having gathered information and oriented ourselves, we have to make an informed decision. The previous two steps should have generated a plethora of ideas, so this is the point where we choose the most relevant option.

Boyd cautioned against first-conclusion bias, explaining that we cannot keep making the same decision again and again. This part of the loop needs to be flexible and open to Bayesian updating. In some of his notes, Boyd described this step as the hypothesis stage. The implication is that we should test the decisions we make at this point in the loop, spotting their flaws and including any issues in future observation stages.

4. Act

While technically a decision-making process, the OODA loop is all about action. The ability to act upon rational decisions is a serious advantage.

The other steps are mere precursors. A decision made, now is the time to act upon it. Also known as the test stage, this is when we experiment to see how good our decision was. Did we observe the right information? Did we use the best possible mental models? Did we get swayed by biases and other barriers? Can we disprove the prior hypothesis? Whatever the outcome, we then cycle back to the first part of the loop and begin observing again.

Why the OODA Loop Works

The OODA loop has four key benefits.

1. Speed

Fighter pilots must make many decisions in fast succession. They don't have time to list pros and cons or to consider every available avenue. Once the OODA loop becomes part of their mental toolboxes, they should be able to cycle through it in a matter of seconds. Speed is a crucial element of military decision making. Using the OODA loop in everyday life, we probably have a little more time than a fighter pilot would. But Boyd emphasized the value of being decisive, taking initiative, and staying autonomous. These are universal assets and apply to many situations.

Take the example of modern growth hacker marketing.

"The ability to operate at a faster tempo or rhythm than an adversary enables one to fold the adversary back inside himself so that he can neither appreciate nor keep up with what is going on. He will become disoriented and confused..."

— John Boyd

The key advantage growth hackers have over traditional marketers is speed. They observe (look at analytics, survey customers, perform a/b tests, etc.) and orient themselves (consider vanity versus meaningful metrics, assess interpretations, and ground themselves in the reality of a market) before making a decision and then acting. The final step serves to test their ideas and they have the agility to switch tactics if the desired outcome is not achieved.

Meanwhile, traditional marketers are often trapped in lengthy campaigns which do not offer much in the way of useful metrics. Growth hackers can adapt and change their techniques every single day depending on what works. They are not confined by stagnant ideas about what worked before.

So, although they may have a small budget and fewer people to assist them, their speed gives them an advantage. Just as Boyd could defeat any opponent in under 40 seconds (even starting at a position of disadvantage), growth hackers can grow companies and sell products at extraordinary rates, starting from scratch.

2. Comfort With Uncertainty

Uncertainty does not always equate to risk. A fighter pilot is in a precarious situation, where there will be gaps in their knowledge. They cannot read the mind of the opponent and might have incomplete information about the weather conditions and surrounding environment. They can, however, take into account key factors such as the opponent's nationality, the type of airplane they are flying, and what their maneuvers reveal about their intentions and level of training.

If the opponent uses an unexpected strategy, is equipped with a new type of weapon or airplane, or behaves in an irrational, ideologically motivated way, the pilot must accept the accompanying uncertainty. However, Boyd belabored the point that uncertainty is irrelevant if we have the right filters in place.

If we don't, we can end up stuck at the observation stage, unable to decide or act. But if we do have the right filters, we can factor uncertainty into the observation stage. We can leave a margin of error. We can recognize the elements which are within our control and those which are not.

Three key principles supported Boyd's ideas. In his presentations, he referred to Gödel's Proof, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics. Gödel's theorems indicate that any mental model we have of reality will omit certain information and that Bayesian updating must be used to bring it in line with reality. Our understanding of science illustrates this.

In the past, people's conception of reality missed crucial concepts such as criticality, relativity, the laws of thermodynamics, and gravity. As we have discovered these concepts, we have updated our view of the world. Yet we would be foolish to think that we now know everything and our worldview is complete. Other key principles remain undiscovered. The

same goes for fighter pilots — their understanding of what is going on during a battle will always have gaps. Identifying this fundamental uncertainty gives it less power over us. The second concept Boyd referred to is Heisenberg's Uncertainty Principle. In its simplest form, this principle describes the limit of the precision with which pairs of physical properties can be understood. We cannot know the position and the velocity of a body at the same time. We can know either its location or its speed, but not both. Although Heisenberg's Uncertainty Principle was initially used to describe particles, Boyd's ability to combine disciplines led him to apply it to planes. If a pilot focuses too hard on where an enemy plane is, they will lose track of where it is going and vice versa. Trying harder to track the two variables will actually lead to more inaccuracy! Heisenberg's Uncertainty Principle applies to myriad areas where excessive observation proves detrimental. Reality is imprecise.

Finally, Boyd made use of the Second Law of Thermodynamics. In a closed system, entropy always increases and everything moves towards chaos. Energy spreads out and becomes disorganized.

Although Boyd's notes do not specify the exact applications, his inference appears to be that a fighter pilot must be an open system or they will fail. They must draw "energy" (information) from outside themselves or the situation will become chaotic. They should also aim to cut their opponent off, forcing them to become a closed system. Drawing on his studies, Boyd developed his Energy Maneuverability theory, which recast maneuvers in terms of the energy they used.

"Let your plans be dark and impenetrable as night, and when you move, fall like a thunderbolt."

— Sun Tzu

3. Unpredictability

Using the OODA loop should enable us to act faster than an opponent, thereby seeming unpredictable. While they are still deciding what to do, we have already acted. This resets their own loop, moving them back to the observation stage. Keep doing this, and they are either rendered immobile or forced to act without making a considered decision. So, they start making mistakes, which can be exploited.

Boyd recommended making unpredictable changes in speed and direction, and wrote, "we should operate at a faster tempo than our adversaries or inside our adversaries['] time scales. ... Such activity will make us appear ambiguous (non predictable) [and] thereby generate confusion and disorder among our adversaries." He even helped design planes better equipped to make those unpredictable changes.

For the same reason that you can't run the same play 70 times in a football game, rigid military strategies often become useless after a few uses, or even one iteration, as opponents learn to recognize and counter them. The OODA loop can be endlessly used because it is a formless strategy, unconnected to any particular maneuvers.

We know that Boyd was influenced by Sun Tzu (he owned seven thoroughly annotated copies of *The Art of War*), and he drew many ideas from the ancient strategist. Sun Tzu depicts war as a game of deception where the best strategy is that which an opponent cannot pre-empt. Apple has long used this strategy as a key part of their product launches. Meticulously planned, their launches are shrouded in secrecy and the goal is for no one outside the company to see a product prior to the release.

When information has been leaked, the company has taken serious legal action as well as firing associated employees. We are never sure what Apple will put out next (just search for "Apple product launch 2017" and you will see endless speculation based on few facts). As a consequence, Apple can stay ahead of their rivals.

Once a product launches, rival companies scramble to emulate it. But by the time their technology is ready for release, Apple is on to the next thing and has taken most of the market share. Although inexpensive compared to the drawn-out product launches other companies use, Apple's unpredictability makes us pay attention. Stock prices rise the day after, tickets to launches sell out in seconds, and the media reports launches as if they were news events, not marketing events.

4. Testing

A notable omission in Boyd's work is any sort of specific instructions for how to act or which decisions to make. This is presumably due to his respect for testing. He believed that ideas should be tested and then, if necessary, discarded.

"We can't just look at our own personal experiences or use the same mental recipes over and over again; we've got to look at other disciplines and activities and relate or connect them to what we know from our experiences and the strategic world we live in."

— John Boyd

Boyd's OODA is a feedback loop, with the outcome of actions leading back to observations. Even in *Aerial Attack Study*, his comprehensive manual of maneuvers, Boyd did not describe any particular one as superior. He encouraged pilots to have the widest repertoire possible so they could select the best option in response to the maneuvers of an opponent.

We can incorporate testing into our decision-making processes by keeping track of outcomes in decision journals. Boyd's notes indicate that he may have done just that during his time as a fighter pilot, building up the knowledge that went on to form *Aerial Attack Study*. Rather than guessing how our decisions lead to certain outcomes, we can get a clear picture to aid us in future orientation stages. Over time, our decision journals will reveal what works and what doesn't.

Applying the OODA Loop

In sports, there is an adage that carries over to business quite well: "Speed kills." If you are able to be nimble, able to assess the ever-changing environment and adapt quickly, you'll always carry the advantage over your opponent.

Start applying the OODA loop to your day-to-day decisions and watch what happens. You'll start to notice things that you would have been oblivious to before. Before jumping to your first conclusion, you'll pause to consider your biases, take in additional information, and be more thoughtful of consequences.

As with anything you practice, if you do it right, the more you do it, the better you'll get. You'll start making better decisions more quickly. You'll see more rapid progress. And as John Boyd would prescribe, you'll start to DO something in your life, and not just BE somebody.

101. Break the Chain: Stop Being a Slave

A vendor once tried to buy me a laptop. Not just any laptop but a very expensive laptop. The vendor claimed that there were no strings attached. And, as they pointed out, I was the only person in the meeting with them, so “no one would know” they had given it to me. It wasn’t a hard decision. I said no. It wasn’t because I didn’t need a laptop. In fact, I did need one. The laptop I was using was old and out of date. I had purchased it myself years ago in a fit of frustration at the ridiculous process the government wanted me to follow to obtain one from them. *“No price is too high to pay for the privilege of owning yourself.”*

— Nietzsche

Governments have clear conflict-of-interest rules for people in situations like this one. The rules, however, are impractical. They’re also expensive. I remember one dinner with a vendor that ended up costing *me* hundreds of dollars personally. I made a mistake: I went to wash my hands around the time the vendor picked out some wine. I came back to see a glass of wine poured for me. When the bill came, the vendor insisted on paying it. Damaging our relationship and embarrassing him, I refused and said, “That’s very generous of you, but the government is clear; I’ve got to pay my share.”

My share? Over \$200. I hadn’t picked the restaurant or the wine. When I returned to work a few days later and submitted a claim for the difference between my per diem and the meal, I was literally laughed at.

But the real reason I said no to the laptop was that I don’t want to be owned by other people. Even if my freedom personally costs me money. However well-meaning the laptop offer might have been, I would have felt a debt to the vendor who’d given it to me. A debt that would need to be paid at some point. That debt would have created a bond between us that I didn’t want.

We need to make our own way, and there is a slippery slope between accepting the generosity of people who help you along and getting dependent on them. The entitlement born from expecting others to help you is a recipe for misery. So is excessive dependence on others.

The lesson is never to anticipate or rely on the kindness of strangers. This dependence means they own you. If you have a mortgage, you don’t own your house; the bank does. Working for the government taught me a lot about ownership — specifically, about dependence on other people. People refused to say what they really thought, subconsciously abiding by the maxim “whose bread I eat, his song I sing.”

When people would approach me and tell me how miserable they were and how they hated their jobs, I would ask them why they didn’t leave. The answer was almost always the same: “I can’t.”

Once we’re bought, it’s hard to get out. While we all start out wanting more independence, we increasingly live lifestyles that make us dependent.

When I first started working in the government, I made just under \$40k a year in salary. For me, just out of university, that was a killing. I felt like I could do whatever I wanted. After a while, I was making more money but still living off the same starting salary. The additional money went to savings and debt repayment. I said no to living above my means and watched as most of my friends couldn’t say no.

A lot of them spent more than they made no matter how many promotions they received. Appetites for desires are rarely quenched. As people spent more, they got more into debt. As they got more into debt, they wanted more and more. As their wants exceeded even the debt-funded shopping sprees (cars, trucks, houses, swimming pools, campers, play structures for the kids, etc.), they got unhappier. They saw other people with things they

wanted. Things they felt like they deserved. Their relationships suffered. They became miserable. They hated their jobs but they were stuck. The bank owned them. Work owned them.

And they realized it too late.

Part of the reason for the laptop offer was likely that vendor expected to have preferred access to me and to the government. Preferred access to information that could potentially benefit his company, to the tune of millions or tens of millions of dollars. Had I accepted the offer, it would have been hard to deny him. I saw the strings and didn't want any part of them.

Amelia Boone, the Michael Jordan of adventure racing, said, "I believe the key to self-sufficiency is breaking free of the mindset that someone, somewhere, owes you something and will come to your rescue."

The bank doesn't owe you a mortgage, just as work doesn't owe you a job.

"Self-sufficiency," wrote Epicurus, "is the greatest of all wealth." Epictetus added that "wealth consists not in having great possessions, but in having few wants."

It can be hard to say no. It means refusing someone, and often it means denying yourself instant gratification. The rewards of doing this are uncertain and less tangible. I call decisions like this "first-order negative, second-order positive." Most people don't take the time to think through the second-order effects of their choices. If they did, they'd realize that freedom comes from the ability to say no.

102. Strategy vs. Tactics: Why the Difference Matters

In order to do anything meaningful, you have to know where you are going.

Strategy and tactics are two terms that get thrown around a lot, and are often used interchangeably in numerous contexts. But what exactly do they mean, what is the difference, and why is it important? In this article, we will look at the contrast between strategy and tactics, and the most effective ways to use each.

While strategy and tactics originated as military terminology, their use has spread to planning in many areas of life. Strategy is overarching plan or set of goals. Changing strategies is like trying to turn around an aircraft carrier—it can be done but not quickly. Tactics are the specific actions or steps you undertake to accomplish your strategy. For example, in a war, a nation's strategy might be to win the hearts and minds of the opponent's civilian population. To achieve this they could use tactics such as radio broadcasts or building hospitals. A personal strategy might be to get into a particular career, whereas your tactics might include choosing your educational path, seeking out a helpful mentor, or distinguishing yourself from the competition.

We might have strategies for anything from gaining political power or getting promoted, to building relationships and growing the audience of a blog. Whatever we are trying to do, we would do well to understand how strategy and tactics work, the distinction, and how we can fit the two together. Without a strategy we run the risk of ambling through life, uncertain and confused about if we are making progress towards what we want. Without tactics, we are destined for a lifetime of wishful thinking or chronic dissatisfaction. As Lawrence Freedman writes in *Strategy: A History*, "Without a strategy, facing up to any problem or striving for any objective would be considered negligent. Certainly, no military campaign, company investment, or government initiative is likely to receive backing unless there is a strategy to evaluate.... There is a call for strategy every time the path to a given destination is not straightforward." And without tactics you become dependent on pure luck to implement your strategy.

To achieve anything we need a view of both the micro and the macro, the forest and the trees—and how both perspectives slot together. Strategy and tactics are complementary. Neither works well without the other. Sun Tzu recognized this two and a half millennia ago when he stated, "Strategy without tactics is the slowest route to victory. Tactics without strategy are the noise before defeat." We need to take a long-term view and think ahead, while choosing short-term steps to take now for the sake of what we want later.

The Relationship Between Strategy and Tactics

Any time we decide on a goal and invest resources in achieving it, we are strategizing. Freedman writes:

One common contemporary definition describes it as being about maintaining a balance between ends, ways, and means; about identifying objectives; and about the resources and methods available for meeting such objectives. This balance requires not only finding out how to achieve desired ends but also adjusting ends so that realistic ways can be found to meet them by available means.

In *The Grand Strategy of the Roman Empire*, Edward N. Luttwak writes that strategy "is not about moving armies over geography, as in board games. It encompasses the entire struggle of adversarial forces, which need not have a spatial dimension at all...." When you think about winning a war, what does it mean to actually win? History is full of examples of wars that were "won" on paper, only to be restarted as soon as the adversary had time to regroup. So being precise in your goal, to encompass the entirety of what you want to achieve, is necessary to articulate a good strategy. It's not about success in the moment, but success in the long term. It's the difference between the end of WWI and WWII. World War I was about winning that war. World War II was about never fighting a

war like that again. The strategies articulated and pursued by the Treaty of Versailles and the Marshall Plan were full of markedly different tactics.

In *Good Strategy, Bad Strategy*, Richard Rumelt writes: “The most basic idea of strategy is the application of strength against weakness. Or if you prefer, strength applied to the most promising opportunity...A good strategy doesn’t just draw on existing strength; it creates strength.” Rumelt’s definition of strategy as creating strength is particularly important. You don’t deplete yourself as you execute your strategy. You choose tactics that reinforce and build strength as they are deployed. Back to winning hearts and minds – the tactics require up-front costs. But as they proceed, and as the strategy unfolds, strength and further support are gained by having the support of the local population. A good strategy makes you stronger.

“Grand strategy is the art of looking beyond the present battle and calculating ahead. Focus on your ultimate goal and plot to reach it.”

— Robert Greene, *The 33 Strategies of War*

The Components of Strategy

The strategic theorist Henry Mintzberg provides a useful approach to thinking about strategy in adversarial situations. According to Mintzberg, there are five key components or types:

1. Plan: A consciously chosen series of actions to achieve a goal, made in advance.
2. Ploy: A deliberate attempt to confuse, mislead or distract an opponent.
3. Pattern: A consistent, repeated series of actions that achieve the desired result.
4. Position: A considered relationship between an entity (organization, army, individual etc) and its context.
5. Perspective: A particular way of viewing the world, a mindset regarding actions that lead to a distinct way of behaving.

Geoffrey P. Chamberlain offers a slightly different perspective on the components of strategy, useful when the strategy is more about a personal goal. He identifies seven parts:

1. A strategy is used within a particular domain.
2. A strategy has a single, well defined focus.
3. A strategy lays out a path to be followed.
4. A strategy is made up of parts (tactics).
5. Each of a strategy’s parts pushes towards the defined focus.
6. A strategy recognises its sphere of influence.
7. A strategy is either intentionally formed or emerges naturally.

According to Rumelt, a strategy must include “premeditation, the anticipation of others’ behavior, and the purposeful design of coordinated actions. As a general rule, strategy is more important in situations where other parties have the potential to thwart or disrupt actions, or where our plans are at risk if we don’t take meaningful steps to achieve them. Good strategy requires us to both focus on a goal, and anticipate obstacles to reaching that goal. When we encounter obstacles, we may need to employ what Freedman calls “deceits, ruses, feints, manoeuvres and a quicker wit”—our tactics.

“The skillful tactician may be likened to the Shuai-Jan. Now the Shuai-Jan is a snake that is found in the Ch’ang mountains. Strike at its head, and you will be attacked by its tail; strike at its tail, and you will be attacked by its head; strike at its middle, and you will be attacked by head and tail both.”

— Sun Tzu, The Art of War

A Few Words on Tactics

Even the most elegant, well-planned strategy is useless if we do not take thoughtful steps to achieve it. While the overall goal remains stable, the steps we take to achieve it must be flexible enough to adjust to the short-term realities of our situation.

The word “tactic” comes from the Ancient Greek “taktikos,” which loosely translates to “the art of ordering or arranging.” We now use the term to denote actions toward a goal. Tactics often center around the efficient use of available resources, whether money, people, time, ammunition, or materials. Tactics also tend to be shorter-term and more specific than strategies.

Many tactics are timeless and have been used for centuries or even millennia. Military tactics such as ambushes, using prevailing weather, and divide-and-conquer have been around as long as people have fought each other. The same applies to tactics used by politicians and protesters. Successful tactics often include an ‘implementation intention’—a specific trigger that signals when they should be used. Simply deciding what to do is rarely enough. We need an “if this, then that” plan for where, when and why. The short-term nature and flexibility of tactics allow us to pivot as needed, choosing the right ones for the situation, to achieve our larger, strategic goals.

If you don’t have a strategy, you are part of someone else’s strategy.”

— Alvin Toffler

Conclusion

Although often regarded as interchangeable, strategy and tactics are somewhat different, though complementary concepts. According to the skilled strategist Sun Tzu, strategy is about winning before the battle begins, while tactics are about striking at weakness. Both are ancient concepts that have come to be an essential part of numerous disciplines and offer endless new ways of thinking.

103. The Decision Matrix: How to Prioritize What Matters

The decisions we spend the most time on are rarely the most important ones. Not all decisions need the same process. Sometimes, trying to impose the same process on all decisions leads to difficulty identifying which ones are most important, bogging us down and stressing us out.

I remember once struggling at the intelligence agency shortly after I received a promotion. I was being asked to make too many decisions. I had no way to sort through them to figure out which ones mattered, and which ones were inconsequential.

The situation built slowly over a period of weeks. My employees were scared to make decisions because their previous boss had hung them out to dry when things went wrong. My boss, a political high flyer, also liked to delegate down the riskiest decisions. As a result, I had more decisions to make than capacity to make them. I was working longer and longer to keep up with the volume of decisions. Worse, I followed the same process for all of them. I was focusing on the most urgent decisions as the cost of the most important decisions.

It was clear to me that I wasn't the right person to make all of the decisions. I needed a quick and flexible framework to categorize decisions into the ones I should be making and the ones I should be delegating. I figured most of the urgent decisions could be made by the team because they were easily reversible and not very consequential. In fact, they were only becoming urgent because the team wasn't making the decisions in the first place. And because I was rushing through these decisions in an effort to put more time into the important decisions, I was making worse choices than the team would have.

As I was walking home one night, I came up with an idea that I used from the next day on, with pretty good success. I call it the Decision Matrix. It's a decision making version of the Eisenhower Matrix, which helps you distinguish between what's important and what's urgent. It's so simple you can draw it on a napkin, and once you get it, you get it.

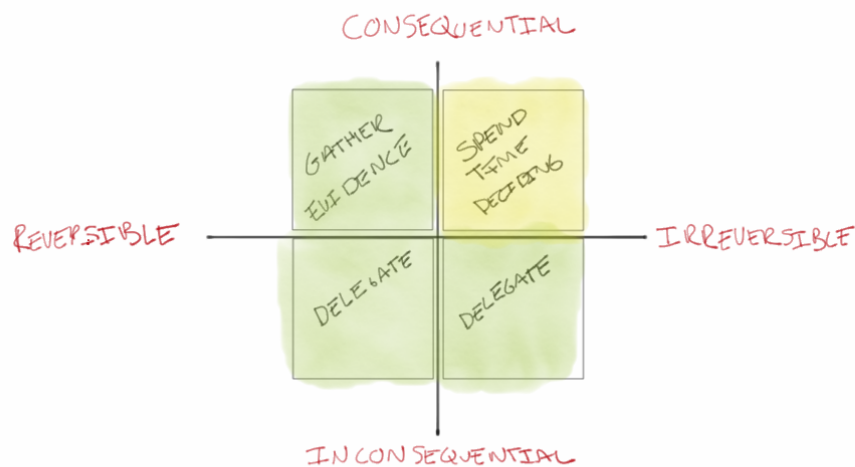
While it won't make the decisions for you, it will help you quickly identify which decisions you should focus on.

The Decision Matrix

My strategy for triaging was simple. I separated decisions into four possibilities based on the type of decision I was making.

1. Irreversible and inconsequential
2. Irreversible and consequential
3. Reversible and inconsequential
4. Reversible and consequential

The great thing about the matrix is that it can help you quickly delegate decisions. You do have to do a bit of mental work before you start, such as defining and communicating consequentiality and reversibility, as well as where the blurring lines are.



The Decision Matrix in Practice

This matrix became a powerful ally to help me manage time and make sure I wasn't bogged down in decisions where I wasn't the best person to decide.

I delegated both types of inconsequential decisions. Inconsequential decisions are the perfect training ground to develop judgment. This saved me a ton of time. Before this people would come to me with decisions that were relatively easy to make, with fairly predictable results. The problem wasn't making the decision—that took seconds in most cases. The problem was the 30 minutes the person spent presenting the decision to me. I saved at least 5–7 hours a week by implementing this one change.

I invested some of that time meeting with the people making these decisions once a week. I wanted to know what types of decisions they made, how they thought about them, and how the results were going. We tracked old decisions as well, so they could see their judgment improving (or not).

Consequential decisions are a different beast. Reversible and consequential decisions are my favorite. These decisions trick you into thinking they are one big important decision. In reality, reversible and consequential decisions are the perfect decisions to run experiments and gather information. The team or individual would decide experiments we were going to run, the results that would indicate we were on the right path, and who would be responsible for execution. They'd present these findings.

Consequential and irreversible decisions are the ones that you really need to focus on. All of the time I saved from using this matrix didn't allow me to sip drinks on the beach.

Rather, I invested it in the most important decisions, the ones I couldn't justify delegating. I also had another rule that proved helpful: unless the decision needed to be made on the spot, as some operational decisions do, I would take a 30-minute walk first.

The key to successfully employing this in practice was to make sure everyone was on same page with the terms of consequential and reversible. At first, people checked with me but later, as the terms became clear, they just started deciding.

While the total volume of decisions we made as a team didn't change, how they were allocated within the team changed. I estimate that I was personally making 75% fewer decisions. But the real kicker was that the quality of all the decisions we made improved dramatically. People started feeling connected to their work again, productivity improved, and sick days (a proxy for how engaged people were) dropped.

Give the Decision Matrix a try—especially if you're bogged down and fighting to manage your time, it may change your working life.

104. Hemingway, a Lost Suitcase, and the Recipe for Stupidity

The best intentions are no match for the havoc caused by stress, tiredness, and unusual circumstances. Even though we know these things can negatively impact our decision-making abilities, we override the caution needed to combat them with faith in our rationality. This failure to recognize our natural vulnerabilities affects everyone. In December 1922, it resulted in a lost suitcase that changed Ernest Hemingway's life. Hemingway, then 23, wrote fiction at night while covering the Lausanne peace conference on assignment for the Toronto Daily Star. Married the year before, Hemingway missed his wife, Elizabeth Hadley Richardson, back in Paris. He asked her to join him in Lausanne. This invite resulted in all of Hemingway's work ending up in a suitcase.

"I have long held that stupidity is very largely the result of fear leading to mental inhibitions."

— Bertie Russell

It's unclear whether Hemingway asked Hadley to bring his work so he could show it to an editor who had taken an interest in him, or she brought it for another reason. Perhaps she thought he'd want to work on something over the Christmas break and wanted to give him all the options. Whatever the reason, the intentions were good. Hadley believed in Hemingway's talent as a writer, and she was financially supporting them so he could pursue his artistic goals.

Sick at the time, Hadley managed to pack everything she could find, including the originals, the carbon copies, and all handwritten notes for a novel in progress, into a single suitcase. When she arrived at Paris's Gare de Lyon, a porter offered to take her bags to her compartment. Right before the train was to depart, Hadley realized the journey would be long and rushed off the train to purchase a bottle of Evian, leaving the bags momentarily unattended. The suitcase was gone when she came back. Devastated, she cried for the entire eight-hour train ride.

Unaware of the loss, Hemingway waited for his wife at Lausanne station. When she arrived in tears, he said nothing warranted such sadness. Whatever was bothering her could be worked out together, he assured her. Hadley finally told him what had happened. Laughing, Hemingway told her not to worry because he had carbon copies of all of his writings. Hadley could barely bring herself to tell him that those too were lost. In disbelief, he rushed back to Paris. In his memoir of those years, *A Moveable Feast*, he recounted: "It was true alright and I remember what I did in the night after I let myself into the flat and found it was true." All his work was lost.

At this point, Hemingway wasn't the Hemingway we know today. None of his fiction had been published. Only two very short stories remained in Paris, "Up in Michigan"—which Gertrude Stein had called unpublishable—and "My Old Man," which was out with an editor at the time.

In a way that would make Marcus Aurelius proud, rather than give up, Hemingway found an interesting way to adapt to the reality of the situation. With the pressure of time, Hemingway shifted his writing style to shorter sentences, cleaner paragraphs and more readable prose. He could write faster this way. Four years later, *The Sun Also Rises* would be published and become a bestseller.

The lessons we can draw from Hemingway are obvious. It's a classic story of a struggling artist who has a setback but overcomes it to achieve huge success. Disney created a multibillion-dollar company on the back of stories like this one. But almost everyone misses the lessons—hiding in plain sight—offered by Hadley. And when it comes to avoiding catastrophic errors, we should pay close attention.

Most of us are not chronically stupid. We make many good decisions and accomplish some amazing things. But we commit acts of stupidity once in a while, usually when we fail to recognize how certain variables are making us vulnerable.

Stupidity is not the opposite of intelligence. My friend Adam Robinson has perhaps the best definition of stupidity I've come across, defining it as the overlooking or dismissing of conspicuously crucial information.

[quote]Stupidity is overlooking or dismissing crucial information.[/quote]

There are some things you should know about stupidity. Stupidity is easier to see in others than ourselves. Stupidity is easier to recognize the farther we are from the act. And stupidity is stubbornly difficult to see in the moment, often only becoming apparent when the outcome is known. This is why it is so important to recognize what the variables are that increase the chances of us doing something stupid. Stress, being tired, being in an unusual situation, these are all things that make us vulnerable to stupidity.

Back to our story: Hemingway shares some blame here, for not separating his originals and carbons. But more interesting are the details that affected Hadley's decisionmaking at the train station. She was outside of her normal environment. She was rushing. She was ill. Each of these things on their own can increase the odds of committing an act of stupidity. Combined, they meant she was significantly vulnerable to errors in judgment. Although Hemingway recovered, and arguably became a better writer because of it, the loss of his work was devastating to both him and his wife at the time. Only the benefit of hindsight gives this episode a decent ending, something that is no guarantee for most stupid decisions.

105. Defensive Decision Making: What IS Best vs. What LOOKS Best

“It wasn’t the best decision we could make,” said one of my old bosses, “but it was the most defensible.”

What she meant was that she wanted to choose option A but ended up choosing option B because it was the defensible default. She realized that if she chose option A and something went wrong, it would be hard to explain because it was outside of normal. On the other hand, if she chose option A and everything went right, she’d get virtually no upside. A good outcome was merely expected, but a bad outcome would have significant consequences for her. The decision she landed on wasn’t the one she would have made if she owned the entire company. Since she didn’t, she wanted to protect her downside. In asymmetrical organizations, defensive decisions like this one protect the person making the decision.

My friend and advertising legend Rory Sutherland calls defensive decisions the Heathrow Option. Americans might think of it as the IBM Option. There’s a story behind this:

A while ago, British Airways noticed a reluctance for personal assistants to book their bosses on flights from London City Airport to JFK. They almost always picked Heathrow, which was further away, and harder to get to. Rory believed this was because “flying from London City might be better on average,” but “because it was a non-standard option, if anything were to go wrong, you were much more likely to get it in the neck.”

Of course, if you book your boss to fly out of Heathrow—the default—and the flight is delayed, they’ll blame the airline and not you. But if you opted for the London City airport, they’d blame you.

At first glance, it might seem like defensive decision making is irrational. It’s actually perfectly rational when you consider the asymmetry involved. This asymmetry also offers insight into why cultures rarely change.

Some decisions place the decisionmakers in situations where outcomes offer little upside and massive downside. In these cases, it can seem like great outcomes carry a 1% upside, good outcomes are neutral, and poor outcomes carry at least 20% downside—if they don’t get you fired.

It’s easy to see why people opt for the default choice in these cases. If you do something that’s different—and thus hard to defend—and it works out, you’ve risked a lot for very little gain. If you do something that’s different and it doesn’t work out, and you might find yourself unemployed.

This asymmetry explains why your boss, who has nice rhetoric about challenging norms and thinking outside the box, is likely to continue with the status quo rather than change things. After all, why would they risk looking like a fool by doing something different? It’s much easier to protect themselves. Defaults give people a possible out, a way to avoid being held accountable for their decisions if things go wrong. You can distance yourself from your decision and perhaps be safe from the consequences of a poor outcome.

Doing the safe thing is not the same as doing the right thing. Often, the problem with the safe thing is that there is no growth, no innovation. It’s churning out more of the same. So in the short term, while you may think that the default is a better choice for your job security, in the long game there’s a negative. When you are unwilling to take risks, you stop recognizing opportunities. If you aren’t willing to put yourself out there for 1% gain, how do you grow? After all, the 1% upsides are more common than the 50% upsides. But in either case, if you become afraid of downside, then what level of risk would be acceptable? It’s not that choosing the default makes you a bad person. But a lifetime of opting for the default limits your opportunities and your potential.

And for anyone who owns a company, a staff full of default decision makers is a death knell. You get amazing results when people have the space to take risks and not be penalized for every downside.

106. How Not to Be Stupid

After a four-hour conversation on The Knowledge Project (Part 1, Part 2), Adam Robinson (@IAmAdamRobinson) and I shared another 10-minutes that shouldn't be missed on how not to be stupid.

Shane Parrish: Adam, you did a presentation once on how not to be stupid. Can you tell me about that? What is stupidity?

Adam Robinson: Right. It's so funny you should ask that, because people think stupidity is the opposite of intelligence. In fact, stupidity is the cost of intelligence operating in a complex environment. It's almost inevitable. And so I was asked by an organizer of an investment conference in the Bahamas of some elite global investors to do a talk on anything I wanted to do, except not about investing. It's just, pick an interesting topic. So I thought for a second and I blurt out, "Okay. How about how not to be stupid?" He laughed and he said, "Okay. Great." It took me a month of hard thinking, mind you, just to define stupidity. By the way, if you're in any field and you want to find ways to innovate, focus on words that are commonly used and try to define them simply.

It took me about a month, and I defined stupidity as overlooking or dismissing conspicuously crucial information. Right? It's crucial information, like you better pay attention to it. It's conspicuous, like it's right in front of your nose and yet you either overlook it or you dismiss it. How not to be stupid, what are the causes of human error—and it took me a couple of months of research just to come up with data points, because most stupidity is ignored or swept under the rug. I studied instances of scientific stupidity and literary stupidity and military stupidity and every other kind of stupidity, as well as two domains that engineer stupidity.

One is benign: magic. The magician misdirects your attention. The whole goal of the magician is to make you stupid, to not notice something you should have. The other is frauds and cons and hoaxes. That's also—but that's a malicious, malevolent kind of engineering of stupidity. The magician does so with our full consent, for entertainment purposes. The conman engineers stupidity for their own gain. I do historical research, everything, and I identify seven factors that lead to stupidity.

These seven factors are fascinating. In no particular order: one, being outside your normal environment or changing your routines. Two, being in the presence of a group. Three, being in the presence of an expert or if you, yourself, are an expert. Four, doing any task that requires intense focus. Five, information overload. Six, physical or emotional stress, fatigue. Seven—I'll come back to seven. I forget it right now. It's a few years. It'll come back to me in a second.

All seven factors are present in U.S. hospitals. All seven factors. This will astonish you. This was recently written about, but I don't think it's really dawned on people. In the United States every year, there are roughly 30,000 fatalities from automobile accidents. That is a benchmark. How many deaths accidentally occur, accidentally, in hospitals every year? In other words, you go in with a broken arm and you don't come out. Not, you died as a result of what you went in for. You died because of error, human error. I would tell you the current best estimate—this is deaths, mind you, not injuries—is 210 to 440 thousand people die every year in the United States from hospital error.

[quote]Stupidity is overlooking or dismissing conspicuously crucial information[/quote] (Editors note, that was not part of the conversation but will add context: When it comes to overloading our cognitive brains, the seven factors are: being outside of your circle of competence, stress, rushing or urgency, fixation on an outcome, information overload, being in a group where social cohesion comes into play, and being in the presence of an "authority." Acting alone any of these are powerful enough, but together they dramatically increase the odds you are unaware that you've been cognitively compromised.)

We know what to do, we just don't do it correctly. (Atul Gawande and I talk about this in [our interview](#)).

It's the third leading cause of death in the United States, right behind cancer and heart disease. If those seven factors—by the way, you don't need all seven factors to be present. They're additive. Oh, I remember what the final one was, and it's so funny I should forget it because it's the one that usually triggers stupidity. Rushing or a sense of urgency. So funny I would forget that one. It's usually the first one I say. By the way, if you're outside your normal environment and you are rushing, you are in big trouble, which is why often people are rushing on the way to the airport and they forget their passport or they do something. It has to do with information overload. All seven factors were present at the U.S. Challenger disaster. Remember back in 1986?

Didn't have to happen. All seven factors were present. There was the musician Yo-Yo Ma, in 1998 I believe, was rushing to an appointment in New York City. He lives in Boston. He was outside his normal environment, rushing, and he was preoccupied because he was late for an appointment. Three of the seven factors. You don't need all seven to create stupidity. In the back of the cab in which he's being driven is his million-dollar cello in a big blue Plexiglas thing. It's in the trunk. He gets out of the cab, he leaves it in the back of the trunk. All of a sudden, because Yo-Yo Ma is such a celebrity, the mayor is called, the police chief and all cars bulletin goes out, find this cello.

Cello?

They do. In the press conference, get this, he says, "I just did something stupid." I'm using air quotes. That's an exact phrase. "I just did something stupid. I was in a rush." Sure enough, in my research, I found three other situations where world class musicians were in a different city, rushing, and they left their instruments. Each one of them. One a \$3 million violin. He was on a national tour, left a \$3 million violin in an Amtrak train. Imagine \$3 million violin in the luggage compartment of an Amtrak train. Fortunately, they called ahead and they found it at the next station. He was lucky. Each of the musicians, in exactly the same—

Circumstance.

*—circumstances led to stupidity. Now, Atul Gawande wrote a book called [The Checklist Manifesto](#). Atul Gawande is brilliant. Brilliant, brilliant, brilliant. However, the problem with checklists is that the stupidity factors override them. The worst aviation disaster in history, *Shane*, occurred in 1977. Nearly 600 lives were lost when two planes collided during the day on the ground. Imagine, two planes collided in an airport on the ground. Six hundred lives were lost. You might say, how does that even happen? All seven factors were present. Something else. Do you know what the pilot that caused the crash was doing right before he took off and slammed into the plane? He was racing through a checklist.*

Checklists don't help you if you're stupid about the checklist. You're just not going to use it. A really important takeaway from that, and I'm so glad we got that final question in, is beware of rushing—and if these factors are present, don't make any important decisions. It doesn't take much. By the way, I mentioned fatigue and illness. If you're tired or emotionally overwrought, if you have pulled an all-nighter, you have the motor control and the reflex speed of someone who is legally drunk. An all-nighter you think, I mean we've all pulled all-nighters, right? We all sometimes pull multiple all-nighters.

You gotta be aware. You may think that cognitively you're okay, but your motor control skills and your reflexes are those of someone who's legally drunk. You've really got to be careful. By the way, multitasking is information overload. That comes under the information overload thing, and if you're talking on Bluetooth while you're driving a car, you have exponentially increased the odds that you're going to get into an accident.

This is why when you're lost, the first thing you do is turn down the radio.

Oh, fascinating. You're right.

When you're in a car, when you get lost, you always...one of the first things you do is eliminate an input, which is the radio.

That's so funny. You're right.

Or if you're talking with somebody you say, "Hold on a second," because you intuitively know that that's just—subconsciously, you know that's distracting you.

By the way, that's so funny you should mention that, because that's why when I tell people that statistic about...talking on Bluetooth on the phone when you're driving is incredibly dangerous. People say, "Yeah, but what about if someone's in the front of the seat talking to you?" That in fact doubles your odds. If someone's in the front seat with you, talking while you're driving, you've doubled the chances of your getting into an accident. Just doubled. Just that, but the difference is that that person, when you are dealing with unusual traffic conditions, he or she will shut up.

Right, they can see it.

They can see it. The person on the phone who's talking on Bluetooth doesn't shut up.

You're still getting the input. That's why it's so dangerous.

That's really interesting. I never thought of that.

Yeah. Well, I didn't think about it until I researched it.

107. The Anatomy of a Great Decision

Making better decisions is one of the best skills we can develop. Good decisions save time, money, and stress. Here, we break down what makes a good decision and what we can do to improve our decision-making processes.

Improving our decision-making abilities is a central goal at Farnam Street. Better decisions save time, money, and stress. While it's an investment now, in the long run, learning principles and developing a multidisciplinary lens that we can apply throughout life is a worthy investment.

As we have said before, a decision should not be judged solely on its outcome.

Sometimes good decisions produce bad results. A recruiting process that has resulted in mostly excellent candidates will still occasionally fail to weed out a bad fit. It is impossible to have perfect and complete information for all the variables involved. So we do the best with what we have.

Using a decision journal can move us to that place where we are consistently making better decisions. At its core, the technique of identifying and reflecting on process from beginning to end helps us achieve the two main qualities in better decisions:

1. Using principles, not tactics
2. Looking at a situation through a multidisciplinary lens

These qualities are what we need to improve over time. And in the same way compounding interest increases our bank balance, better decisions produce exponentially better results the more of them we make. Hard decisions today, made well, prepare us to make decisions more easily in the future.

When we look around, however, to see what we can learn from others who made great decisions, we often judge based solely on the outcomes. Whether a decision by a family member to buy Coca-Cola stock in the '80s, or Caesar to cross the Rubicon, we evaluate a decision as good based on how things turned out.

Evaluating decisions on outcomes prevents us from learning. We need to dive into a decision, cut it open and examine its parts. Regardless of what happened, learning how a decision was made is the place to find knowledge. So what does the anatomy of a great decision look like?

// Evaluating
decisions on
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prevents us from
learning. //

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The Marshall Plan

After WWII, Europe was in ruins. Much of the infrastructure had been destroyed. Many people were starving, and had lost everything they possessed. Those systems we take for granted, but on which we rely daily—transportation, manufacturing, agriculture—had been devastated. The economies were essentially broken, and the countries that saw a lot of fighting had much to rebuild. But with what money? Many countries were in serious debt. Continued, widespread economic hardships were on the horizon.

In 1947, Secretary of State General George Marshall put forward a plan that has since carried his name, a plan to give a massive amount of money to several European nations. Those countries accepted, the continent was rebuilt, and Marshall is credited with one of the most positive defining acts of economics, politics, and ethics in the last century. But when you look at the thinking that went into the Marshall Plan, the reasoning behind the details, you see that it would have been a great decision regardless of the outcome.

Asking the Right Questions

At the beginning, participants asked questions. What do we want to achieve? What problems are we addressing? What does a successful outcome look like?

From there came the principles, things like: strong economies minimize social unrest; countries that work toward mutual goals are less likely to fight each other; let's not have another war in Europe anytime soon.

Starting from these principles, decision makers evaluated the situation through a multidisciplinary lens. Economics, politics, humanitarian responsibilities, historical and psychological factors—the plan sought to address issues on many fronts and took a wide perspective into account.

The plan was developed in the State Department of the United States. It was not the work of a single individual, and contributions from many people made it into the final version that Marshall fought for in Congress.

In the end, there were three key decisions made in terms of the structure of the plan:

1. To give, versus lend, the majority of the aid
2. To require the nations receiving the aid to work out how to allocate it
3. To invite Russia to partake

Using Multiple Lenses

The decision to give rather than lend the majority of the aid was the result of looking at the situation through economic, political, and humanitarian lenses. It was also a win-win.

Immediately following the war, the European nations had put significant effort into restarting their economies. But they were doing it with borrowed dollars, needing to import far more than they were capable of exporting. Many economies needed modernization, which was impossible to fund while paying for imports at the same time. Without full economic recovery in Europe, there was great danger of a recession, or even a second depression. Basically, Europe needed money.

But economies are also about people. It is people who produce and consume and develop the economy. So it wasn't just the countries that needed financial assistance, but the people in them. The designers of the plan knew that hungry, desperate people would only create more social unrest. They saw that if they didn't give the money to Europe they might very well have to spend it on national security as Europe fell apart.

And we can't discount the impact of the physical reality of the aftermath of the war that the liberating forces confronted—starving people, towns reduced to rubble. The case for humanitarian assistance was strong.

Letting the World Do the Work For You

The decision to have the participating nations allocate the aid among themselves was the answer to what the historical, political and psychological lenses revealed.

Many people felt that the approach to reparations after WWI was a significant impetus for WWII. The First World War had a similar effect on the economies and infrastructures of the nations involved. In 1918, angry at Germany, France and Britain had demanded huge sums of money. The problem was, it essentially crippled Germany economically, and caused a social and political situation that created enmity among the European nations. Many argue that it was this series of events that produced a situation in which Hitler could come to power.

The creators of the Marshall Plan were aware of this, and it was one of the elements that influenced the design of the terms. If Germany collapsed again, they might be fighting World War III in twenty years.

By asking enemies to work together and approve each other's share, the plan created a buy-in that defused much of the anger and animosity between the nations. Just a couple of years earlier they had been at war with each other. After sacrificing so much in both lives and money, it was natural that the various peoples were angry over both who started the war, and the many violent and destructive events that were enacted over those six years.

But the US decided to not take sides and extend the alliances of the war. The plan creators realized this wouldn't help fulfill the principles they had chosen to abide by. Europe working meant Europe working together.

Outcomes Over Optics

Inviting Russia to share in the aid was another important result of applying those political, historical, psychological, and humanitarian lenses.

The end of WWII marked the beginning of the Cold War. More nebulous by nature, starting a couple of years after the liberation of Europe and the dropping of the atomic bomb, this political climate would shape international relations for the next 40 years. The Marshall Plan took into account how best to navigate this complicated territory. Russia had been a valuable ally during the war, holding the eastern front and inflicting considerable damage on Hitler's efforts. But immediately post-war their actions demonstrated a desire to at least influence, if not control, the political structure of the world. Their version of communism was at direct odds with US democracy, and was thus considered a legitimate threat. Even though there was very little expectation that Russia would participate, and possibly even less desire to give them money, Russia and its allied countries were invited by both the US and the European nations to participate in the talks involving the implementation of the plan. They chose not to, and followed up with accusing the plan of being a front to American imperialist goals. This was important because it forced Russia's hand. They could not later claim that the Iron Curtain was something that was thrust on them. It was, instead, something they deliberately chose to build.

The Marshall Plan is remembered as a great decision, not strictly because of its outcomes—though it did contribute to the debatably successful reconstruction of Europe, it did not succeed in preventing the deterioration of relations with Russia—but because it was firmly grounded in principles that were identified and executed through a multidisciplinary lens.

108. Externalities: Why We Can Never Do “One Thing”

No action exists in a vacuum. There are ripples that have consequences that we can and can't see. Here are the three types of externalities that can help us guide our actions so they don't come back to bite us.

An externality affects someone without them agreeing to it. As with unintended consequences, externalities can be positive or negative. Understanding the types of externalities and the impact they have in our lives can help us improve our decision making, and how we interact with the world.

Externalities provide useful mental models for understanding complex systems. They show us that systems don't exist in isolation from other systems. Externalities may affect uninvolved third parties which make them a form of market failure—an inefficient allocation of resources.

We both create and are subject to externalities. Most are very minor but compound over time. They can inflict numerous second-order effects. Someone reclines their seat on an airplane. They get the benefit of comfort. The person behind bears the cost of discomfort by having less space. One family member leaves their dirty dishes in the sink. They get the benefit of using the plate. Someone else bears the cost of washing it later. We can't expect to interact with any system without repercussions. Over time, even minor externalities can cause significant strain in our lives and relationships.

The First Law of Ecology

To understand externalities it is first useful to consider second-order consequences.

In *Filters Against Folly*, Garrett Hardin describes what he considers to be the First Law of Ecology: We can never do one thing. Whenever we interact with a system, we need to ask, “And then what? What will the wider repercussions of our actions be?” There is bound to be at least one externality.

Hardin gives the example of the Prohibition Amendment in the U.S. In 1920, lawmakers banned the production and sale of alcoholic beverages throughout the entire country. This was in response to an extended campaign by those who believed alcohol was evil. It wasn't enough to restrict its consumption—it needed to go.

The addition of 61 words to the American Constitution changed the social and legal landscape for over a decade. Policymakers presumably thought they could make the change and people would stop drinking. But Prohibition led to numerous externalities. Alcohol is an important part of many people's lives. Few were willing to suddenly give it up without a fight. The demand was more than strong enough to ensure a black-market supply re-emerged.

Wealthy people stockpiled alcohol in their homes before the ban went into effect.

Thousands of speakeasies and gin joints flourished. Walgreens grew from 20 stores to 500, in large part due to its sales of ‘medicinal’ whiskey. Former alcohol producers simply sold the ingredients for people to make their own. Gangsters like Al Capone made their fortune smuggling, and murdered his rivals in the process. Crime gangs undermined official institutions. Tax revenues plummeted. People lost their jobs. Prisons became overcrowded and bribery commonplace. Thousands died from crime and drinking unsafe homemade alcohol.

Policymakers did not fully ask, “And then what?” before legislating. Drinking did decrease during this time, on average by about half. But this was far from the hope of a total ban. The second-order consequences outweighed any benefits.

As economist Gregory Mankiw explains in *Principles of Microeconomics*,

In the presence of externalities, society's interest in a market outcome extends beyond the well-being of buyers and sellers who participate in the market; it also includes the well-being of bystanders who are affected indirectly.... The market equilibrium is not efficient

when there are externalities. That is, the equilibrium fails to maximize the total benefit to society as a whole.

Negative Externalities

Negative externalities can occur during the production or consumption of a service or good. Pollution is a useful example. If a factory pollutes nearby water supplies, it causes harm without incurring costs. The costs to society are high and are not reflected in the price of whatever the factory makes. Economists often view environmental damage as another factor in a production process. But even if pollution is taxed, the harmful effects don't go away.

Transport and manufacturing release toxins into the environment, harming our health and altering our climate. The reality though, is these externalities are hard to see, and it is often difficult to trace them back to their root causes. There's also the question of whether we are responsible for externalities or not.

Imagine you're driving down the road. As you go by an apartment, the noise disturbs someone who didn't agree to it. Your car emits air pollution, which affects everyone living nearby. Each of these small externalities will affect people you don't see and who didn't choose them. They won't receive any compensation from you. Are you really responsible for the externalities you cause? If you're not being outright careless or malicious, isn't it just part of life? How much responsibility do we have as individuals, anyway?

Calling something a negative externality can be a convenient way of abdicating responsibility.

Positive Externalities

A positive externality imposes an unexpected benefit on a third party. The producer doesn't agree to this, nor do they receive compensation for it.

Scientific research often leads to positive externalities. Research findings can have applications beyond their initial scope. The resulting information becomes part of our collective knowledge base. However, the researcher who makes a discovery cannot receive the full benefits. Nor do they necessarily feel entitled to them.

Blaise Pascal and Pierre de Fermat developed probability theory to solve a gambling dispute. Their work went on to inform numerous disciplines (like the field of calculus) and transform our understanding of the world. Probabilities are now a core part of how we think. Pascal and Fermat created a positive externality.

Someone who comes up with an equation cannot expect compensation each time it gets used. As a result, the incentives to invest the time and effort to discover new equations are reduced. Algorithms, patents, and copyright laws change this by allowing creators to protect and profit from their ideas for years before other people can freely use them. We all benefit, and researchers have an incentive to continue their work.

Network effects are an example of a positive externality. Silicon Valley understands this well. Each person who joins a network, like a marketplace app, increases the value to all other users. Those who own the network have an incentive improve it to encourage new users. Everyone benefits from being able to communicate with more people. While we might not join a new network intending to improve it for other people, that is what normally happens. (On the flipside, network effects can also produce negative externalities, as too many members can decrease the value of a network.)

Positive externalities often lead to the "free rider" problem. When we enjoy something that we aren't paying for, we tend not to value it. Not paying can remove the incentive to look after a resource and leads to a Tragedy of the Commons situation. As Aristotle put it, "For that which is common to the greatest number has the least care bestowed upon it." A good portion of online content succumbs to the free rider problem. We enjoy it and yet we don't pay for it. We expect it to be free and yet, if users weren't willing to support sites like Farnam Street, they would likely fold, start publishing lower quality articles, or sell readers to advertisers who collect their data. The end result, as we see too frequently, is low-

quality content funded by page-view advertising. (This is why we have a membership program. Members create a positive externality for non-members by helping support the free content.)

Positional Externalities

Positional externalities are a form of second-order effects. They occur when our decisions alter the context of future perception or value.

For example, consider what happens when a person decides to start staying at the office an hour late. Perhaps they want a promotion and think it will endear them to managers. Parkinson's Law states that tasks expand to fit the time allocated to them. What this person would otherwise get done by 5pm, now takes until 6pm. Staying late becomes their norm. Their co-workers notice and start to also stay late. Before long, staying at the office until 6pm becomes the standard for everyone. Anyone who leaves at 5pm is perceived as lazy. Now that 6pm is the norm, everyone suffers. They are forced to work more without deriving any real benefits. It's a lose-lose situation for everyone.

Someone we know once made an investment with a nearly unlimited return by gaming the system. He worked for an investment firm that valued employees according to a perception of how hard they worked and not necessarily by their results. Each Monday he brought in a series of sport coats and left them in the office. He paid the cleaning staff \$20 a week to change the coat hanging on his chair and to turn on his computer. No matter what happened, it appeared he was always the first one into the office even though he often didn't show up from a "client meeting" until 10. When it came to bonus time, he'd get an enormous return on that \$20 investment.

Purchasing luxury goods can create positional externalities. Veblen goods are items we value because of their scarcity and high cost. Diamonds, Lamborghinis, tailor-made suits — owning them is a status symbol, and they lose their value if they become cheaper or if too many people have them. As Luca Lambertini puts it in *The Economics of Vertically Differentiated Markets*,

The utility derived from consumption is a function of the quantity purchased relative to the average of the society or the reference group to whom the consumer compares." In other words, a shiny new car seems more valuable if all your friends are driving battered old wrecks. If they have equally (or more) fancy cars, the value of yours drops. At some point, it seems worthless and it's time to find a new one. In this way, the purchase of a Veblen good confers a positional externality on other people who own it too.

That utility can also be a matter of comparison. A person earning \$40,000 a year while their friends earn \$30,000 will be happier than one earning \$60,000 when their friends earn \$70,000. When someone's salary increases, it raises the bar, giving others a new point of reference.

We can confer positional externalities on ourselves by changing our attitudes. Let's say someone enjoys wine but is not a connoisseur. A \$10 bottle and a \$100 bottle make them equally happy. When they decide to go on a course and learn the subtleties and technicalities of fine wines, they develop an appreciation for the \$100 wine and a distaste for the \$10. They may no longer be able to enjoy a cheap drink because they raised their standards.

Conclusion

Externalities are everywhere. It's easy to ignore the impact of our decisions—to recline an airplane seat, to stay late at the office, or drop litter. Eventually though, someone always ends up paying. Like the villagers in Hardin's *Tragedy of the Commons*, who end up with no grass for their animals, we run the risk of ruining a good thing if we don't take care of it. Keeping the three types of externalities in mind is a useful way to make decisions that won't come back to bite you. Whenever we interact with a system, we should remember to ask Hardin's question: and then what?

109. Preserving Optionality: Preparing for the Unknown

We're often advised to excel at one thing. But as the future gets harder to predict, preserving optionality allows us to pivot when the road ahead crumbles.

How do we prepare for a world that often changes drastically and rapidly? We can preserve our optionality.

We don't often get the advice to keep our options open. Instead, we're told to specialize by investing huge hours in our passion so we can be successful in a niche.

The problem is, it's bad advice. We live in a world that's constantly changing, and if we can't respond effectively to those changes, we become redundant, frustrated, and useless. Instead of focusing on becoming great at one thing, there is another, counterintuitive strategy that will get us further: preserving optionality. The more options we have, the better suited we are to deal with unpredictability and uncertainty. We can stay calm when others panic because we have choices.

Optionality refers to the act of keeping as many options open as possible. Preserving optionality means avoiding limiting choices or dependencies. It means staying open to opportunities and always having a backup plan.

An option is usually defined as something we have the freedom to choose. That's a fairly broad definition. In the context of a strategy, it must also have a limited downside and an open-ended upside. Betting in a casino is not an option, for example—the upside is known. Losses and gains are both constrained. What about betting on a new tech startup? That's an option—the upside is theoretically unlimited; the losses are limited to the amount you invest.

Options present themselves all the time, but life-altering ones often come up during times of great change. These options are the ones we have the hardest time capitalizing on. If we've specialized too much, change is a threat, not an opportunity. Thus, if we aren't certain where the opportunities are going to be (and we never are), then we need to make choices to keep our options open.

Baron Rothschild is often quoted as having said that "the time to buy is when there's blood in the streets." That's a misquote, however. What he actually said was "buy when there's blood in the streets, even if the blood is your own." Rothschild recognized that those are the times when new options emerge. That's when many investors make their fortunes and when entrepreneurs innovate. Rothschild saw opportunity in chaos. He made a fortune buying during the panic after the Battle of Waterloo.

When we occupy a small niche, we sacrifice optionality. That means less freedom and greater dependency. No one can predict the future—not even experts—so isn't it a good idea to have as many avenues open as possible?

The coach's dilemma: strength vs. optionality

In Simple Rules: How to Thrive in a Complex World, Kathleen Eisenhardt and Donald Sull describe the experience of strength coach Shannon Turley. For the uninitiated, the role of a strength coach is to help athletes stay healthy and perform better, rather than teach specific skills.

Turley began his career working at Virginia Polytechnic Institute and State University.

When he started, the football players there followed a strength program based on weightlifting alone. Athletes wore t-shirts listing their personal records and competed to outdo each other. The mantra was: get stronger by lifting more weight.

But Turley soon realized that this program was not effective because it left the athletes with limited optionality. Turley found no correlation between weightlifting prowess and competitive performance. Being able to bench press a lot of weight didn't serve them well on the football field. As he put it, "In football if you're on your back, you've already lost."

Keeping a record of what he saw, he began looking for different options for the athletes.

After gaining experience coaching in several sports, Turley realized that strength was not the most important factor for athletic success. What mattered for any type of athlete was staying free of injuries and good nutrition. Why? Because that gave athletes greater optionality.

An uninjured, healthy player could stay in each game for longer and miss fewer training sessions. It also meant less chance of requiring surgery, which many of his students faced, or of being forced to retire from competitive sports at a young age.

Turley began coaching football players at Stanford University. He implemented a program focusing on proper nutrition and flexibility exercises such as yoga—not weightlifting. He also focused on healing existing injuries that restricted athletes' performance. One football player he worked with had ongoing back problems, so Turley designed a regime to improve that issue. It worked: the athlete never missed a game and went on to play in the NFL. Turley's approach served to preserve optionality for his players. Even the best athlete will lose many competitions. So the more an athlete is healthy enough to participate in games, the greater the chances of those crucial successes. Turley's experience illustrates the trade-offs between particular physical abilities and optionality.

Over-specializing in one area is highly limiting, especially if it requires extensive upkeep.

Like a football player, we can retain optionality by avoiding overtly damaging risks and ensuring we stay in the game for as long as possible—whatever that game is. That might mean lifting less metaphorical weight at any one time, while also working to keep ourselves flexible.

The tyranny of small decisions

Few people would deliberately lock themselves into an undesirable situation. Yet we often make small, rational decisions that end up removing options over time. This is the tyranny of small decisions. Economist Alfred Kahn identified the concept in 1966. Kahn begins the article with a provocative thought experiment:

Suppose, 75 years ago, some being from outer space had made us this proposition: "I know how to make a vehicle that could in effect put 200 horses at the disposal of each of you. It would permit you to travel about, alone or in small groups, at 60 to 80 miles an hour. But the costs of this gadget are 40,000 lives per year, global warming, the decay of the inner city, endless commuting, and suburban sprawl." What would we have chosen collectively?

Put that way, the answer, of course, is no—we wouldn't choose the advancement of transportation technology if we could immediately see the grievous cost. But we have said yes to that exact offer over time through a million small decisions, and now it is difficult to back out. Most of the modern world is built to accommodate cars. Driving is now the "rational" choice, no matter the destructive effect. Sometimes it feels as though we have no other option.

Kahn's point is that small decisions can lead to bad outcomes. At some point, alternatives disappear. We lose our optionality. It is easy to see the downsides of big decisions. The costs of smaller ones can be more elusive. In a market economy, Kahn explains, change is the result of tiny steps. Combined, they have a tremendous cumulative effect on our collective freedom. Day to day, it is hard to see the path that is forming. At some point, we may look up and not like where we are going. By then it is too late. Kahn writes:

Only if consumers are given the full range of economically feasible and socially desirable alternatives in a big discrete bundle will misallocation of resources due to the tyranny of small market-determined decisions be broken.

The tragedy of the commons is another such instance of the power of small decisions.

Garett Hardin's parable illustrates why common resources are used more than is desirable from the standpoint of society as a whole. No one person makes a single decision to deplete the resources. Instead, each person makes a series of small choices that ultimately cause environmental ruin. In the original example where villagers are freely able

to graze their animals on common land, having access to it gives everyone a lot of options for raising animals or farming. Once the pasture is exhausted from everyone putting too many animals out to graze, however, everyone loses their optionality.

Optionality can be a matter of perspective

As Seneca put it, “In one and the same meadow, the cow looks for grass, the dog for a hare, and the stork for a lizard.” Where some people only see blood in the streets, other people see a chance to succeed.

Preserving optionality can be as much about changing our attitudes as our circumstances. It can be about learning to spot opportunities—and to make them. Optionality is not a new concept. A portion of the Old Testament dating back to between 450 and 180 BCE declares:

Invest in seven ventures, yes, in eight; you do not know what disaster may come upon the land. If clouds are full of water, they pour rain on the earth. Whether a tree falls to the south or to the north, in the place where it falls, there it will lie. Whoever watches the wind will not plant; whoever looks at the clouds will not reap . . . Sow your seed in the morning, and at evening let your hands not be idle, for you do not know which will succeed, whether this or that, or whether both will do equally well.

In today’s world, optionality can be integrated into a number of different areas of our lives by looking for ways to prepare for a variety of possible events, instead of optimizing for the recent past.

Keeping our options open means developing generalist skills like creativity, rather than specializing in one area, like a particular technology. The more diverse the knowledge and skills you can draw on, the better positioned you are to take advantage of new opportunities.

It means not relying on a single distributor for your company’s product or having the supply chain for an entire industry dependent on one country. You can’t make your decisions solely on how the world was yesterday. Preserving optionality means you may take a short-term hit in sales by funding diversity, but the result is you will be much better positioned in the future to keep your business going when circumstances change.

It means not relying on a single energy source to power the vehicles that move us and the goods we need around. Building our society around oil—a finite resource—is limiting. Developing multiple forms of sustainable energy creates new options for when that finite resource is depleted.

Or consider the lean startup methodology. Building a minimum viable product means having the flexibility to pivot or change plans. No demand? No problem! Just try something else. Lean startups iterate until they find product/market fit. Many founders keep their teams as small as possible. They avoid fixed costs and commitments. They keep their options open.

The lean startup methodology recognizes that a new company cannot make a grand plan; it needs to adapt and evolve. As Steve Jobs understood, most customers don’t know they will want something until they have tried it. It’s hard to prepare for changing customer desires without optionality. If a company is flexible, they can adapt to the information they receive once a product hits the market.

“Wealth is not about having a lot of money; it’s about having a lot of options.”

— Chris Rock

Ultimately, preserving optionality means paying attention and looking at life from multiple perspectives. It means building a versatile base of foundational knowledge and allowing for serendipity and unexpected connections. We must seek to expand our comfort zone and circle of competence, and we should take minor risks that have potentially large upsides and limited downsides.

Paradoxically, preserving optionality can mean saying no to a lot of opportunities and avoiding anything that will prove to be restrictive. We need to look at choices through the lens of the optionality they will give us in the future and only say yes to those that create more options.

Preserving your optionality is important because it gives you the flexibility to capitalize on inevitable change. In order to keep your options open, you need diversity. Diversity of perspective, thought, knowledge, and skills. You don't want to find yourself in a position of only being able to sell something that no one wants. Rapid, extraordinary change is the norm. In order to adapt in a way that is useful, keep your options open.

Making decisions and applying mental models in the real world involves a systematic approach that combines critical thinking, analysis, and creativity. Here's a step-by-step guide to help you make decisions and apply mental models effectively:

Steps for Making Decisions and Applying Mental Models:

1. Define the Decision to Be Made:

- Clearly define the decision you need to make, including the problem or question you're trying to address and the desired outcome.

2. Identify Relevant Mental Models:

- Consider which mental models might be applicable to the decision-making process based on the nature of the problem or question.
- Choose mental models that offer insights or frameworks that align with the decision you're facing.

3. Gather Information and Data:

- Collect relevant information and data related to the decision from reliable sources.
- Use research, analysis, and observation to gather insights that will inform your decision-making process.

4. Analyze the Decision Using Mental Models:

- Apply the relevant mental models to analyze the decision from different perspectives.
- Use the frameworks provided by the mental models to organize your thoughts, identify patterns, and evaluate potential outcomes.

5. Consider Alternative Perspectives:

- Explore alternative viewpoints and consider how different mental models might lead to different conclusions or approaches.
- Use critical thinking to weigh the pros and cons of each perspective and consider their implications for the decision.

6. Evaluate Potential Solutions or Courses of Action:

- Generate potential solutions or courses of action based on the insights gained from applying mental models.
- Use logical reasoning and analysis to evaluate the feasibility, effectiveness, and potential risks of each option.

7. Make a Decision:

- Based on your analysis and evaluation, make a decision that aligns with your goals, values, and priorities.
- Choose the option that offers the best balance of benefits, risks, and alignment with the mental models applied.

8. Implement the Decision:

- Develop a plan for implementing the decision, including specific actions, timelines, and responsibilities.
- Use project management tools and techniques to track progress and ensure accountability.

9. Monitor and Evaluate:

- Monitor the implementation of the decision closely and evaluate its effectiveness over time.
- Use feedback, data analysis, and reflection to assess whether the decision is achieving the desired outcomes and adjust course as needed.

10. Reflect and Learn:

- Reflect on the decision-making process and outcomes, considering what worked well and what could be improved.
- Learn from your experiences and apply lessons learned to future decision-making efforts.

11. Iterate and Improve:

- Continuously refine your decision-making skills and apply new mental models as you encounter different challenges and opportunities.
- Seek out feedback, training, and resources to enhance your ability to make informed and effective decisions.

By following these steps, you can systematically approach decision-making and apply mental models to gain deeper insights, make more informed choices, and achieve better outcomes in the real world.

Making decisions in a complex world and within complex systems requires a nuanced approach that acknowledges uncertainty, interdependencies, and dynamic interactions. Here are steps to guide you through the process:

Steps for Making Decisions in a Complex World and Complex Systems:

1. Acknowledge Complexity:

- Recognize the complexity of the world and the systems within it. Understand that factors influencing decisions are often interconnected and dynamic.

2. Define the Decision Context:

- Clearly define the decision you need to make and understand the broader context in which it exists.

- Consider the various stakeholders, objectives, constraints, and uncertainties involved.

3. **Gather Diverse Perspectives:**

- Seek input from a diverse range of stakeholders, experts, and perspectives to gain a comprehensive understanding of the decision context.
- Encourage open dialogue and collaboration to uncover different viewpoints and insights.

4. **Map the System:**

- Map out the complex system relevant to the decision, identifying key components, relationships, and feedback loops.
- Use tools such as systems diagrams, causal loop diagrams, or network analysis to visualize the system's structure and dynamics.

5. **Identify Leverage Points:**

- Identify potential leverage points within the system where interventions or changes could have significant impact.
- Consider both high-leverage interventions that target key systemic drivers and low-leverage interventions that address specific symptoms or outcomes.

6. **Apply Systems Thinking:**

- Use systems thinking principles to understand how actions and decisions may affect the broader system over time.
- Consider the potential unintended consequences and feedback loops that could arise from different courses of action.

7. **Anticipate Uncertainty:**

- Acknowledge and embrace uncertainty, recognizing that outcomes may be unpredictable due to the complexity of the system.
- Use scenario planning, sensitivity analysis, or simulation modeling to explore different possible futures and their implications.

8. **Evaluate Trade-offs:**

- Recognize that decisions in complex systems often involve trade-offs between competing objectives, interests, and values.
- Evaluate these trade-offs transparently and ethically, considering both short-term and long-term implications.

9. **Embrace Iterative Learning:**

- Approach decision-making as an iterative process of learning and adaptation.
- Be willing to experiment, monitor outcomes, and adjust course based on feedback and new information.

10. **Engage in Adaptive Governance:**

- Implement adaptive governance structures and processes that allow for flexibility, responsiveness, and learning.
- Foster collaboration, transparency, and accountability in decision-making processes.

11. **Communicate Effectively:**

- Communicate the rationale behind your decisions clearly and transparently to stakeholders.
- Use storytelling, visualization, and other techniques to convey complex concepts and trade-offs in a way that is understandable and compelling.

12. **Reflect and Learn Continuously:**

- Reflect on the outcomes of your decisions and the effectiveness of your decision-making processes.
- Encourage a culture of continuous learning and improvement, where lessons from past decisions inform future actions.

By following these steps, you can navigate the complexities of the world and make decisions that are informed, adaptive, and effective within complex systems.

Step 84- Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 85- Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works.
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman.**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding

Step 86-Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**
2. **Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.**
 - **First, he would learn everything he could about it and prepare physically as best as possible.**
 - **Once the physical prep was done, he'd take care of the mental prep with visualization.**
 - **Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.**
 - **Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.**
 - **Side note: visualization is great, but it's no substitute for preparation.**

Step 87-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman.**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 13: Deep Work and Communication

Step 88-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 89-NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 90-You Have Required To Do The Work For Communication.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 91-Use Rules of Reading for Communication

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Decision Making.
 - A. **VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. **VERY FAST READING- Entertainment.**
 - I. **Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. **Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. **Method 6-Devotional Bible Read. Pages 73-74.**

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books For Communication.

Step 92 - Communication Books

1. Person Has 2 Ears and 1 mouth. Therefore, The person needs to listen minimum twice more than speak. Ask Questions, Ask for clarification, Ask Myself If I understood his position in full. Try to understand the person position by restated in my own words, and Ask them to confirm or deny if I correctly stated the person position. Ask Myself, if this is logical, and the proposition leads to the conclusion. Ask Myself if I agree with the person position. Ask Myself What could be the weak point of this position.
2. One of The Most Important Traits and Features of Person are Being Critical Thinker and Think Before Speak in Any Situation in Life.
3. Better To Keep Silence and Be Thought A Fool than To Open Your Mouth and Remove all Doubt.
4. Take A moment to Think Before Speaking, to construct exactly what you wanted to tell without variously sentences. Do not be like most of the people feel the need to say the first thing that comes to mind rather taking a moment to break down the question and forming the best answer possible.
5. Never Rush yourself and anybody when communicating to answer the question, but let the person take a moment to break down the question and forming the best answer possible.
6. Absolutely do not believe anything you hear and only half of what you see.
7. What is the Key Of Story Teller: True answer that not that you do not have story. You have so many stories in your life. It is because you do not document them. To be great storyteller, you must first become, great collectors of stories. So You need to do, start new note on the paper story bank, and next time in your life something that emotionally moves you, capture it. Like interaction with colleague. Use 5w and 1h and dialogue
 - A. Who
 - B. What
 - C. Where
 - D. When
 - E. How
 - F. Dialogue
 - G. Capture the story, and before you know it, and before you know it a story a day.

8. **Listen, Follow And Apply Rules of Reading Part 1 to 11, before looking into Communication.**
9. **Listen, Follow and Apply the following Books.**
 - A. **How To Read A Book By Mortimer Adler Various Editions**
 - B. **Socratic Method**
 - C. **Preaching.**
 - I. **EXPOSITORY PREACHING.**
 - II. **Homiletic _ moves and structures.**
 - III. **Homiletics.**
 - IV. **Homiletics or the Theory of Preaching.**
 - V. **How to Speak How to Listen.**
 - VI. **Preaching _ the art of narrative exposition.**
 - VII. **The Art & Craft of Biblical Preaching_ A Comprehensive Resource for Today's Communicators.**
 - VIII. **Tactics and Socrates Method.**
 - D. **Public Speaking.**
 - I. **A Pocket Guide to Public Speaking.**
 - II. **Confessions of a Public Speaker.**
 - III. **Confident Public Speaking.**
 - IV. **How to Develop Self-Confidence And Influence People By Public Speaking.**
 - V. **How to Speak How to Listen.**
 - VI. **No Sweat Public Speaking!_ How to Develop, Practice, and Deliver a Knock Your Socks Off Presentaton! with No Sweat.**
 - VII. **Public Speaking Handbook.**
 - VIII. **Tactics_ A Game Plan for Discussing Your Christian Convictions.**
 - IX. **The Complete Guide to Public Speaking.**
 - X. **The Confident Speaker.**
 - XI. **The Everything Public Speaking Book. Deliver a Winning Presentation Every Time.**
 - XII. **The Official TED Guide to Public Speaking.**
 - XIII. **Voice and Speaking Skills For Dummies.**
 - XIV. **Tactics and Socrates Method.**
 - XV. **Media Argumentation_ Dialect, Persuasion and Rhetoric.**

- XVI. Power, Persuasion and Manipulation in Specialised Genres_ Providing Keys to the Rhetoric of Professional.**
- XVII. How to win every Argument: the art of Debating and Public Speaking**
- XVIII. Socratic method today.**
- XIX. Socratic Method.**
- XX. The Art of Asking Essential Questions_ Based on Critical Thinking Concepts and Socratic Principles.**
- XXI. Rhetoric**

E. Communication Face To Face.

- I. Arguing with Socrates_ An Introduction to Plato's Shorter Dialogues.**
- II. Does Socrates Have a Method__ Rethinking the Elenchus in Plato's Dialogues and Beyond.**
- III. How to Speak How to Listen.**
- IV. Plato's "Euthyphro"_ an Examination of the Socratic Method in the Definitional Dialogues.**
- V. Socrates_ A Guide for the Perplexed.**
- VI. Socrates' Way_ Seven Keys to Using Your Mind to the Utmost.**
- VII. Tactics_ A Game Plan for Discussing Your Christian Convictions.**
- VIII. The Language of Law School_ Learning like lawyer.**
- IX. The Socratic Method.**
- X. The Trivium_ The Liberal Arts of Logic, Grammar.**
- XI. We Need to Talk_ How to Have Conversations That Matter.**
- XII. Tactics and Socrates Method.**
- XIII. Never Split the Difference_ Negotiating As If Your Life Depended On It.**
- XIV. Socrates Meets Dante.**
- XV. Socrates meets Jesus.**
- XVI. Socrates Meets Kant.**
- XVII. Socrates Meets Machiavelli.**
- XVIII. Socrates Meets Marx.**
- XIX. Socrates Meets Sarte.**
- XX. Rhetoric.**
- XXI. Encyclopedia of Rhetoric**

F. Debate.

I. Argumentation and Debate_ Critical Thinking for Reasoned Decision Making.

II. Art, argument, and advocacy_ mastering parliamentary debate .

III. How to Debate Leftists and Destroy Them_ 11 Rules for Winning the Argument.

IV. How to Speak How to Listen.

V. Learning to "Think Like a Lawyer.

VI. Tactics_ A Game Plan for Discussing Your Christian Convictions.

VII. The Art of Debate.

VIII. The debater's guide.

IX. Winning Debates - International Debate.

X. Tactics and Socrates Method.

XI. Socratic method today.

XII. Socratic Method.

XIII. The Art of Asking Essential Questions_ Based on Critical Thinking Concepts and Socratic Principles.

XIV. How to win every Argument: the art of Debating and Public Speaking.

XV. Rhetoric.

XVI. Encyclopedia of Rhetoric

Step 93- Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 94-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. The world never tells you that you're wrong; it only gives you outcomes.
3. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
4. **Reality will do a lot of the work for us if we simply align with it.** Most of the time we're simply adding friction because we want the world to work in the way we think it should.
5. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care

about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.
- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything

outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models

allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's

got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do

put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 14: Deep Work and Teach

Step 95-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 96-NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 97-You Have Required To Do The Work For Teaching.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 98-Use Rules of Reading for Teaching

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Teaching.

A. VERY VERY FAST Reading- Skimming. Pages 47-51.

B. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books For Teaching

Step 99-Teaching Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 12, before looking into Teaching.**
2. **Listen, Follow and Apply the following Books.**
 - A. **How to Read A Book bY Mortimer Adler Various Editions**
 - B. **Socratic Method and Logic**
 - C. Building a Better Teacher_ How Teaching Works.
 - D. Does Socrates Have a Method___ Rethinking the Elenchus in Plato's Dialogues and Beyond.
 - E. Socrates and the Socratic Dialogue.
 - F. Socrates_and_Philosophy_in_the_Dialogues_of_Plato.
 - G. Socratic Circles_ Fostering Critical And Creative Thinking In Middle And High School.
 - H. Socratic Ignorance and Platonic Knowledge in the Dialogues of Plato.
 - I. Socratic Teaching Method (A Textbook for_ Socratic Questions 101.
 - J. Tactics and Socrates Method.
 - K. Teaching Psychology and the Socratic Method_ Real Knowledge in a Virtual Age.
 - L. Teaching to Learn, Learning to Teach.
 - M. The art of teaching art _ a guide for teaching and learning the foundations of drawing-based art.
 - N. How Learning Works.
 - O. Learning to Read Critically in Teaching and Learning (Learning to Read Critically Series).
 - P. Teaching to Learn, Learning to Teach.
 - Q. The-role-of-socratic-questioning-in-thinking-teaching-and-learning.
 - R. THE_SOCRATIC_METHOD_AS_AN_APPROACH_IN_TEACHING_SOCIAL_STUDIES_A_LITERATURE_REVIEW.
 - S. Heather Coffey_Socratic method.
 - T. EXPERIENCE-EDUCATION-JOHN-DEWEY.
 - U. Socratic Questioning
 - V. Platos Socrates as Educator
 - W. Redefining Scientific Thinking for Higher Education
 - X. Socratic Method In The Classroom.

Y. Teaches Like Socrates

Z. The Power of Socratic Classroom

AA. Thinker Guide of Socratic Questioning

BB.Socratic Logic__ A Logic Text using Socratic Method, Platonic Questions, and Aristotelian Principles.

CC.The Art of Asking Essential Questions_ Based on Critical Thinking Concepts and Socratic Principles.

DD.Socratic Method Today

Step 100- Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 101-Teach.

Teach

- A. Let The People Ask Questions and Use Socratic Method.**
- B. Additionally, Be Honest and Transparent at all time, if I do not know, then let the people know that I do not know.**
- C. Always be humble.**
- D. Lead the people to the truth, by asking them to never criticise the idea, without fully investigated. Ask Them to read, and use Rules of reading to find out the answers.**
- E. Never discourage the person, but encourage the person and lets investigate this question together to find the answer.**
- F. Primary Goal of this step is to take stock of all the knowledge we have acquired and teach it to someone else.**
- G. Pause and think carefully, before Talking, Speaking, Communicating For Following Reasons:**
 - **Use How to Read A Book Rules and Steps by Mortimer Addler for Various Editions**
 - **Socratic Logic, Method AND Questioning.**
 - **Think How Will I Say this.**
 - **Think What Words Will I Use Communicating.**
 - **Think The way I will Respond.**
 - **Think Why would I say and respond this way.**
 - **Think, If this is logical what will I say**
 - **Think, If this is reality what I am saying, Responding and Communicating.**
 - **Think, If there are Questions might arise?**
 - **Think of Questions, I might ask?**
- H. Teaching can be done through different means:**
 - **Videos, Audio Podcast, Writing, Conversation, Speeches**
- I. The crucial point is that you need to collect all the information you have gathered and attempted to articulate it in simple words that can be grasped by someone wholly unfamiliar with the topic.**

J. This step will force your mind to organise your knowledge in a way that can be utilised more practically. The importance of this step lies in the fact that when you try to reorganise and pass on all the information you have, you'll inevitably discover gaps in your understanding that will compel you to revise your resources to plug them. It will also ingrain your knowledge on a deeper level, due to the massive difference between simply regurgitating acquired knowledge and understanding it enough to be able to teach someone else.

K. Method of Teaching.

- Compile a Youtube video on the larger topic.
- Create presentation or blogpost.
- Write a book chapter or something else.
- Conversation with someone.

Step 102 - Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. The world never tells you that you're wrong; it only gives you outcomes.
3. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
4. **Reality will do a lot of the work for us if we simply align with it.** Most of the time we're simply adding friction because we want the world to work in the way we think it should.
5. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care

about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.
- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything

outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models

allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself “If I do X, what will happen *after* that?”. I sum this up using the ecologist Garrett Hardin's simple question: “And then what?” A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves “And then what?” We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they “reorganize their incentive programs,” but practically, they've simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's

got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do

put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 15: Deep Work and Writing

Step 103-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 104 - NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 105-You Have Required To Do The Work For Writing.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very very hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. Proofread 10 times to see if there is a flow or grammatical or syntax mistake on my part.
9. The Art of Anticipation of Objections.
 - A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
 - B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
 - C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
 - D. Use Think, Logic, Strategem, Thinking models.
 - E. Write.
 - F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
 - G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
 - H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
 - I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts

that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

10. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Proofread 10 times to see if there is a flow or grammatical or syntax mistake on my part.

G. Be Honest.

H. Be Open Minded.

I. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

- J. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.
- K. Never Take Cheap Shots at the Opponent.
- L. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- M. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 106-Use Rules of Reading for Writing

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research ON the Topic Before Any Writing On The Subject.

A. VERY VERY FAST Reading- Skimming. Pages 47-51.

B. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books On Writing

Step 107-Books On Writing

1. **Listen, Follow And Apply Rules of Reading Part 1 to 13, before looking into Writing.**
2. **Listen, Follow and Apply the following Books For Writing.**
 - A. **Writing Research.**
 - I. **How to Read A Book By Mortimer Adler Various Editions**
 - II. **How-to-Write-a-Better-Thesis.**
 - III. **A Manual for Writers of Research Papers, Theses, and Dissertations.**
 - IV. **Academic writing_ A Handbook for International Students.**
 - V. **Authoring a PhD How to plan, draft, write and finish a doctoral thesis or dissertation.**
 - VI. **English for Writing Research Papers.**
 - VII. **How to Write and Publish a Scientific Paper.**
 - VIII. **How to Write Better Medical Papers.**
 - IX. **How to write dissertations & project reports.**
 - X. **Little Brown Handbook, The, MLA Update Edition.**
 - XI. **Mastering Academic Writing in the Sciences _ A Step-by-Step Guide.**
 - XII. **Patterns for College Writing_ A Rhetorical Reader and Guide.**
 - XIII. **Patterns for College Writing, Brief Edition_ A Rhetorical Reader and Guide.**
 - XIV. **Planning Your Research and How to Write It.**
 - XV. **Steps+to+Writing+Well.**
 - XVI. **The Craft of Scientific Writing.**
 - XVII. **Writing Science_ How to Write Papers That Get Cited and Proposals That Get Funded.**
 - XVIII. **Writing Scientific Research Articles_ Strategy and Steps.**
 - XIX. **The Longman Writer_ Rhetoric, Reader, Research Guide, and Handbook.**

B. Writing Novel.

- I. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. The Complete Handbook of Novel Writing_ Everything You Need to Know to Create & Sell Your Work.**

C. Writing Children Book.

- I. How to Write a Children's Book and Get It Published.**

D. Writing Legal Writing.

- I. Legal Writing and Analysis.**

E. Writing Fiction.

- I. An introduction to literature _ fiction, poetry, and drama.**
- II. Classic Writings on Poetry.**
- III. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- IV. How to Write Poetry_ And Get it Published.**
- V. Literature and the Writing Process.**
- VI. Popular Lyric Writing_ 10 Steps to Effective Storytelling.**
- VII. Writing Poetry.**
- VIII. How to Write Like Tolstoy_ A Journey into the Minds of Our Greatest Writers.**

F. Writing Non-Fiction.

- I. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. On Writing Well, The Classic Guide to Writing.**
- III. Executive Writing Skills for Managers_ Master Word Power to Lead Your Teams, Make Strategic Links and Develop Relationships.**
- IV. The Sense of Style_ The Thinking Person's Guide to Writing in the 21st Century .**

G. Writing Technical Writing.

- I. Technical Writing 101_ A Real-World Guide to Planning and Writing Technical Documentation.**
- II. The Blackwell Encyclopedia of Writing.**
- III. The Handbook of Technical Writing.**
- IV. Writing With Power Techniques for Mastering the Writing Process.**

H. Writing Comedy.

- I. An introduction to literature _ fiction, poetry, and drama.**
- II. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- III. The Art of Comedy Writing.**
- IV. The Complete Idiot's Guide to Comedy Writing.**

I. Writing Article.

- I. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. The Complete Guide to Article Writing_ How to Write Successful Articles for Online and Print Markets.**

J. Writing Screenwriting.

- I. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. The Screenwriter's Bible, 6th Edition_ A Complete Guide to Writing, Formatting, and Selling Your Script.**

K. Writing Essay.

- I. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. Get Writing_ Paragraphs and Essays.**
- III. Little Brown Handbook, The, MLA.**
- IV. Logical Essay Writing.**
- V. Real Essays with Readings with 2009 MLA Update_ Writing Projects for College, Work, and Everyday Life.**
- VI. Real Writing with Readings_ Paragraphs and Essays for College, Work, and Everyday Life.**
- VII. The Write Start_ Sentences to Paragraphs with Professional and Student Readings.**

- VIII. **Write Source_ A Book for Writing, Thinking, and Learning.**
- IX. **Writers Resources From Paragraph to Essay.**
- X. **Writing Analytically.**
- XI. **Writing Arguments_ A Rhetoric with Readings.**
- XII. **Real Writing with Readings_ Paragraphs and Essays for College, Work, and Everyday Life.**

L. Writing Book.

- I. **Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. **Write More, Publish More, Stress Less!_ Five Key Principles for a Creative and Sustainable Scholarly Practice.**

M. Writing Report.

- I. **Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- II. **Writing a Report_ Step-by-step Guide to Effective Report Writing.**

N. Writing Films.

- I. **Writing the Short Film, Third Edition Writing & Journalism.**

O. Writing Debate.

- I. **A Writer's Reference.**
- II. **Argumentation and Debate_ Critical Thinking for Reasoned Decision Making.**
- III. **Art, argument, and advocacy_ mastering parliamentary debate.**
- IV. **Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- V. **How to Debate Leftists and Destroy Them_ 11 Rules for Winning the Argument.**
- VI. **Learning to "Think Like a Lawyer.**
- VII. **Socratic Debate.**
- VIII. **The Art of Debate.**
- IX. **The debater's guide.**
- X. **Winning Debates - International Debate Education Association.**

P. Dialogue.

- I. A Writer's Reference.**
- II. Compact Literature_ Reading, Reacting, Writing, 2016 MLA.**
- III. Socratic Dialogue.**

Q. Writing At Work.

- I. Organization of Successful Writing at Work.**

R. Write Sermon.

- I. Christ Centered Preaching_ Preparation and Delivery of Sermons
LECTURE.**
- II. EXPOSITORY PREACHING.**
- III. Homiletic _ moves and structures.**
- IV. Homiletics.**
- V. Homiletics or the Theory of Preaching.**
- VI. Preaching _ the art of narrative exposition.**
- VII. The Art & Craft of Biblical Preaching_ A Comprehensive Resource for
Today's Communicators.**

- 3. Use Rules of Reading Before Writing: Comments, Book, Essay, Poem,
Dialogue, Debate, Dissertation or any Other Type of Writing.**
- 4. Have Grammar Book in the Language I am writing, to ensure that my
Grammar is Good and correct, and there are no mistakes in grammar.**

Step 108-How To Become Straight A Student

Efficiency. The simple truth is that the brute force techniques used by most students are incredibly inefficient. When it comes to exam preparation, passive review is not an effective way to learn complicated concepts. It's also mentally draining, which further diminishes the rate at which you can absorb and internalize information. For paper writing, this same problem holds. When you approach the task without proper preparation, it becomes incredibly tiring and you can end up spinning your wheels. After a while, even the formation of coherent sentences becomes difficult and time intensive. In contrast, the techniques I came up with were so streamlined that I could learn more material than my classmates and actually spend less time studying. By eliminating stupid habits and wasted effort, I transformed exam prep and paper writing from a dreaded chore to a targeted activity. You will learn how to:

- Manage your time and deal with the urge to procrastinate.
- Take targeted notes in class.
- Handle reading assignments and problem sets with ease.
- Prepare efficiently for exams.
- Master the art of exam-taking.
- Write incisive critical analysis essays.
- Conduct thorough research.
- Write standout term papers.

A big part of the solution is timing—they gain efficiency by compressing work into focused bursts. To understand the power of this approach, consider the following simple formula:

work accomplished = time spent x intensity of focus

With this formula in mind, you can begin to understand why many straight-A students actually study less than their classmates: They replace long, low-intensity stretches of work with a small number of short, high intensity sessions. Of course, this is not the whole story behind their success; what straight-A students actually do in these short bursts is also crucial—technique is just as important as timing. Part Two (Quizzes and Exams) and Part Three (Essays and Papers) of this book are dedicated to these technical details. But learning how to follow an efficient schedule, and banishing pseudo-work from your college experience for good, is a crucial first step toward your academic overhaul.

Quizzes vs. Exams

If the test is worth less than 15 percent of your final grade, it's a quiz; otherwise, it's an exam. If the test is worth only 5 percent or less of your grade, designate this a tiny quiz. Don't spend too much time on tiny quizzes. Even if you fail one, it still probably won't change your final letter grade. And if you're attending classes and keeping up with your reading, you should be able to score above average with little to no preparation.

Step 1

Take Smart Notes

Gather the Right Materials When I was a freshman, less than half of my class brought a laptop to campus. The year I graduated, over 95 percent of incoming freshmen brought laptops. By the time you read this, laptops will more or less be the de facto standard for undergraduates across the country, and this is a great advancement for the cause of collegiate note-taking. Why? I think David, another Dartmouth student, put it best: "Use your laptop. Seriously! You will be overwhelmed by the quality and legibility of your notes... it's really a no-brainer."

Take Smart Notes in Nontechnical Courses (What's the Big Idea?)

The key to doing well in these courses is straightforward: Identify the big ideas. That's what it all comes down to. Exams in nontechnical courses focus entirely on big ideas—they require you to explain them, contrast them, and reevaluate them in the light of new evidence. If you are aware of, and understand, all of the big ideas presented in the course, these tasks are not so difficult, and strong grades will follow. As you would expect, lectures are a major source of these big ideas. Identifying them, however, is not a trivial task.

Professors ramble. And they rarely start a class by clearly identifying the big ideas that will be explored. Instead, they tend to dive right in, leaving the poor student to separate on his own the interesting conclusions from the digressions.

Format Your Notes Aggressively

When it comes to formatting the text itself, the basic rule to follow is that anything that makes the information easier to read is fair game. You don't need a consistent scheme. Don't be afraid to use aggressive text formatting to help emphasize important points. On a computer, smart students often make use of bold fonts and lists to help organize their thoughts. Capture Big Ideas by Using the Question/Evidence/Conclusion Structure Keep in mind that professors don't always state the question. Often they jump right into the evidence and leave it to you to deduce the question being discussed. Don't be afraid to jot down "QUESTION:" and then leave the rest of the line blank as you begin recording evidence. Once you figure out what the professor's talking about, you can go back and fill in this blank.

The same holds true for conclusions. Professors will sometimes hint at a conclusion but not come right out and present a neat endpoint for the current discussion. In this case, it will be up to you to synthesize the question, evidence, and professor's hints into a conclusion of your own. This is the important part. When you formulate a conclusion, you are cementing a big idea. If you can't finalize a conclusion before the professor moves on to the next question, simply jot down "CONCLUSION:" and plan to come back later during a lull in the lecture, or immediately following class, to fill in the blank.

Step 2

Demote Your Assignments

Work Constantly

Most college students depend on “day-before” assignment planning, meaning they never start an assignment until the day before it’s due. This might be the simplest scheduling decision, but it creates many problems. Large assignments will quickly transform from potentially interesting to tedious to painful when tackled in one monolithic, last-minute chunk of time. And, if two or more assignments happen to be due on the same day (which will happen often), you will be forced into a frenzied work marathon that will produce lackluster results at best. Smart students avoid these issues by working constantly on assignments, in small chunks, every day. “I try to sit down every Sunday night and plan out the week,” explains Simon, a straight-A student from Brown. “My goal is to make sure that I don’t have too much work on busy days and that I do at least a little bit each day.” For example, if you have a problem set due every week, complete one problem a day, one hour at a time. Don’t spend five hours the night before. The same goes for reading assignments—knock off a chapter a day, and you’ll never find yourself spending a lonely night with a textbook and a six-pack of Red Bull.

Bear in mind that even if you get caught up on all of your assignments for a given class, you should continue to work. For example, if it’s Sunday morning and you have already finished your reading for Monday’s history class, and you have time to spare, break out a book and do a little of the reading for Wednesday’s history class. This doesn’t mean that you should study like crazy twenty-four hours a day. Don’t stay up until 2 A.M. Sunday night trying to finish the entire week’s load. But on days where you happen to be ahead of schedule, and you have already put aside time to work on a certain class, take advantage of this fortuitous situation to get ahead. Once you get used to working a little bit every day, you’ll be surprised by how often this situation might arise.

Don't Read Everything

For example, in most college courses there are one or two sources that show up on the reading list for almost every lecture. We will call these favored sources— they're usually a textbook or a course reader, and they provide the basic structure for the course by outlining key facts and arguments in a condensed form. Always read the assignments from favored sources.

Professors usually augment these favored sources with a variety of supplemental readings that provide context or analyze certain arguments and events in more detail. These supplemental readings are often academic papers, transcripts of speeches, or chapters from books —and they are typically fascinating. But they are also typically expendable, and you should not plan on reading them all. Instead, if your time is limited during a particular week, then your strategy should be to select only the most important supplemental readings for review. So how do you decide which supplemental readings to review, which to skim, and which to skip? Straight-A students follow this simple hierarchy: Readings that make an argument are more important than readings that describe an event or person, which are more important than readings that only provide context (i.e., speech transcripts, press clippings).

Confirming Your Decisions

You should always use the lecture itself to confirm your choice about what to read and what to skip. If the professor emphasizes the importance of a work that you dismissed (which will happen occasionally—this system isn't perfect), then make a note that you will need to go back and cover this reading in more detail before the next exam. A smart technique is to simply write these skipped readings right onto your syllabus as an assignment for a later class. Choose a day with a light reading load, and treat the assignment as if it was given to you by your professor. If you don't explicitly schedule a time to cover this material, you will invariably procrastinate and then find yourself with a huge reading list to cover right before the exam.

Take Smart Notes on Your Favored

Reading Assignments

We've discussed which readings to ignore or skim. But the logical next question is what to do with the favored sources that you decide to read carefully. In this situation, how you take notes on the reading makes a big difference. If you write down very little, the assignment can be completed fast, but the time will be wasted because you won't have bothered to extract the big ideas in a way that makes them accessible when it comes time to study. If, on the other hand, you take detailed notes on every paragraph, your assignments will take way too long to complete. The best compromise is to use a strategy similar to the one outlined earlier for taking lecture notes. To refresh your memory, the core of this strategy is that all big ideas can be reduced to a question, evidence, and conclusion. This approach can work wonderfully for reading assignments as well. Apply it as follows:

First, as with lectures, try to take notes on your computer. They will be more organized and easier to computer. They will be more organized and easier to follow later on, when you use them for review. In addition, typing makes it easier to record more and finish faster. Next, carefully read the beginning of the assignment. Look for the question being answered by the author. Note that this is different than a thesis statement. For example, "Why did the Clinton health care plan fail?" is a question. "The Clinton health care plan failed because of resistance from commercial health care providers" is a thesis. In a reading assignment, the question can usually be found in the title or perhaps explained in the first few sentences. Record this in your notes, and label it clearly. Next, look for the

author's conclusion (the thesis statement). This is perhaps the most difficult part, since academics are known to propose complicated answers to their questions, especially when writing. So it may take some serious consideration to figure out what's being suggested. Search the first few paragraphs; this is typically where the conclusion is hidden. Also check the final few paragraphs. Often a thesis is proposed at the beginning of an article but then refined slightly at the end once all of the supporting evidence has been presented. When you feel confident in your understanding of the conclusion, record it carefully in your notes. Don't worry if it takes several sentences to capture the point—err on the side of being thorough. Now comes the easy part: Skim the entire reading. Now comes the easy part: Skim the entire reading. Don't take notes yet. Instead, use a pencil to make checkmarks next to important paragraphs that jump out at you. Because you are reading fast, you may miss some points—don't worry. "Just get the gist of the author's message and how he is supporting that message with evidence, then move on," explains Jason, a straight-A student from the University of Pennsylvania. You don't need to capture everything. Your goal is simply to mark a few solid examples that justify the conclusion as the answer to the question. Once you have skimmed through the entire reading, go back and find your check marks. For each mark, record in your notes a concise summary of the corresponding point. Label each point in your notes with the page number where you found it. This shouldn't take long. Don't worry about being formal or grammatically correct. Just dump these pieces of evidence into your notes. When you're done, your notes should contain a clearly labeled question followed by a half-dozen or so bullet-pointed pieces of evidence, then a clearly labeled conclusion.

Don't Work Alone on Problem Sets

Perhaps the most important rule for taming the problem sets assigned in technical courses is to follow our earlier rule and work on them constantly. As Ryan, a straight-A student from Dartmouth, explains: “You can work on problem sets in small pieces while you’re between classes or activities.” Concentrating on only one or two problems a day will help you avoid mental fatigue. Once your brain gets tired, it’s easy to stall—but if you spread out your work, you will end up spending fewer hours on the assignment than if you tried to do it all at once.

Even with a smart schedule, however, you will probably still get stuck occasionally. When this happens, use all the available resources to help you get unstuck. If you’re allowed to collaborate with your classmates, which is often the case in technical courses, definitely take advantage of this opportunity. As Greta from Dartmouth explains, working in groups “can drastically cut the time required to finish a really hard problem set.” Identify one or two students who share a similar skill level. Identify one or two students who share a similar skill level as you and then construct a regular schedule for working together on the class assignments. Set your meeting dates for two or three days before the deadlines; this gives you time to first try the problems on your own and identify the ones that give you the most trouble. Then, when you meet with your problem set group, your energy will be focused where it’s needed most. However, don’t meet the day before your deadline. It’s important to have at least one day before handing in the assignment so you can review all of your answers and fix any small mistakes. You should also take advantage of office hours. Most technical courses hold office hours once a week, usually run by a teaching assistant (TA). These meetings are meant to clarify complicated concepts from class and to be a source of help on hard problems. Always go to office hours, if you have time, and arrive knowing which homework problems pose the biggest challenge to you. Don’t be afraid to ask for help. You will learn a lot during these weekly sessions, since the TAs will be able to walk you through the more difficult concepts—which will ultimately save you a lot of time and frustration.

Solve Problems on the Go

First, set aside a little block of time to familiarize yourself with a couple of problems, and make sure you understand exactly what is being asked. You may need to review your notes to refamiliarize yourself with the relevant concepts. Next, try to solve the problem in the most obvious way possible. This, of course, probably won't work, because most difficult problems are tricky by nature. By failing in this initial approach, however, you will have at least this initial approach, however, you will have at least identified what makes this problem hard. Now you are ready to try to come up with a real solution. The next step is counterintuitive. After you've primed the problem, put away your notes and move on to something else. Instead of trying to force a solution, think about the problem in between other activities. As you walk across campus, wait in line at the dining hall, or take a shower, bring up the problem in your head and start thinking through solutions. You might even want to go on a quiet hike or long car ride dedicated entirely to mulling over the question at hand.

Write Solutions Right the First Time

Another important time-saving tip for problem set work is to record solutions formally the first time you write them down. Many students first jot down their answers informally and then return later to reformat them into something neat enough for submission. There is no reason to include both steps. You are, for no good reason, adding a lot of extra time to the process. Instead, go slowly and deliberately the first time. Write your answer carefully, and clean it up immediately until it is of submission quality. Then you can cross the assignment off your list and it will be one less thing to worry about.

Step 3

Marshal Your Resources

Smart students understand that if you're studying hard, then you've done something wrong. Preparing for a test should not be painful. And it should not require a lot of time. If you have been putting Steps #1 and #2 into practice, taking smart notes and handling assignments effectively, studying should not be a big deal for you either. In fact, when faced with a looming quiz or exam, you have to do only two things. First, organize your material intelligently. Second, perform a targeted review of this material. This section will teach you how to accomplish the former. Don't worry—organizing your material properly is not a difficult task, but it is important that you do it right. Many students neglect this step, eager to dive right into the review, but by doing so they condemn themselves to hours of unnecessary work. You don't want to be like these students. Pay attention to the advice that follows and you will experience a significant reduction to the difficulty of your study experience.

Define the Challenge

Before you can conduct any meaningful studying, you must first define the scope of the exam. As Simon from Brown puts it: "You need to know what kind of information the professor wants you to know." To accomplish this goal, answer the following questions:

- Which lectures and reading assignments (or problem sets) are fair game?
- What type of questions will there be, and how many of each? As Christine from Harvard explains: "It's helpful to know in advance what kind of knowledge will be asked for on the exam—IDs, dates, broad syntheses of the texts' major arguments?"
- Is the exam open note or open book?
- For a technical class, will formulas be provided or do they need to be memorized?
- How much time will be available? Does the professor expect the exam to be easy to complete during the test period or a challenge?

Some professors offer answers to these questions without being prompted. Many, however, do not. If it's two weeks before the exam, and the professor hasn't mentioned any details yet, you should ask. If you're shy, ask after class. But get the information as early as possible—it's crucial to your success. Build a Study Guide (Organizing Nontechnical Course Material) "I have always been a big fan of making a study guide," admits Ryan from Dartmouth. This is a technique that popped up again and again in my

straight-A interviews. Each student, of course, had his or her own variation on study guide creation, but they all followed, more or less, this same general approach:

For a nontechnical course, once you find out which lectures and reading assignments are fair game for the exam, print out the corresponding notes that you've typed up or gather the pages you've written on (don't be afraid to deconstruct your notebook). Cluster these pages into piles, separated by general topic. Clearly label each of these piles with its topic and fasten them together with a paper clip so you can easily transport them without mixing up the pages. This final step is important, since you will be moving to and from your various isolated study spaces once you begin your review. For simplicity, we will refer to these topic-themed piles as "chapters." Your final study guide, therefore, should contain a chapter, consisting of reading and lecture notes, for each general topic that might be covered on the exam.

Construct a Mega-Problem Set (Organizing Technical Course Material)

For a technical course, many students follow a variant of the study guide approach that focuses on sample problems. It works as follows: Your problem set assignments are the key to your review process. Start a pile for each problem set that covers material that might appear on the exam. Next, you'll need to supplement each problem set with sample problems from your lecture notes. For each lecture relevant to the upcoming exam, do the following:

1. Match the lecture to the problem set that covers the same material.
2. Copy sample problems from these lecture notes onto a blank sheet of paper. You don't have to copy the steps or the answers, just the questions.
3. Label the blank sheet of paper with the date of the lecture. This will help you later figure out where these problems came from (and more important, where their answers can be found).
4. Fasten this sheet with a paper clip to the problem set you matched it to in step one. In other words, this process transforms your problem sets into mega-problem sets by adding extra problems drawn from your lecture notes. Pretty simple.

Finally, you must augment your mega-problem sets with technical explanation questions. What are these?

For every major topic covered in a particular megaproblem set, jot down a question that asks you to explain the basics of the topic. For example, as Greta from Dartmouth recounts, in an “economics course, I would make study sheets and then add a general question such as: what happens when a government increases spending and lowers interest rates?” Or, for a chemistry class, you might have a problem set containing many questions that require you to draw the molecular structure of specific chemical compounds. In this case, you could add a technical explanation question along the lines of: “Explain the general procedure for drawing a molecular structure, why this is useful, and what special cases must be kept in mind.” It’s important that you add these technical explanation questions in addition to your regular sample problems, since they will reveal whether or not you understand the underlying concepts or if you’ve just memorized the steps for some particular problems. One last note: If your professor makes a practice exam available, then print out a copy of it and store it with your mega-problem sets. For technical courses, sample exams are a great review tool, and you will definitely want to have them handy when it comes time to study.

Prepare Memorization Aids

Both technical and nontechnical courses sometimes require you to do some memorization—formulas, chemical equations, artwork, dates, or chronologies—and the most efficient way to memorize this information is by using flash cards. Almost every straight-A student interviewed for this book used flash cards to help with rote memorization. Fortunately, this technique is easy. Buy a stack of index cards, put the prompt on one side and the answer on the other. Constructing these flash cards, however, can take longer than you might imagine, so start early. If possible, start writing up your cards at least a week before the first day you plan to actually study. The activity is mindless—you can write flash cards while watching TV—so it shouldn’t be too hard to get them done, in advance, bit by bit.

Schedule Your Organization Wisely

Don't try to organize and study in the same day. This is a crucial tactic used by many straight-A students. When you review, you want your brain at full power. If you organize your materials the same day that you review them, your brain will be too tired to accomplish both effectively. So keep these two tasks separate and you'll end up working more effectively, which reduces the total time spent and produces better results.

Step 4 Conquer the Material

This is the step students most commonly identify with exam preparation. It's also the step that most students misguidedly spend the majority of their time on. You're not most students—at least not anymore. All of the work you put in up to this point was meant to make this one step as small and painless and insignificant as possible. So don't worry. There are no all-nighters in your future. What follows are powerful techniques for taking your imposing piles of study material and imprinting the key ideas on your mind as efficiently as possible. These techniques are quick but ruthlessly effective. Use them with confidence. They get the job done, and they get it done fast.

USE Feynman Technique

Feynman Technique

- I. **Choose a Concept, Idea, topic to Learn. Select a Topic You are interested in learning about and write it at the top of the blank page in the Notebook or Paper.**
 - A. Choose your topics carefully: Not everything that you study suits this technique. Usually abstract complex ideas are best understood by Feynman technique but ideas that are evidence-based/observational might not really be suited for this.
 - B. Selecting a concept to study compels you to be intentional about what you don't know. It also forces you to choose a topic that's small enough that it could reasonably fit onto one or several pages.
 - C. **You face what you don't know.** By writing a topic down on a blank page, you acknowledge you're starting from scratch or at least filling in some blanks. In doing so, take the initial step in the process.
 - D. **You need to be specific.** Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.
- II. **Use It For Real.**
 - A. Use it for real: perfectly suitable for weekly tech-talks, lectures, paper-reading, Study, Bible Study, Sermon or any type of study, deep work and deep study sessions.

III. Study The Topic By Reading, Listening, Watching and Communicating.

- A. You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.
- B. Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.
- C. Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.
- D. Make it your own.
 - Start with not knowing.
 - Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
 - Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.
- E. Take Notes On the Topic From Study.
- F. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.
- G. Don't write notes on notes: Life is short.
- H. Cornell Notes.
 - How Will I Take Notes and Cornell Note Take Method Pages 79-82.

IV. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

V. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

VI. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

A. Step 1- Use The Chosen Rules of Reading Method For Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method and Follow Each Steps Of The Method Until Finish All Steps, While Re-listen Lectures, Read Books or Lecture Notes 1-100 Times For Each Step.

B. Step 2- Following Rules of Reading Methods:

C. VERY VERY FAST Reading- Skimming. Pages 47-51.

D. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

E. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

F. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

G. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

- A. Learning should be iterative. More often than not, learning something challenging takes several attempts. With the Feynman Technique, returning to the source material is an explicit part of the learning process. When gaps in our knowledge arise and our explanations aren't quite right, revisiting our primary and secondary sources can help solidify what we're learning.
- B. Getting it right will likely take several iterations. That's a good thing; the more you refine your explanations, the more your understanding will deepen. Learning becomes an iterative process. Rather than viewing learning as one-and-done, this step gives you permission to continuously refresh your knowledge.
- C. You're actively engaged. Using sources to polish our own explanations and models is an active process. When we learn passively, committing details to memory is more challenging. When we're actively part of creating our own summaries and reasoning, drawing intentionally from original information to fill our blind spots, we can more readily commit knowledge to our long-term memory.
- D. You expand your knowledge base. Paradoxically, the more we learn, the more *our capacity* to learn increases. Looking through a chapter of a textbook might feel like a different language the first time around. The second time it becomes more clear. The third time, with a strong base already, we pick up nuances we couldn't have possibly seen before.

VIII. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
- B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

IX. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.

- A. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.
- B. Remove any jargon or complexity.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
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- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.
- G. **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught them in their own words. If they can't do this, your explanation is too complex — simplify it and use plain language.
- H. **You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes

you to tackle even more challenging subjects knowing you have a solid framework for learning.

X. Reflect, Refine, and Simplify.

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- B. Simple is beautiful.**
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.**
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IX. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

Trust the Quiz-and-Recall Method

Whether it's philosophy or calculus, the most effective way to imprint a concept is to first review it and then try to explain it, unaided, in your own words. If you can close your eyes and articulate an argument from scratch, or stare at a blank sheet of paper and reproduce a solution without a mistake, then you have fully imprinted that concept. It's not going anywhere. The same is not true if you merely read over something. Passively reviewing a concept is not the same as actively producing it. Most students make the mistake of relying only on passive review; they read and reread their notes and assignments, and assume that the more they read, the more they will remember. But as Ryan from Dartmouth warns: "Simply reading it over doesn't work. You have to make the extra effort to get it into your head."

Using the Quiz-and-Recall Method for Nontechnical Courses

To apply the quiz-and-recall method to nontechnical course material, you first need to construct a practice quiz for each chapter in your study guide. Fortunately, the questions for these quizzes already exist, since, if you've followed the advice of Steps #1 and #2, all of your notes should be in a question/evidence/conclusion format.

Therefore, the quiz for any given chapter can simply contain all of the questions from the notes you took for that chapter. You can be flexible here. If your notes contain some really broad questions—for example, an entire lecture that deals with only one idea—break them up into several smaller questions that, together, cover all of the relevant points. On the other hand, if your notes have a bunch of really small questions, you can combine some into larger questions to save space and time. This process is not an exact science; your goal is simply to produce practice quizzes that cover all the material contained in each corresponding chapter. If you can answer all the questions, then you understand all the big ideas. Once you've built your practice quizzes, go through them one by one. For each question, try to articulate the matching conclusion and provide some highlights from the supporting evidence. You don't have to reproduce the material in your notes word for word, but you do need a reasonable summary of the big idea and its support. Here's the important part: Don't do this only in your head! If you're in a private location, say your answers out loud using complete sentences.

However, if you are forced to review with other people around and you need to be quiet, then you can write out your answers. “The physical act of writing and the manipulation of the material in my mind was usually enough to keep things straight,” explains Melanie, a straight-A Dartmouth student. You don’t have to format these responses perfectly with correct spelling and grammar, but they must contain all of the pertinent information. No shortcuts. If you don’t say or write it, don’t consider it fully reviewed. Next, put little check marks on your quizzes next to any questions that you had trouble answering. Glance through your study guide to remind yourself of the right answers to these questions. Take a quick break.

Now, repeat the first step, except this time you need to answer only the questions that you marked during your first run-through. Put a new check mark next to the questions that you still have trouble with. Once again, look through your notes to get the right answers, and then take a quick break. Then go back to the practice quiz and try to answer the questions that you marked on your second run-through. You get the idea. Repeat this pattern until you complete a run-through without adding any new check marks. At this point, you’re done!

Using the Quiz-and-Recall Method for Technical Courses

The quiz-and-recall method is easily applied to technical courses. You already constructed your mega-problem sets; now you simply need to solve them. Start with the technical explanation questions—thinking about the general concepts first will make it easier to solve the specific sample problems that follow. As with nontechnical courses, try to provide an articulate answer for each problem, and if possible, give your explanation out loud, as if lecturing to a class. Otherwise, write out your answers clearly. Don't skip any important details. Once you're done with the technical explanation questions, move on to the sample problems. Try to answer each. Again, don't do this in your head. "I don't just read the material," explains Worasom, a straight-A student from Brown. "I write the important equations and concepts out by hand." Your solutions don't need to be as detailed as if this was a real assignment, but they should clearly demonstrate that you know what you're doing. If you can't explain exactly how you got from the question to the answer, then you don't yet understand this problem. Be honest with yourself: If you're just regurgitating memorized solutions, you aren't prepared to handle new questions on a test.

Memorize over Time

If you have material that must be truly memorized— dates, artists, chronologies, formulas—there are, unfortunately, no real shortcuts. You just have to keep working with your flash cards until you have no trouble providing the right answer, even after you shuffle the cards into a random order.

Memorization is particularly dependent on your available mental energy. It doesn't work if you try to commit items to memory for eight hours straight, but it does work if you memorize only an hour at a time and only one or two hours a day. So separate the task of memorizing from your other review. Spread the work out over many days, and never dedicate too much time to any one sitting with your flash cards. Melanie from Dartmouth recalls how some of her peers would "review their flash cards at any opportunity—eating dinner, waiting in line at an e-mail terminal," which is the most effective way to get through this tedious task and commit the necessary items to memory.

Step 5 Invest in “Academic Disaster Insurance”

Straight-A students have a knack for avoiding rogue questions. It's as if they invest in some sort of academic disaster insurance: protection against the unexpected return of those obscure topics that slip by when you doze off for a moment in class. In reality, this insurance policy is nothing more than a simple strategy: Eliminate your question marks. This technique can be employed throughout the term and, over time, significantly reduce the chance that you will be baffled by an unexpected exam question.

Eliminate Your Question Marks

In Step #1, we covered smart techniques for taking notes in class. If you remember, this strategy suggests that you put a question mark in your notes for any topic that flies by without you really understanding the conclusion. This will occur occasionally in both technical and nontechnical courses—sometimes as the result of your attention wandering and sometimes as the result of the professor heading off on a tangent and not offering a satisfactory explanation.

These question marks are dangerous. As Christine from Harvard puts it, by skipping a point made in a lecture, “you’re gambling with the possibility of being truly in the dark on the exam.” The scenario is simple. During the semester a few topics slip past your attention in class, so you end up with a handful of question marks in your notes. When it comes time to study, you have more than enough big ideas that you do understand, and that you need to review, so the occasional question-marked topic gets ignored. You enter the exam feeling prepared, and then, as luck would have it, you find yourself face-to-face with a big essay question covering one of those bypassed concepts. Whoops. To prevent this from happening, you need to eliminate these question marks. The key is to start this process well before the exam. If you leave all of these question marks unanswered until you start studying, you will end up spending many extra hours looking up the required explanations. Learning a large quantity of material from scratch during the review process is a mistake made by average students—and you should avoid this. Instead, try to knock off question marks as soon as they arrive. By the time you begin studying you should, as

Robert, a straight-A student from Brown, explains, “have at least a vague understanding of every topic that will be covered on the exam.” The following four tactics, if used regularly, will help you achieve this goal. They provide a solid defense against unclear ideas and will allow you to start the study process with an explanation in mind for all relevant topics.

- Ask questions during class. “When in doubt, I just ask questions in class for more clarification,” explains Worasom from Brown. If a topic slides by you, raise your hand and ask for a clarification. The more question marks you eliminate on the spot, the less work you will have to do later.
- Develop the habit of talking to your professor briefly after class. “Talk to the professor after class, or send him an email asking for clarification about questions that arose during his lecture,” suggests Jason from Penn. There is nothing unusual about this. Most professors will stick around for five or ten minutes after the bell to answer final questions. Take advantage of this time. When the class ends, head over to the professor and see how many of the question marks of the day you can get eliminated. You should then immediately correct your notes before you forget the explanations. Will this turn you into a brown noser? No! The brown nosers are those who come up to the professor only to tell him what parts of the lecture they found interesting, or to offer up some of their own “brilliant” thoughts on the topic. You, on the other hand, have a list of focused questions that you want answered, which makes you seem smart, not snivelling.
- Ask classmates. If you’re still unclear, James, a straight-A student from Dartmouth, recommends that you “talk with other people about the topic.” Send an e-mail or corner them in the hall soon after the lecture. If they understand the topic, it will take them only a few minutes to explain it to you while it’s still fresh in their minds.
- Come prepared to exam review sessions (if offered). Many classes offer a formal review session the week before the exam. Go to these. Before you arrive, jot down all of the topics from your notes that you are still unsure about. Then, during the session, try to get all of them answered. Don’t be worried about having a lot to discuss. More often than not, review sessions suffer from too few student questions, so your professor or TA will appreciate your preparation.

The goal of these defensive tactics is to eliminate your question marks without adding any study time. If, however, despite your best attempts, some of these unclear topics persist until your review, your last-ditch defense is to skim. You probably won’t have time at this

defense is to skim. You probably won't have time at this point to look up detailed explanations from scratch for every leftover question mark. And, even if you did, the effort would be way too time consuming (remember: Straight-A students avoid long study hours), so skim over just enough material to have something to say for each of these points. On the off chance that one of these lingering question-marked topics comes up on the exam, at least you won't leave a blank page. But this situation can still be dangerous, so follow the first four strategies to reduce the topics you don't understand as much as possible before your studying begins.

Step 6 Provide “A+” Answers

Even the most prepared student can bomb an exam due to poor test taking skills. The potential pitfalls during an exam are numerous, but the most common are: (1) running out of time and (2) providing answers that, although detailed, don't fully answer all parts of the question being asked. In fact, these two dangers work together in a devilish counterbalance, making them particularly hard to conquer. That is, if you try to avoid spending too much time on questions, then you are likely to provide time on questions, then you are likely to provide

incomplete answers. On the other hand, if you try to provide detailed answers, then you are likely to run out of time.

The situation sounds dire, but it's not. With the right strategy, you can eliminate these fears and ensure that your grade properly reflects your level of preparation. Straight-A students recognize this point, and when asked about test-taking, they provided detailed responses, proving that for them, this final step is no mere afterthought. They treat the test-taking process with great respect, and this attention is reflected in their consistently high grades. Their advice has been culled into five key strategies. Together, they provide a comprehensive test-taking system, finely tuned through experience to maximize performance. Follow these rules on every exam, and you'll be able to transform yourself into a test-taking machine—cool, confident, and ruthlessly efficient as you move from question to question, providing the best possible answers.

Strategy #1: Review First, Answer Questions Later

“I always read through the entire exam first,” explains Robert from Brown. This is good advice—for any exam, your first step should always be to review all of the questions. If it’s an essay exam or a technical exam with a relatively small number of questions, then read each prompt carefully. If the exam is multiple choice or contains many questions, skim through quickly and get a feel for which topics are covered. This review familiarizes you with the length and relative difficulty of what lies ahead. It also primes your brain for the topics you’ll need to address. “Always scan all the questions,” explains Anna from Dartmouth. “This allows your mind to think about all of them, even while you are focusing on one in particular.” In other words, while you toil away on an early question, another part of your brain, working in the background, will begin to retrieve information relating to the topics still to come. This actually happens, and it helps you answer the later questions more quickly.

Finally, and perhaps most significantly, this first step also helps you relax. Stress proliferates in a classroom right before an exam is distributed. It’s a make-or-break situation. Months of effort have led up to this single moment, and you have only a scant hour or two to prove what you know and secure your final grade. You begin to question yourself. Did you study everything you needed to? Have you forgotten important ideas? What if the to? Have you forgotten important ideas? What if the exam focuses on a subject you know nothing about? If you left it blank, what would happen then? Just thinking about this situation is enough to make most undergrads sweat.

However, by taking the first few minutes to carefully review the exam, you break this mounting tension. It gives you something productive to do that doesn’t involve actually answering questions. Once you complete this task and build a better idea of what to expect, the exam becomes less menacing. You’ve seen the questions, and (hopefully) none seem impossible. You begin to say to yourself: Okay, maybe this isn’t all that bad. Your confidence rises, your heart rate lowers, and your stress begins to dissipate. Now you can turn your full attention to providing standout responses.

Strategy #2: Build a Time Budget

At any given point during an exam, you should know the maximum number of minutes you have to spend on the current question before moving on to the next. As Doris from Harvard puts it: “I lay down very strict time limits for myself on each question.” This strategy goes a long way toward avoiding time trouble; it keeps your attention focused and prevents you from spending too much time on any particular question. The key to maintaining this keen awareness is to build a time budget. First, take the time allotted for the exam and subtract ten minutes. Next, divide this amount by the number of questions. The result is how long you have to spend on each prompt.

What should you do with this information? For an exam with a small number of questions, mark right on the test pages the time when you should begin and finish each one. For an exam with many questions, divide the exam into equal fourths, then jot down the time you should begin and end each section. In both cases, these recorded times will keep you updated on how close your current progress matches your predetermined schedule. Why do we subtract ten minutes in the first step? This provides a safety buffer. You want a few extra minutes available here and there to be able to double check your answers when you are finished, or go back and add more insights to questions on which you were rushed

Strategy #3: Proceed from Easy to Hard

Straight-A students almost never answer exam questions in the order that they are presented. Years of informal experimentation by successful students have demonstrated that the most effective way to tackle an exam is to answer the easiest questions first, and this is exactly what you should do. Start with the most approachable questions before moving on to the more forbidding. Don't worry if this has you skipping around all over the exam—in most cases the provided order is irrelevant. The advantage of this approach is that it first focuses your energy on the questions you know the most about, ensuring that you get maximum points on these. It also gives you a better chance of conquering the more difficult ones. “I always skip a question if it does not come to me immediately,” explains Ryan from Dartmouth. “This keeps my mind clear to answer other questions and hopefully something will jog my memory.” When you come across something hard early on in the exam, your natural instinct is to panic. You have so many more questions to finish, and you can almost feel the minutes ticking away as you stare blankly at this one particular

roadblock. It can be tough to get your focus back to wring out as many points as possible from the easier questions that follow. If, instead, you tackle this same roadblock at the end of the exam, you'll find that the situation seems less dire. You've answered everything else, so all that's left to do is working out this final puzzler. More often than not, you will find the mental block diminished. Without the pressure of other questions looming in the background, you can take a more relaxed approach. You might not know the best answer, but you can spend some time to devise a reasonable answer. Because you have nothing else left to finish, you can spend the remainder of the time polishing this answer, thinking, and repolishing. The result is the strongest possible outcome given your state of preparation.

Strategy #4: Outline Essays

When facing an essay question, don't just start writing and see what happens. This approach leads to rambling answers and missed concepts. Instead, your first step should be to jot down a quick outline. This might seem like a waste of time, but in truth it can be invaluable.

First, reread the question carefully. As Matthew from Brown explains: "Usually, you can isolate three or four mini-questions from a single essay question." Underline each of these mini-questions; this will help you flesh out your outline and avoid an incomplete answer. "Then, outline on paper (not in your head) the way that you will use what you know to answer these mini-questions," continues Matthew. To do so, use the margin of the exam to jot down all of the points you can recall that are relevant to the question. Record only a few key words for each point to save time and space. For example, if you want to mention an argument made by an author named Robert Caro dealing with Lyndon Johnson's views on race relations, you might jot down: "Caro—race." Next, go back and check the question parts you underlined in the first step. Make sure each is adequately addressed by the points you just noted in the margin. When you're sure that you have identified all the relevant information for the essay, number these points in the order that you want to present them. Only now should you begin writing your essay. Follow your outline, and the writing will proceed smoothly. You should be able to quickly produce a solid response that draws on everything you reviewed and addresses all parts of the question asked.

Strategy #5: Check Your Work

Advice and go back and check your work. You will be surprised by how many times this final review turns up a mistake in a technical problem or an important concept that you forgot to mention in an essay. If, after your first round of review, you still have time left over, then go through and check again. If there is a problem you feel particularly shaky on, use this time to go over it in detail, augmenting the answer wherever appropriate. Don't worry about using carets and arrows to add in new phrases and facts to your essays, or to point out added steps in your technical problems. Neatness doesn't count on exams; it's the content that matters. It's tempting to relax after finishing your exam, perhaps walking proudly to the front of the classroom and handing it in before anyone else. But aside from the wistful stares of your classmates, this strategy is ill conceived. Double checking your work up to the last minute can make the difference between an above-average student and an academic star.

Part Two Cheat Sheet

Step #1. Take Smart Notes

- Always go to class and try to take the best notes possible.
- For nontechnical courses, capture the big ideas by taking notes in the question evidence/conclusion format.
- For technical courses, record as many sample problems and answers as possible.

Step #2. Demote Your Assignments

- Work a little bit each day on your assignments; avoid suffering from day-before syndrome.
- Read only the favored sources on the syllabus in detail. To decide how much time to spend on supplemental sources, remember the importance hierarchy: – readings that make an argument are more important than – readings that describe an event or person, which are more important than – readings that only provide context (i.e., speech transcripts, press clippings).
- Take reading notes in the question/evidence/conclusion format.
- Work in groups on problem sets, solve problems on the go, and write up your answers formally the first time.

Step #3. Marshal Your Resources

- Figure out exactly what the test will cover.
- Cluster your notes for nontechnical courses.
- Build mega-problem sets for technical courses.

Step #4. Conquer the Material

- Embrace the quiz-and-recall method. It's the single most efficient way to study.
- Spread out memorization over several days. Your mind can do only so much at a time.

Step #5. Invest in “Academic Disaster Insurance”

- Eliminate the question marks for topics covered in class or from the reading that you don't understand.

Step #6. Provide “A+” Answers

- Look over the whole test first.
- Figure out how much time you have to spend on each question (leaving a ten-minute cushion at the end).
- Answer the questions in order of increasing difficulty.
- Write out a mini-outline before tackling an essay question.
- Use any and all leftover time to check and recheck your work.

Essay and Papers

Paper writing is hard, but the good news is that it doesn't have to be as hard as most students make it. Let's begin by taking a closer look at the paper-writing process itself, which can be broken down into three separate components:

1. Sifting through existing arguments.
2. Forming your own argument.
3. Communicating your argument clearly.

The sooner you dispel the notion that writing is the most important part of paper writing, the easier it will become for you to reap the benefits of the straight-A approach.

Research Papers vs. Critical Analysis

Essays

Writing assignments come in many varieties. Some require a lot of original research, whereas others require only a critical discussion of a topic introduced in class. Some have ulcer-inducing length requirements, whereas others ask for only a handful of pages. We capture these differences with the simple classification scheme of research papers versus critical analysis essays. Some assignments, of course, may fall outside of these two descriptions, but, for the most part, they capture the major variations in paper writing. All of the advice that follows explicitly describes which of these two types it applies to.

Research Papers

A research paper requires you to choose a topic within provided parameters and then devise an original thesis relevant to your chosen topic. For example, the broad parameters for your topic choice might be “anything involving the British Empire,” the specific topic you choose from within these parameters might be “public schools and the British Empire,” and the thesis you choose might be “the public school system in nineteenth-century England had a curriculum specifically tailored to the requirements of the British Empire.”

Research papers require original research to support your original thesis, and, accordingly, their page lengths are long and their due dates are generally a ways off from when they are assigned. If you spread out the work appropriately and choose the right topic, research papers can provide a rewarding intellectual challenge. Proposing and supporting an original argument is exciting. However, if left until the last minute, these assignments can become a nightmare. More than a few students have suffered a nervous breakdown from the stress of tackling a major research paper at the last moment. So for these assignments in particular, take careful note of the scheduling recommendations that follow.

Critical Analysis Essays

Critical analysis essays are the bread and butter of most liberal arts classes. These essays are short, and they typically require you to analyze one or more of your class reading assignments. They are often set up as a comparison, for example: “How do Nordlinger and Hopkins differ in their approach to understanding American Isolationism. What cultural and theological sources account for these differences?” Critical analysis essays differ from research papers in several significant ways: Topics are provided in advance, your thesis is nothing more than a specific answer to the question asked in the assignment, and there is little-to-no original research required. Not surprisingly, these essays require less time to complete than research papers. Their goal is to test your understanding of the material presented in class, not to seek out and present new ideas. Don’t get the wrong idea—these essays are not necessarily easier than research papers. College writing assignments follow a simple rule: The required precision of your thinking works in direct proportion to the constraint of the material. That is, the more specific the assignment, the more subtle and detailed your thinking must be. So beware. If your assignment covers only one chapter, then you’re going to need to understand every word of that chapter and be able to articulate your analysis with precision.

Step 1 Target a Titillating Topic

Remember: A topic does not equal a thesis. A topic describes an interesting subject or area of observation. A thesis presents an interesting, specific argument about that subject or observation. Let's look at some examples. As mentioned, for a critical analysis essay, the topic is provided, so this step won't be applicable. For a research paper, however, you get to choose the topic—so we'll focus on the specific case of research paper topic selection for the remainder of this section.

Choosing a Research Paper Topic

Typically, the professor will provide some loose parameters. For an art history course, these might be: parameters. For an art history course, these might be: "Any artist covered in the class so far." For a political science class they might be: "Economic policy and Latin America." The key is to choose a topic, within the constraints of the assignment, that excites you. All work that follows on your paper will stem from this topic; if you are not intrigued by the idea, then the paper-writing process will be tedious. If, on the other hand, you are fascinated, or at least curious, then the process will be that much easier. The best way to identify a titillating topic is to start looking for one early. "I work on topic ideas in my head and on scraps of paper beginning anywhere from a week to a month in advance of the actual deadline for a paper," explains Doris, a straight-A Harvard student. Follow this approach. On the very first day of class, read the description of the research paper(s) that will be assigned. The syllabus should describe each paper's topic parameters, and the professor will usually discuss these assignments briefly early on in the term. Once you know the parameters for the paper, you should constantly be on the lookout for a particular subject or observation that interests you. If one reading assignment really grabs your attention, jot down the topic so you'll remember it later. If a professor poses an interesting question during class, or piques your curiosity by describing a compelling open area of research, make a note of it. As Sean, a straight-A student from Yale, explains: "Keep an eye out for concepts that interest you in the readings and lectures. If there's something that grabs you, it will probably make a good topic." If you have trouble finding a topic in advance, you have two options. First, as Chien Wen, a straight-A student from Dartmouth, advises: "Approach your professor with some ideas you have and let him recommend some appropriate readings." Professors know their field well, so they should have no trouble pointing you toward some resources to help flesh out your initial thoughts. Second,

as Chien Wen also advises: “Read your primary sources carefully.” Grab a textbook or similar general source from the class, and then skim through and look for angles that catch your attention, passages that make you ask “why,” or descriptions of competing arguments debating an interesting subject. “Be imaginative and intuitive—look for unusual connections between individuals, ideas, and broader themes,” says Chien Wen. In general, the more care you take during this first step, the easier the rest of the paper-writing process will be, so take your topic choice seriously.

Step 2 Conduct a Thesis- Hunting Expedition

You need to construct a thesis that makes a compelling argument concerning this topic. Once again, for a critical analysis essay, most of the work toward constructing your thesis has already been done for you. Typically, the essay prompt will contain a specific question (i.e., “How do the two arguments differ?” or “Why does the author say this?”), and your thesis is a summary of your answer. For a research paper, on the other hand, you might be dealing with a very broad topic that requires significant digging to find an interesting and supportable idea that can be expanded to fit the required page limit. In both cases, some initial research is required. A thesis devised from scratch is dangerous. Without some initial exploration, you have no idea whether or not your idea is viable, and there are few experiences worse than being forced to restart a paper after many hours of work. At the same time, however, you don’t want to dedicate days to intensively reading every book in the field in search of a perfect thesis, because this would be inefficient. For a critical analysis essay, the solution is simple: Review both the reading notes and lecture notes that relate to the essay prompt. And that’s it! This should provide a rough idea of how you are going to answer the question posed by the assignment. Therefore, your thesis has been found. Even though it’s simple, don’t skip this step for critical analysis essays. The earlier you develop an idea of what you are going to say, the more time you have to refine the nuances of your argument. For research papers, on the other hand, the task of finding a thesis is more complicated. No sources have been preselected for you, and no specific question has been provided. All you have is a general topic that you thought up yourself. Now you must wade into a vast sea of knowledge and somehow find enough material to devise a strong thesis—while avoiding drowning in the sheer volume of available information. Not surprisingly, the straight-A students interviewed for this book have mastered the art of conducting research paper thesis-hunting expeditions. Their goals are twofold: (1) find an interesting thesis that can be supported within the scope of the assignment; and (2) minimize the time required to conduct this search. Accomplishing both of these goals sounds hard, but straight-A students get it done. What’s their secret? One simple phrase: Start general, then move one layer deep. Let’s take a closer look at what this really means. Start General, Then Move One Layer Deep “I usually begin with basic sources,” explains Chris, a straight-A student from Dartmouth. “If I’m doing a paper on the Kurds in Turkey, for example, I get a recently published general history on this topic.” Similarly, if your topic is Faulkner’s early writing, you might find one or two Faulkner biographies and then focus only on the chapters dealing with his early years. If you have a

hard time finding a few general sources for your topic, then ask your professor—he'll have plenty of titles to recommend. In addition, keep in mind that most courses set up a reserve shelf at the campus library. This shelf contains books that were selected by the professor because of their relevance to the course. Typically, you can check out reserve books for only a couple of hours at a time, so they should always be available to the students who need them. This is a great place to find general sources. So that's step one (the "start general" part of the strategy). The reason we need a second step is because you shouldn't expect to find your thesis idea in a general source. Of course, you might get lucky and find an interesting thesis during this first step. In general, however, overview sources will be much too broad to reveal a targeted and interesting argument that hasn't already been written about extensively. The main reason you found these general sources is to get at their bibliographies. As Chris goes on to explain: "I read any chapters from my general sources that look useful for my paper. I then look up the sources used in that chapter." In other words, the second step of your thesis-hunting expedition is to examine the list of books and articles cited in the relevant sections of your general sources. From this list, choose the cited works that look the most promising, and then go find them in the library. These sources will be more focused—perhaps journal articles or books addressing only a small number of specific arguments. You are most likely to come across an interesting and appropriately targeted thesis idea using these more focused sources. Let's apply this approach to our Faulkner example from before. Perhaps one of our general sources cites a journal article on the influence of a specific European modernist writer on Faulkner. You find this journal article, and while reviewing it you notice that it mentions, in passing, a list of other modernist writers who might have had a similar influence. Aha! Now this could be an interesting thesis. You might choose one of these modernists from the list and then look for historical evidence of their connection to the primary writer. Perhaps, instead, one of the general sources talks about a period of Faulkner's life that he spent in Europe. Maybe it also mentions that our only records of this travel are letters written by the young author himself, and then it provides a citation to a collection of these letters. You then locate these letters, begin to read through them, and notice that he mentions a particular bar in London several times. This too might be a source of a fascinating thesis. You could investigate the intellectual climate of London nightspots of the time and posit their potential influence on Faulkner's work. From there, perhaps the core of your paper could be to present a piece of writing from right before the trip, and another from right after, and then argue which stylistic changes may have been influenced by his foray into the intellectual intensity of the London literary milieu. The key is to keep in mind that even very small observations can

lead to large, interesting discussions. How do you know your thesis idea is good enough to support an insightful paper? “A great thesis typically has at least these four qualities,” explains Christine, a straight-A student from Harvard. “It’s provocative, nuanced, direct, and inclusive.” She goes on to warn: “A thesis should, at the same time, also show a grasp of the complexities of a subject—‘in this poem, X symbolizes Y because Z’ is a weak type of thesis structure, far too reductive and simplistic—don’t be afraid to leave room for ambiguity and unresolved issues.” Wendy, a straight-A student from Amherst, puts it simply: “The most important part of your paper is the thesis. Once you have a solid thesis, the rest just falls into place.” Here’s the tricky part: Your thesis will change and evolve as you continue the paper-writing process. This is inevitable, because you haven’t done your exhaustive research yet. At this early stage, your thesis more likely explains the type of connection or answer you hope to find, rather than the final connections and answers themselves. To revisit our Faulkner example, your early research may indicate that the social milieu of a certain London nightspot influenced a young Faulkner, but you might not yet know all the ways this influence was manifest. More research is required, and that’s okay. You should embrace this evolution of your ideas as the process continues. For now, it’s sufficient that your fledgling thesis looks like it’s on the path toward fulfilling the properties mentioned above. In other words, before continuing, make sure that your preliminary research strongly indicates that something similar to your thesis idea will be supported by the more detailed investigations to follow. Be honest with yourself: If you made up your thesis simply because it sounded cool, but have no real reason to believe it to be true, then you’re courting a paper-writing disaster. If, on the other hand, several pieces of early evidence point to the types of interesting connections described by your thesis, then you’re on the right track.

Step 3 Seek a Second Opinion

At this point you should have an interesting topic and a targeted thesis. You're well on your way toward a standout paper, but don't get too far ahead of yourself. It's time to take a step back. More than a few students have dived deep into the paper-writing process, supported by what they thought was a compelling thesis, only to find out many pages later that their premise was not as strong as it initially seemed. Perhaps they fail to find enough evidence to support the argument. Perhaps they stumble across another source that has already made the exact same point. Or, as is often the case, perhaps they find their thesis to be too broad to be succinctly argued within the scope of a paper assignment. The thesis-hunting tips of the last step help eliminate this possibility, but they're not enough by themselves. Once you think you have a good thesis, a final step remains before diving fully into the research and writing process. As Rielle, a straight-A student from Brown, explains: "I often talk to a professor to clarify my ideas before I begin writing." This is great advice. For every research paper and significant critical analysis essay (i.e., assignments more than just a few pages long), you should make a habit of discussing your targeted thesis idea with your professor. Go to office hours, or make an appointment, explain your topic and thesis, then ask the following questions:

- 1. Is my idea appropriate for the assignment?*
- 2. Does it cover too much?*
- 3. Is it too simple?*

For a critical analysis essay, if the professor deems your thesis appropriate, this is a good sign that you are not going to get stuck. You can now move ahead with confidence. For a research paper, if the professor deems your thesis appropriate, take advantage of this time to explain some of the sources you plan to examine. The professor will likely have some additional sources to suggest. Write these down. This just saved you some suggest. Write these down. This just saved you some serious research time! For both types of papers, if the professor isn't enthusiastic about your thesis idea, then he or she will likely help you adjust it into something that is reasonable. When you leave this meeting, which should require only ten to twenty minutes, you will have confidence in the foundation of your paper. You can now move full speed into the research stage without fear of reaching a devastating dead end later on in the process. It's amazing how many students ignore this incredible resource. One simple meeting can make the difference between a standout work and an incoherent dud. Remember, this step is not intended as a shortcut. If

you skipped the previous step and show up at office hours without a targeted idea, the professor is not going to give you one for free. However, as Christine from Harvard explains: “They’ll rarely refuse to listen if they see you’ve thought things out in advance.”

Step 4 Research like a Machine

Not surprisingly, research is the domain of the research paper. For a critical analysis essay, your sources are already specified, and there are probably only one or two of them. Therefore, when working on an essay, you can skip this step and move on to Step #5 (Craft a Powerful Story), which describes how to organize your argument. For research papers, however, the following advice is crucial. Why? Because how you research can make or break your paper-writing efforts. If your strategy is haphazard—as is the case with most students—then two immediate problems will arise. First, the writing process will become frustrating and tedious, since you will be forced to continually stop and seek out new sources to extend your argument. Second, and more important, the resulting paper will be weak. A good argument requires a solid grasp of all relevant information. You want all the necessary facts and ideas to be at your fingertips, easily manipulated, sourced, and shuffled, as you build your case. If your sources are incomplete and disorganized, then your paper will be, too. On the other hand, you can also run the risk of spending too much time on research. Many eager students have succumbed to the horrors of research recursion syndrome—an unhealthy need to go find “just one more source,” often leading to hours and hours of wasted time, dorm rooms overwhelmed with teetering stacks of books, and one seriously sleep-deprived student. This is grind territory, and you should avoid it at all costs. So while at first glance it may seem easier than choosing a thesis or writing the paper itself, in fact the research step of paper writing is easy to get wrong. Fortunately, straight-A students have figured out a way to walk the research tightrope—getting the information they need without becoming lost amid the endless available sources. Their strategy can be summarized by a simple phrase: Research like a machine. They follow a system—a mechanical process, the same for every paper—that produces consistent high-quality results. Feed them a thesis, watch their wheels turn, and then out pops a set of photocopied, organized, and annotated notes. Their system ensures that the quality of their research is sufficient to fuel a standout paper and at the same time requires the minimum amount of time to achieve this goal. Sounds pretty cool, right? But how does it work? Their system is based on these four steps:

1. *Find sources.*
2. *Make personal copies of all sources.*
3. *Annotate the material.*
4. *Decide if you're done. (If the answer is “no,” then loop back to #1.)*

That's it. The devil, of course, is in the details. So let's take a closer look at what each of the steps entails.

1. Find Sources

There are two types of sources: general and specific. As described in Step #2, the former include overviews of your topic (i.e., biography or textbook), whereas the latter focus on specific arguments (i.e., a journal article or book about a specific event or idea). For a college-level paper, most of your best information is going to come from specific sources. The hard part, of course, is finding them.

Step #2: Start with general sources and then look in their bibliographies for more targeted resources.

As David, a straight-A student from Dartmouth, says: "Once you have two or three materials that you like, it's all about the bibliographies...find out where the author found the fuel for his arguments and go check those out." In Step #2, I suggested that you ask your professor or browse the course reserve shelf to find some of these general sources. Another place to look is your library's online card catalog. This sounds obvious, but using an online catalog correctly is not a trivial task. Just typing in keywords might not turn up every book that deals with your topic of interest. You need some more advanced tricks. One such trick is to take advantage of the Library of Congress (LOC) topic classifications. What are these? The Library of Congress tries to classify all books into one large hierarchy of topics. For example, Heinrich Harrer's fascinating book *The White Spider* (an account of the first team to ascend the infamous North Face of the Eiger Mountain) is described by the following two classifications:

1. Mountaineering—Switzerland—Eiger—History

2. Eiger (Switzerland)—Description and travel

When you find a book in an online card catalog, its corresponding LOC topic classifications should be listed. The cool part is that these topics should also be hyperlinked. That is, if you found an entry for *The White Spider*, you could click on Mountaineering—Switzerland—Eiger—History to return a list of every book in the library under this classification. Therefore, if you find one general source on a topic, then you can easily find many others. And once you have found general sources, you can turn to their bibliographies to find something more specific.

The second strategy for finding specific sources is to search for them directly. This approach is important. Not every specific source relevant to your thesis can be found in the bibliography of a general source. This is particularly true for more recent scholarship. Books take a long time to write; if a paper was published only within the last few years, it is

probably too soon to find a general tome that cites it. The problem here is that specific sources can be difficult to find. For example, continuing with the Eiger topic introduced above, let's say your thesis within this topic is: "The many failed attempts to ascend the North Face of the Eiger played an important role in the development of Swiss cultural identity during the first half of the twentieth century." Finding a general source about the Eiger, such as *The White Spider*, is easy enough. But finding a targeted source on the impact of the Eiger on Swiss cultural identity will be significantly more complicated. Simply typing "the impact of the Eiger on Swiss cultural identity" into the library card catalog probably won't turn up many hits. So how do you locate these elusive specific sources? There are four main search tactics.

Search Tactic #1: Break Up Your

Query into General Chunks If you can reduce your specific query to a group of related, yet succinct, general searches, you will have a much better chance of finding a relevant source. Following the Eiger example, you might try:

- Alpine hiking Switzerland culture
- Switzerland cultural identity
- Alpine hiking
- Mountaineering Switzerland

Any one of these more general queries could turn up a source that either directly references your thesis or makes a point that supports your thesis. With practice, you will get better at constructing these general probes aimed at illuminating a specific idea.

Search Tactic #2: Use Journal Databases

As mentioned, specific sources are more likely to be scholarly articles than books. Your library card catalog does not index articles. Therefore, as Chris from Dartmouth recommends, you should consider "article database searches (like JSTOR) on the specific topic." How do you find these databases? Your library Web site should contain a list of available electronic resources. At some point during your freshman year, you will probably be given an orientation on this topic. (Even if you sleep through it, as most of us do, it shouldn't be that hard to figure out.) This list of resources is usually broken up by academic concentration (i.e., Political Science, Anthropology, and so forth). Go to the concentration relevant to your paper, and you should see a list of searchable archives. Many of these resources will be databases of scholarly articles, so search these focused

databases using the general search term chunks described in the preceding tactic and see what pops up. If your topic is interdisciplinary, meaning that it draws from multiple academic concentrations, follow Chris's advice and try a big database like JSTOR (<http://www.jstor.org>), which contains scholarly articles on a large variety of academic topics.

Search Tactic #3: When in Doubt, Google

"Google is your friend, first and foremost," says David from Dartmouth. This is good advice—as Google is a great tool—but it should be used with some caution. A good rule of thumb is: Don't cite Web sites. Academics don't trust them. Journal articles go through extensive peer-reviewing before they are published, and academic books are written by experts and rigorously edited. On Web sites, however, anything goes. Therefore, they're worthless in terms of supporting an argument. Referencing Web sites is something you do in high school. If you do this in college, be prepared to experience the wrath of your professor. This being said, Google is still immensely useful. Not for finding Web sites to cite, but for finding Web sites that reference books and articles relevant to your thesis. For example, a search for "Eiger and Swiss Cultural Identity" might actually turn up some Web sites dealing with, or related to, this obscure issue. The Google search algorithm is a lot smarter than the one used by card catalogs, so even very complicated queries can turn up surprisingly accurate results. If you're lucky, some of these Web sites will mention specific sources—a book name or article title. Now you can look up these in your card catalog, and then treat them like any other formal source.

Search Tactic #4: Ask a Librarian

Most college libraries are staffed with reference librarians who want nothing more than to help you find the information that you seek. It's what they're paid to do, and they're great at it. Too many students, however, ignore this wonderful resource. Here you have experts who can save you hours of struggle by conducting advanced searches on your behalf; yet most students never think to take advantage of the opportunity. Making a visit to the reference desk should be one of your first steps when researching a challenging assignment. Simply explain your topic and thesis to the librarian, and he or she will walk you through several searches. Not only will this identify some specific sources that you may have otherwise missed, but it will also expose you to new library resources and databases that you can now use for future projects. The more time you spend with reference librarians, the better you will become at finding solid material on your own.

2. Make Personal Copies of All Sources

How you handle the sources makes a big difference in the overall efficiency of the paper-writing process. Though there are many ways to deal with the book chapters and articles relevant to your research efforts, many of the straight-A students interviewed for this book favored the following strategy: Make a photocopy or printout of all relevant material. If you find a book that has two chapters related to your topic, photocopy those two chapters. If you find an important journal article, photocopy the entire article. If you find an article online, or a relevant Web site, print it out. The goal is to create your own personal hard copy of all sources. The advantages of this approach are numerous. First, these hard copies are portable. It's easier to carry around a stack of photocopies than a stack of books and journals, so you can take your research with you to your secret study spots or office hours. Second, the information is more accessible. No flipping through big tomes or searching your computer hard drive; all the relevant information is stored in one condensed stack. You can now physically organize your sources, for example, by putting them into piles by author, clustering relevant arguments together with paper clips, or dividing them into folders labeled by subject. As Sean, a straight-A student from Yale, explains: "It's often easier to grasp something when you have a hard copy in front of you." Third, you can mark them up with impunity. "Printouts and Xeroxes of source info are often superior to books or digital copies," explains Christine from Harvard, "since you can annotate them to death." Feel free to underline things, highlight, draw arrows, cross out sections, or put big stars next to important points. In general, this approach maximizes the control you have over your information, ensuring that your sources work for you. However, there are a couple of important caveats to remember. First, make sure you label each photocopy with all of the information needed to later construct a formal citation. For example, if you photocopy a book chapter, jot down on the first page the name of the book, the author(s), the publisher and its location, and the copyright date. Or, if you prefer, follow Christine's advice and simply "make a photocopy of the title and copyright info" as found in the front of the book, so you can use it later while constructing the works cited for your paper and ensure that you don't find yourself "running back to the library at the last moment for citation info." Second, photocopy each source's bibliography. This way, if you come across an interesting reference in one of your photocopies, you will have easy access to the full citation attached to the reference. For articles, the bibliography is almost always listed immediately following the article. For books using the endnote format, you might have to flip to the back to find the bibliography for a specific chapter.

3. Annotate the Material

Finding a source, of course, is just the first step. A stack of photocopied pages is worthless if you don't know what information it contains and how it might be useful to your paper. You need to review the sources and annotate them with a concise description of the important information, if any, that they contain. Be careful how you proceed here. Your first instinct might be to follow the advice described in Part Two about how to take notes on your reading assignments. Don't do this—it's overkill. For now, you should be content to follow the advice of David from Dartmouth, who recommends **that you “skim, skim, skim.”**

Use The Following:

- A. VERY VERY FAST Reading- Skimming. Pages 47-51.**
- B. VERY FAST READING- Entertainment.**
 - I. Method 1-Speed Reading. FAST Reading. Pages 59-64.**
- C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. Method 6-Devotional Bible Read. Pages 73-74.**

Specifically, read through the source quickly. Every time you pass by an important definition, idea, or opinion that seems relevant to your thesis, jot down (on your computer or by hand) the page number and a quick description. For example, if the author argues a particular point of interest, write only what this point is— there is no need to also copy down the evidence he uses to support it as you would for notes on a reading assignment. If the source is a book, then, as Anna from Dartmouth explains: “Pick out only the chapters that relate to the specific aspect of the topic that you are interested in...it is not necessary to read the entire book!” When you're finished, staple your annotations to your personal copy of the corresponding source. In general, proper source annotations should act as

concise pointers, containing just enough information to show you where the relevant arguments are hiding. In the next step, where you organize all of your gathered information into a coherent structure, these simple annotations turn out to be exactly what you need to quickly assess the importance of each source. Therefore, you will end up needing to carefully read only the passages that help your paper. You should not think of this step as adding work. As you will soon discover, these concise annotations are actually going to save you a significant amount of time.

4. Decide If You're Done

There is no simple answer to this question. While it would be nice to offer a perfect formula for how much research is enough, it is impossible—there are just too many variations to contend with. Some short papers might require dozens of sources, while some long tracts may focus entirely on a handful of original documents. What follows is a rough procedure that should aid your decision about whether or not you have gathered enough research. Remember, this is just an approximation. Always keep in mind the context of your specific assignment. However, this approach should help reduce the guesswork involved in completing this step.

The Research Termination Determination Procedure:

1. List the topics (specific questions, facts, or accounts from your research) that are crucial to support your thesis.
2. List the topics that might help you support your thesis.
3. If you have at least two good sources for each of the topics from #1, and have at least one good source for a majority of the topics from #2, then you're done. Otherwise, you need to keep researching.

The reason these criteria are just an approximation is because at this early stage you probably don't know exactly how your thesis argument will proceed, so you don't know exactly what information you need. This procedure simply helps you estimate as best you can. By separating out the crucial from the potentially helpful, you are less likely to get stuck hunting down an obscure piece of information that you could do without. This approach is advised by David from Dartmouth, who describes the following similar procedure for sorting his research sources: "I make three piles of my sources: very useful, potentially useful, and not useful." To draw from our previous example, if your thesis deals with the Eiger and Swiss cultural identity, you might construct

your list of “crucial” and “might help” topics as follows:

1. Topics that are crucial to support the thesis:

- Basic historical information concerning the Eiger (when it was discovered, when it was first climbed, and so forth)
- Arguments concerning Swiss cultural identity at the turn of the century

2. Topics that might be helpful in supporting the thesis:

- Memoirs of people who were involved in the first ascents of the mountain
- Press accounts from the time (both Swiss and non- Swiss)
- General discussions of the role of sports and national pride

If you have a hard time tracking down one of the topics from the second list, you would still be okay. If, on the other hand, you have a hard time tracking down either of the topics from the first list, then you need to keep looking. In the next step, where you actually begin to outline your paper, it's expected that you might need to return briefly to the research phase and find additional sources to fill in any holes. If you follow the procedure above, however, you will minimize the amount of secondary research that you are forced to conduct—thus saving yourself from more hours in the library.

Step 5 Craft a Powerful Story

This step is where the magic happens. It's the fun part of paper writing—the moment of intellectual eureka. You have already defined (and verified) a compelling thesis, and you have at your disposal a collection of well organized and annotated research material. Now it's time to stretch your mental muscles and pull these pieces together into a powerful story. As Anna from Dartmouth says: "In order to write a great paper, you really need to make connections that other people haven't made, and the only way to do that is to think." This is the step where such thinking occurs.

Formulate Your Argument

"You must have a vision of what the overall structure of your paper will be," explains Frank, a straight-A student from Brown. "Organization of thought can make a decently researched essay into a fine piece of academic work." Formulating a solid argument, however, cannot be reduced to a system; it is a mental exercise that requires critical thinking and creativity. At the college level, there is no set structure that allows you to fill in the blanks and automatically produce a smart paper. As mentioned in the opening to Part Three, the intro, body and conclusion nonsense introduced in high school won't do you any good here. It's too simplistic, and your professors will be expecting more. In general, a good college-level argument should accomplish the following:

- 1. Draw from previous work on the same topic to define the context for the discussion.**
- 2. Introduce a thesis and carefully spell out how it relates to existing work on similar issues.**
- 3. Support the thesis with careful reasoning and references to existing arguments, evidence, and primary sources.**
- 4. Introduce some final prognostications about extending the argument and its potential impact on the field as a whole.**

There is, however, no set order or format for presenting these general points. One paper might start by defining the context and then move on to the thesis. Another paper might start with the thesis, argue it, and then introduce the broader context at the end. Many papers might interweave all four points. There is no right answer here. And the hard truth is that the only way to get better at organizing and presenting your thoughts is through practice. So write a lot and read good arguments a lot. This is the best recipe for

developing your skills for this step. That being said, there are some general pointers about how to go about formulating your argument. These aren't rules for what to say; rather, they are tips for how to get your brain fired up and your creative juices flowing.

Tip #1: When it comes time to craft the storyline of your paper, put yourself in the right mind-set. Grab a copy of *Atlantic Monthly*, *The New Yorker*, *Harper's*, or any other publication that features well crafted discussions. Peruse some articles, and then go for a walk along a quiet path. Alternatively, as David from Dartmouth recommends: "Talk to friends —if they are good friends they will allow you to bounce ideas off of them and talk through your work." You can also cloister yourself in a dusty, wooden-shelved, overstuffed-armchair-filled corner of the library, or argue with your professor during office hours. Reread related articles and chapters from your course syllabus. Watch a PBS documentary. Do whatever it takes to get the reasoning portions of your mind inspired and curious.

Tip #2: At this point, grab your source material from the previous step. If your assignment is a critical analysis essay, this will consist of only a couple of books and your reading notes. If it's a research paper, you might have a large stack of photocopied chapters and articles. In either case, dive into this information, and start letting the relevant facts and arguments settle into your mind. This is where your annotations will point you toward what's interesting, and help you avoid the irrelevant.

Tip #3: Take a break. Do something else. Let the pieces float around in the background noise of your mind. "The first thing I do when I have a paper to write is take a nap," explains Laura, a straight-A student from Dartmouth. "I crawl into bed and just think...as long as I'm thinking about the subject when I fall asleep, I will dream about the material and usually come up with some sort of interesting idea." Similarly, start looking for any opportunity to do a little thinking about your argument. "I think about my paper when I go around completing my daily chores, when I walk to class or when I wait on line in the dining hall," explains Anna from Dartmouth. Use this downtime to slide the pieces of your argument around in your head and play with the structure a bit. Keep returning to your research material as needed to find more details and to increase your understanding. You need to

expose yourself to the source material again and again to fully internalize it. Only then can you really pull together the best possible argument.

Constructing an Outline

You need an outline to capture the argument you just spent so much time devising. Keep in mind, however, that all outlines are not created equal. In fact, there are two major outline-related mistakes made by students.

First: under-outlining. If your outline lacks enough detail, it's not going to serve its purpose as a structure to guide your writing, and you will end up writing from scratch. You want to avoid this at all costs; it leads to argumentative dead ends and weak structure overall. "In high school, I wrote all my papers in one go, starting with the intro, constructing and polishing each sentence in order," explains Christine from Harvard. "In college I've become a huge fan of outline-based writing, which has made my essays much more tightly argued and given them better, clearer trajectories...since I can now shuffle topics around until they flow with some natural order and logic— rather than straining rhetorically to bridge from one idea to another."

The second mistake: over-outlining. Some students construct beautifully intricate outlines, replete with three or four levels of information, roman numerals, digits, letters, and tabs flying everywhere—the type of outline they taught you to make for your fifth-grade research project. Don't do this either. It constrains you. As Doris from Harvard explains: "One pitfall to avoid is getting stuck in the outline stage—I've seen students who spend far too much time embellishing their outlines when they should really have begun writing the paper itself long ago." When it comes time to write, you will be hampered if you constructed an outline that practically spells out what each sentence of each paragraph should say. These sorts of low-level decisions should be made when you write, not before. It's not until you're actually putting words on paper that you will understand the best way to make each small piece of your argument flow. Don't let an outline make these decisions for you. The happy medium between these two extremes is to construct a topic-level outline. Before we can cover the specifics of this process, I must first define what I mean by "topic." Here, I use the term to describe any self contained point that you might discuss in your paper. Typically, this is something more general than a piece of evidence but also more specific than a multipart argument. For example, here are some sample topics for our hypothetical paper about the Eiger:

- Our thesis about the Eiger and Swiss cultural identity
- Early written accounts of the Eiger

- The first ascent of the Eiger
- Contemporary press accounts of Eiger summit attempts
- Mentions of the Eiger in early-twentieth-century popular culture
- Mentions of the Eiger in early-twentieth-century Swiss tourist brochures
- MacMillan's thesis about the Alps and European identity
- The relationship between our thesis and MacMillan's argument
- Concluding thoughts about our thesis—implications and future work and future work

We start the outlining process by constructing a topic skeleton. This is a list of all the topics you will discuss in your paper, presented in the order that you plan to include them. Type this list directly into your computer because you will later need the ability to insert text in between items. Your topic skeleton succinctly describes the structure of your argument. For example, we might take the previously mentioned topics and order them as follows to form a topic skeleton for our hypothetical Eiger paper:

1. Mentions of the Eiger in early-twentieth-century Swiss tourist brochures
 2. MacMillan's thesis about the Alps and European identity
 3. Our thesis about the Eiger and Swiss cultural identity
 4. Early written accounts of the Eiger
 5. The first ascent of the Eiger
 6. Contemporary press accounts of Eiger summit attempts
 7. Mentions of the Eiger in early-twentieth-century popular culture
 8. The relationship between our thesis and MacMillan's argument
 9. Concluding thoughts about our thesis—implications and future work
- At this point, no specific pieces of evidence are described by our outline, but it does capture how the paper will flow. In a perfect world, you would have at least one or two good sources to support each topic.

However, it will often occur that as you formulate your topic skeleton, you come across a topic that you really need to include but for which you don't yet have any sources. That's okay. We mentioned at the end of the last step that once you start formulating your argument, you might come across some holes that need to be filled. This is exactly where these holes will become noticeable. Once you have completed your topic skeleton, you need to return to the previous step and find sources to support any of the currently unsupported topics. If you followed the research termination determination procedure from before, there shouldn't be too many of these holes.

Filling in the Details of Your Topic Outline

Once you finish your topic skeleton, and find sources for all of the unsupported topics, it's time to fill in the supporting details. This next step is crucial. As Christine from Harvard explains: "Below each bold header [in my topic skeleton], I compile in regular typeface the evidence pertaining to that header." You should actually type quotes from your research material right into the word processor document containing the outline, and label each quote with the source and page that it came from. For example, under the "first ascent of the Eiger" topic from above, you might insert quotes from a few different books on the mountain as well as excerpts from several contemporary articles. Some of these latter excerpts may also be included under the "contemporary press accounts of Eiger summit attempts" topic. It's okay to share information between topics at this point, since you will sort out which quote to use where once the writing process begins. This is not a time for caution—if it seems relevant, stick it in.

At first, this step may sound excessive. By the time you finish, your outline will be large and filled with quotes, perhaps even longer than the projected length of your completed paper. Fortunately, this process is greatly simplified by the format of your gathered research materials. Because you made a personal copy of and annotated every source, finding the appropriate pieces of evidence to include in your outline will be much easier than if you had to page through each book and article from scratch. Furthermore, the benefits of this outline far outweigh the annoyance of constructing it. As Robert, a straight-A student from Brown, explains; "I find that using this process helps me avoid digging through a pile of books and articles for each piece of information I need as I need it during writing." Remember, the goal of the straight-A approach is to separate the different components of paper construction. When it comes time to write, you don't want to be flipping through your sources, hunting down the right support. This drains your energy, increases your pain, takes time, and reduces the quality of your writing. This is why it is crucial that you extract the information from your sources in advance. Later, the writing process will be reduced to the much simpler task of simply building a framework around this already identified and organized information structure.

Step 6 Consult Your Expert Panel

“I discuss ideas with friends,” says Suzanne, a straight-A student from Brown, “and am therefore usually pretty confident with my argument by the time I sit down to write.” Suzanne reinforces a key observation: The more input you receive, the better your paper will turn out. And because soliciting advice is easy, you might as well get your outline reviewed by a group of people you trust. In the straight-A lexicon, this strategy is called “consulting your expert panel.” The technique is popular because it requires little effort on your part, but the impact on your paper quality is significant. This is the final push that transforms your thinking from interesting into compelling and your paper from competent into a standout.

Choosing Your Expert Panel

The size of your expert panel should be directly proportional to the importance of the assignment. If it's a one-page essay worth 5 percent of your grade, then your expert panel should consist of only yourself. If it's a medium-size critical analysis essay, you might aim for two opinions. If it's a major term paper worth a significant portion of your grade, then you may want to solicit feedback from as many as half-a-dozen well-chosen people. Who should sit on your panel? Your number one pick should be your professor. Unless he specifically states that he won't discuss drafts in progress (which professors sometimes do to avoid an overload of conferencing in a large class), definitely plan to bring your outline to office hours. Lay out the general shape of your argument, and the types of sources you are drawing from and where. More often than not, the professor will have some targeted advice on how to better present your points. He might suggest a new order or an added topic that should be addressed. As David from Dartmouth notes, this meeting also “will help you to create a rapport with the prof, and give you an idea of what he or she is looking for.” Yes, you've already talked with your professor in Step #3 (Seek a Second Opinion). Don't worry. There is nothing wrong with talking to a professor on two separate occasions for one paper. The first conference was quick and dealt with making sure you were starting off in the right direction. This second conference is more detailed, making sure that you managed to stay on course. Keep in mind that some students talk to their professors many times during the paper-writing process, perhaps once or twice a week. This is overkill and shouldn't be necessary if you've followed the efficient strategy laid out in this book. But rest assured that two visits are hardly monopolizing your professor's time. In addition to your professor, as David also suggests, “if you have smart friends, get their help too.”

Friends from the same class are your best bet, since they will already understand the constraints of the assignment. If you aren't close with any classmates, then tap a friend with a compatible academic background. For example, if your paper is for a history class, it makes more sense to talk to a liberal arts major than an engineering major. The former will be more familiar with this style of paper. Pick a half-hour period to sit down with each friend you chose. Explain your thesis and then run through your outline, touching on your main supporting arguments. Your friends will help you identify pieces of your structure that are unclear or unnecessary. As Jason, a straight-A student from the University of Pennsylvania, explains: "If you can explain why your argument works in a rational, step-by-step manner, and you have an arsenal of sources to cite to support the argument, then you're ready to go." One final warning: Before discussing with a classmate, make sure that collaboration of this sort is allowed. It should be no problem for research papers, but for focused critical analysis essays the professor may specifically forbid that you discuss your response with other people from the class.

Step 7 Write Without the Agony

If you've followed the Straight-A strategy so far, writing should be the most straightforward part of constructing a standout paper. This step is not mysterious. At this point, you know what to say and in what order, so all you have to do is clearly communicate your already well developed argument. "Once I have the outline, my brain relaxes," explains Jeremy, a straight-A student from Dartmouth. "I don't need to think anymore about structuring the paper, but rather just think about how to best articulate my thoughts." Note, however, that this book is not about the mechanics of writing. This is a skill that you will need to develop on your own. In general, the more you write outside of class, the better; so, to improve your skills, try to write as much as you can. Also, don't be afraid to plunk a Chicago Manual of Style above your desk or flip through well-known style guides like William Zinsser's *On Writing Well*. These can help you focus and polish your writing, and professors appreciate clear exposition. This being said, there is not much left to cover. You know what you have to do: Put words on paper. It's not easy, but, if you followed the previous steps, it won't be nearly as agonizing as most students make it. I leave you with only three succinct pieces of logistical advice to help guide you through the process of combining your writing skills with your straight-A preparation to produce the best possible paper:

Separate Your Writing from the Steps That Come Before and After

As Greta, a straight-A student from Dartmouth, explains, when it comes to the writing process she "would map out a schedule, for example, write two pages a day for five days, and then edit one day." Ryan, another Dartmouth student, admits that he "usually gave about two days for the actual writing, but the research part of the paper usually happened a few weeks before." Both of these students' habits are instructed by a simple rule:

Separate your research from your writing and your writing from your editing.

Of course, this is not always practical for a small critical analysis essay, but it's crucial for a more substantial research paper. A fresh mind produces better results. It's hard to write well when you've spent an exhausting morning researching in the library. It's equally as hard to edit carefully when you have already spent hours that day writing the words you are about to review. "Having time away from the paper," explains Jeremy from Dartmouth, "allows you to come at it with better concentration."

Write in Quiet Isolation

Writing requires substantial concentration. If you work in an area with a lot of ambient noise, you will become distracted and your efficiency will decrease dramatically. Therefore, if you have a laptop, retreat to a distant, silent corner of a faraway building to work on your writing. “I am most productive,” explains Suzanne from Brown, “in a place where I have total silence and no external stimulation—for example, the library stacks.” As I emphasized in Part One of this book, avoid, if possible, study lounges, crowded areas of the library, and public computer labs. These places are noisy, and, as Rielle from Brown warns: “You’re always running into people and getting snagged by fascinating conversations.” If you don’t have a laptop, then work at the computer in your room at times when your roommates are in class or at meetings. If necessary, arrange in advance to kick them out for a few hours so you can work in peace. In addition, you should schedule your writing to correspond to your energetic high points during the day. For me, this meant working right after breakfast with my first cup of coffee. For others, this might be the early evening, right before dinner, or the afternoon after a post-lunch workout. The key is to recognize that writing is perhaps the most demanding (in terms of focus required) intellectual activity you will do while a college student. More so than reading, solving problem sets, or studying, writing demands all the energy and focus that you can manage.

Follow Your Outline and Move Slowly

Chris from Dartmouth offers simple advice for tackling the writing process: “I use the outline I’ve created as a guide and just sort of build from that, taking it one paragraph at a time.” Follow this example. Use your outline to direct your writing, setting up and expounding on each of the topics in a clear, cogent way, and copying and pasting quotes directly into your paper wherever needed. Keep your attention focused on the topic at hand. Your mind is free from concerns of structure and sources at this point, so you can concentrate on articulating specific points clearly and strongly. Always make sure your current point reads clearly before moving on to the next. Some students have success by writing their first draft quickly and sloppily, and then returning to clean it up in many successive editing rounds. In your case, however, because you’re working from a detailed topic outline, it will end up being quicker to write carefully the first time. Moving fast tends to produce time-consuming dead ends later on, and ultimately necessitates major rewrites. And, believe it or not, that’s all you need to know. So stop fearing writing! If you follow this system, this step, though still challenging, won’t take an excessive amount of time. Leave

the all-nighters to the average students, get your first draft done quickly and effectively, and then go have some fun.

Step 8 Fix, Don't Fixate

Editing your paper is important, and this shouldn't come as a surprise. If you hand in pages containing spelling and grammatical mistakes, the professor will be more than disappointed—she's likely to lower your grade as a result. Even if your argument is brilliant, it's really hard to get past those simple errors. This last step of the paperwriting process aims to free your work of these imperfections. At the same time, however, you don't want to overedit. Many students fixate on these fixes, and end up devoting hours to reviewing draft after draft. This act of academic self-flagellation is especially prevalent when working on big research papers. After all the work you dedicate to crafting a masterpiece of an argument, you begin to fear letting your baby out into the world. It's sort of like suffering from a nerdy version of Stockholm Syndrome— and it's a drag. “You can edit a paper forever and still not be satisfied,” explains Frank from Brown. “So it's important to know when to just print the damn thing out and send it off to its fate.” The goal here is to devise a simple system, something you can follow for every paper to help you root out the embarrassing typos and confusing constructions but also to prevent you from becoming a grammar psycho. Drawing from the advice given in my straight-A interviews, I present in this step a system that meets these criteria. It involves three simple passes through your draft. No more and no less. For those of you who are used to endless editing runs, the idea that three passes is enough might sound suspiciously quick. Or, if you're the kind of person whose idea of proofreading is hitting the spell-check button, multiple runs might seem hopelessly time consuming. But rest assured, the system is efficient and it gets the job done. As we will soon discuss, the key is the specific kind of attention given to each pass. Here is how it works:

The Argument Adjustment Pass

Your first pass through your work should be conducted on your computer. Read carefully, and focus on the on your computer. Read carefully, and focus on the presentation of your arguments—don't worry about small grammatical mistakes for the moment. Take in the paper one paragraph at a time. If a section is awkwardly stated, clarify the sentences. If it makes a point you already explained earlier, ruthlessly cut it out. If the argument is lacking detail, add in more sentences as necessary to fully explain your point. If a transition is lacking between topics or paragraphs, add one. Also be on the lookout for any major structural issues. Sometimes you don't realize until you finish an entire draft that your topic outline wasn't optimal. Don't be afraid to shift around major chunks of text. This is your

chance to make serious edits to the structure of your paper, so take this seriously. Do this editing at a time when you are rested and unhurried by upcoming appointments. For a large paper, spread this pass out over several days if possible. When you're done, your paper may still contain small mistakes. That's okay. You'll fix those next. The goal here is to tweak the argument until you're satisfied that it makes every point that you want to make in the order that you want to make them. Once you're done with this pass, these big picture details are locked in.

The Out Loud Pass

The Argument Adjustment pass is important, but not sufficient by itself. As Robert from Brown explains: "My papers always read differently on the page than on the screen." And as Melanie, a straight-A Dartmouth student, adds: "having a hard copy to read and mark up was absolutely necessary." Accordingly, for this next pass, you should first print out a copy of your paper, and then take it where you can have some privacy. With a pencil in hand, and this is the important part, begin to read your paper out loud. Don't cheat. Use a strong voice and articulate each word as if you're delivering a speech. For a long paper, it may take a long time to read the entire thing, so be prepared to split this into several sessions. You might also want water or hot tea on hand to prevent you from losing your voice. Whatever you do, however, don't avoid actually articulating every word. Whereas the last pass focused on your arguments, the goal of this pass is to root out small mistakes that might otherwise distract a reader from your engaging thesis. While reading, whenever you come across a grammatical mistake or an awkward construction, mark it clearly on the printout. Then go back up to the beginning of the preceding paragraph and start reading again. After you have marked up the entire document, go back to your computer and enter the changes you noted on your printout. A word of warning—this process always takes longer than expected, so leave yourself plenty of time. The rationale behind this approach is simple. As Ryan from Dartmouth explains: "Reading it out loud helps you catch typos or strange wording better than reading it in your head." No matter how many times you review a draft, if you're scanning silently, there are certain awkward phrases you might skip over every time—our subconscious minds have a habit of patching over these mistakes when reading our own writing. When you say the words out loud, on the other hand, your ear will catch even minor problems and draw your attention to them. "Something that looks fine on paper will jump out as strange or poorly worded when you hear it," explains Jeremy from Dartmouth. Therefore, by reading the paper out loud, you

will catch most mistakes in your paper in just one pass—requiring much less time than the multiple silent reviews necessary to achieve similar results.

The Sanity Pass

Because the previous passes were so careful, you're almost done, and you've only read through your work twice so far! Just to be sure that something embarrassing didn't slip through, it's a good idea to make a final, quick pass through a printed copy of your paper before handing it in. You don't have to do this pass out loud, and feel free to move through it quickly. But definitely use a printed copy, rather than reading on your computer screen, since a hard copy has a better chance of revealing a typo. If possible, separate this pass from the previous two. In fact, it's fine to do this the morning of the deadline. At this point, there should be no major mistakes lurking in your document. The goal here is twofold.

First, as mentioned, this last pass catches stray mistakes.

"I tried to always reread my papers before handing them in," explains James, a straight-A student from Dartmouth. "I try to smooth out any last kinks in the flow during that final editing."

Second, and perhaps more important, it also provides closure on your paper.

Because your work is so polished by this point, this final read-through should essentially go smoothly. As a result, you will develop a better feel for the flow and enjoy the experience of watching your argument unfold. This should help put your mind at ease. After all your work, think of this last pass as your reward. A final review before the paper leaves your hands, probably never to be read by you again. That's why we call it a sanity pass. Once you hand in your paper, you can now confidently tell yourself: "Unless I'm going insane here, I'm pretty sure that I just handed in a damn good piece of writing!"

Part Three Cheat Sheet

Step #1. Target a Titillating Topic

- Start looking for an interesting topic early.

Step #2. Conduct a Thesis-Hunting Expedition

- Start with general sources and then follow references to find the more targeted sources where good thesis ideas often hide.

Step #3. Seek a Second Opinion

- A thesis is not a thesis until a professor has approved it.

Step #4. Research like a Machine

- Find sources.
- Make personal copies of all sources.
- Annotate the material.
- Decide if you're done. (If the answer is "no," loop back to #1.)

Step #5. Craft a Powerful Story

- There is no shortcut to developing a well-balanced and easy-to-follow argument.
- Dedicate a good deal of thought over time to getting it right.
- Describe your argument in a topic-level outline.
- Type supporting quotes from sources directly into your outline.

Step #6. Consult Your Expert Panel

- Before starting to write, get some opinions on the organization of your argument and your support from classmates and friends who are familiar with the general area of study.
- The more important the paper, the more people who should review it.

Step #7. Write Without the Agony

- Follow your outline and articulate your points clearly.
- Write no more than three to five pages per weekday and five to eight pages per weekend day.

Step #8. Fix, Don't Fixate

- Solid editing requires only three careful passes:
 - The Argument Adjustment Pass: Read the paper carefully on your computer to make sure your argument is clear, fix obvious errors, and rewrite where the flow needs improvement.
 - The Out Loud Pass: Carefully read out loud a printed copy of your paper, marking any awkward passages or unclear explanations.
 - The Sanity Pass: A final pass over a printed version of the paper to check the overall flow and to root out any remaining errors.

Step 109-Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 110-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman.**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

*PART 16: Deep Work, Strategy
and Tactics.*

Step 111-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don't go away never to be seen again. It's not like we make a bad decision and we're done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we're doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we're going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn't about turning your back on the world; it's about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it's how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we're out in the world, gathering impressions, but when we're sitting still, turning those impressions into sentences.

Step 112 - NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 113-You ARE Required To Do The Work For Strategy and Tactics.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 114-Use Rules of Reading for Strategy and Tactics

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Strategy and Tactics.
 - A. **VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. **VERY FAST READING- Entertainment.**
 - I. **Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. **Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. **Method 6-Devotional Bible Read. Pages 73-74.**

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books To Strategy and Tactics

Step 115-Strategy, Stratagem and Tactic

Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 14, before looking into Strategy and Tactics.**
2. **Listen, Follow and Apply the following Books.**
 - A. Competitive Strategy.
 - B. Games, Strategies, and Decision Making.
 - C. Good Strategy_Bad Strategy.
 - D. Strategic Management_ Theory & Cases_ An Integrated Approach.
 - E. The 33 Strategies of War.
 - F. The Art of Strategy_ A Game Theorist's Guide to Success in Business and Life.
 - G. Your Strategy Needs a Strategy_ How to Choose and Execute the Right Approach.
 - H. 36 Strategem.
 - I. Extreme Ownership.
 - J. Competitive Advantage of Nations.
 - K. Competitive advantage_ creating and sustaining superior performance _ with a new introduction.
 - L. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.
 - M. Secrecy & Stratagem_ Understanding Chinese Strategic Culture.
 - N. Stratagem_ Deception and Surprise in War (Artech House Information Warfare Library).
 - O. Stratagems And Spoils_ A Social Anthropology Of Politics.
 - P. Strategem.
 - Q. Strategic Management.
 - R. Strategic Management.
 - S. Strategic Management and Business Policy.
 - T. Strategic Management Theory An Integrated Approach.
 - U. Strategy - Strategic Planning For Project Management.
 - V. Sun Tzu and the Art of Business_ Six Strategic Principles for Managers.

- W. The 33 Strategies of War.
- X. The 36 Stratagems for Business_ Achieve Your Objectives Through Hidden and Unconventional Strategies and Tactics.
- Y. The 36 Strategies of the Chinese Can It Be a Eurasian Strategic Model in a Global Context?
- Z. The 36 strategies of the martial arts _ the classic Chinese guide for success in war, business, and life.
- AA.The Art of War for Small Business_ Defeat the Competition and Dominate the Market with the Masterful Strategies of Sun Tzu.
- BB.The Art of War_ Complete Text and Commentaries.
- CC.The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.
- DD.The Complete Art of War.
- EE.Treasons, Stratagems, And Spoils_ How Leaders Make Practical Use Of Beliefs And Values.

Step 116-A Primer on Strategy

There are many good reasons to read Good Strategy Bad Strategy by Richard Rumelt.

You may be frustrated by the state of your organization's strategy. You may be interested in identifying the characteristics of good strategy. Or you may want to learn how to identify the elements of a bad strategy.

A leader's most important responsibility is identifying the biggest challenges to forward progress and devising a coherent approach to overcoming them. In contexts ranging from corporate direction to national security, strategy matters. Yet we have become so accustomed to strategy as exhortation that we hardly blink an eye when a leader spouts slogans and announces high-sounding goals, calling the mixture a "strategy."

Complexity

"A hallmark of mediocrity and bad strategy," Rumelt writes, "is unnecessary complexity—a flurry of fluff masking an absence of substance." Most bad strategies are nothing more than statements of desire. And if you read them closely, the goals often contradict one another. This book should be required reading for managers and executives alike.

The Strategy Retreat

I'm sure this excerpt sounds familiar to many of you:

The event was a "strategy retreat." The CEO had modeled it on a similar event at British Airways he had attended several years before. About two hundred upper-level managers from around the world gathered in a hotel ballroom where top management presented a vision for the future: to be the most respected and successful company in their field. There was a specially produced motion picture featuring the firm's products and services being used in colorful settings around the world. There was an address by the CEO accompanied by dramatic music to highlight the company's "strategic" goals: global leadership, growth, and high shareholder return. There were breakouts into smaller groups to allow discussion and buy-in. There was a colorful release of balloons. There was everything but strategy.

Good strategy is the exception not the rule. Rumelt argues that the bad strategy problem is only growing. Even worse, more and more leaders think they have a strategy when they do not—they have a bad strategy. Bad strategy, "ignores the power of choice and focus,

trying instead to accommodate a multitude of conflicting demands and interests.” Sounds familiar?

What is a bad strategy?

Bad strategy is long on goals and short on policy or action. It assumes that goals are all you need. It puts forward strategic objectives that are incoherent and, sometimes, totally impracticable. It uses high-sounding words and phrases to hide these failings.

Underperformance

When a leader characterizes the challenge as underperformance, it sets the stage for bad strategy. Underperformance is a result. The true challenges are the reasons for the underperformance.

Good Strategy

Good strategy is not just “what” you are trying to do. It is also “why” and “how” you are doing it. ... Good strategy requires leaders who are willing and able to say no to a wide variety of actions and interests. Strategy is at least as much about what an organization does not do as it is about what it does.

Strategy is not vision or ambition

Despite the roar of voices wanting to equate strategy with ambition, leadership, “vision,” planning, or the economic logic of competition, strategy is none of these. The core of strategy work is always the same: discovering the critical factors in a situation and designing a way of coordinating and focusing actions to deal with those factors. A leader’s most important responsibility is identifying the biggest challenges to forward progress and devising a coherent approach to overcoming them. In contexts ranging from corporate direction to national security, strategy matters.

The Three Elements of Strategy

The kernel of a strategy contains three elements: a diagnosis, a guiding policy, and coherent action. The guiding policy specifies the approach to dealing with the obstacles called out in the diagnosis. It is like a signpost, marking the direction forward but not defining the details of the trip. Coherent actions are feasible coordinated policies, resource commitments, and actions designed to carry out the guiding policy.

Coherence of design

A good strategy doesn’t just draw on existing strength; it creates strength through the coherence of its design. Most organizations of any size don’t do this. Rather, they pursue

multiple objectives that are unconnected with one another or, worse, that conflict with one another.

Coordination is costly and hard

Coordination is costly, because it fights against the gains to specialization, the most basic economies in organized activity. To specialize in something is, roughly speaking, to be left alone to do just that thing and not be bothered with other tasks, interruptions, and other agents' agendas. As is clear to anyone who has belonged to a coordinating committee, coordination interrupts and de-specializes people.

Good strategy is surprising

Most complex organizations spread rather than concentrate resources, acting to placate and pay off internal and external interests. Thus, we are surprised when a complex organization, such as Apple or the U.S. Army, actually focuses its actions. Not because of secrecy, but because good strategy itself is unexpected.

Focus, however, is hard. It means saying no to individuals, groups, and even entire lines of business.

The inside view describes the fact that people tend to see themselves, their group, their project, their company, or their nation as special and different.

Increasing value ...

In particular, increasing value requires a strategy for progress on at least one of four different fronts: deepening advantages, broadening the extent of advantages, creating higher demand for advantaged products or services, or strengthening the isolating mechanisms that block easy replication and imitation by competitors.

Unfinished Thought

As I was reading this book I kept wondering why organizations were so reluctant to employ a strategy. All of this thinking reminded me of another book I had read a few years back on strategy called The Strategy Paradox.

What is the paradox?

The most profitable strategies are “extreme” strategies that commit companies to positions of either product differentiation or cost leadership. These extreme positions expose firms to a greater likelihood of bankruptcy by increasing the strategic risk they face. Consequently, the strategies likeliest to succeed are also likeliest to fail. That is the strategy paradox.

At first I thought that maybe organizations avoided good strategy simply because it was complicated and involved hard choices. The more I thought about it, however, the more I settled on the fact that people avoid good strategies because they don't want to be wrong. When Steve Jobs took over Apple, he did the unexpected.

What he did was both obvious and, at the same time, unexpected. He shrunk Apple to a scale and scope suitable to the reality of its being a niche producer in the highly competitive personal computer business. He cut Apple back to a core that could survive.

Steve Jobs talked Microsoft into investing \$150 million in Apple, exploiting Bill Gates's concerns about what a failed Apple would mean to Microsoft's struggle with the Department of Justice. Jobs cut all of the desktop models—there were fifteen—back to one. He cut all portable and handheld models back to one laptop. He completely cut out all the printers and other peripherals. He cut development engineers. He cut software development. He cut distributors and cut out five of the company's six national retailers. He cut out virtually all manufacturing, moving it offshore to Taiwan. With a simpler product line manufactured in Asia, he cut inventory by more than 80 percent. A new Web store sold Apple's products directly to consumers, cutting out distributors and dealers.

What is remarkable about Jobs's turnaround strategy for Apple was how much it was “Business 101” and yet how much of it was unanticipated.

In May 1998, shortly after taking over Apple, Jobs explained the substance and coherence of his actions:

The product lineup was too complicated and the company was bleeding cash. A friend of the family asked me which Apple computer she should buy. She couldn't figure out the differences among them and I couldn't give her clear guidance, either. I was appalled that there was no Apple consumer computer priced under \$2,000. We are replacing all of those desktop computers with one, the Power Mac G3. We are dropping five of six national retailers—meeting their demand has meant too many models at too many price points and too much markup.

Jobs's actions were both focused and decisive and, in hindsight, correct. Everyone at the time was surprised because they expected the fluffy goals and vacuous promises typical of

most executives. But Jobs's back-to-business 101 approach was correct. Jobs had a sick business and he needed to fix it.

While Jobs's turnaround at Apple was impressive it wouldn't enable Apple to become more than a niche player in an industry dominated by network effects. In 1998 Rumelt had a chance to ask Jobs "What is the strategy?" Jobs responded simply "I am going to wait for the next big thing." This encounter struck Rumelt as different. Everywhere he went and everyone he talked to just spewed the same clichés about their strategy — network relationships, adopt best practices, etc.

Rumelt writes:

Jobs did not enunciate some simple-minded growth or market share goal. He did not pretend that pushing on various levers would somehow magically restore Apple to market leadership in personal computers. Instead, he was actually focused on the sources of and barriers to success in his industry—recognizing the next window of opportunity, the next set of forces he could harness to his advantage, and then having the quickness and cleverness to pounce on it quickly like a perfect predator. There was no pretense that such windows opened every year or that one could force them open with incentives or management tricks. He knew how it worked. He had done it before with the Apple II and the Macintosh and then with Pixar. He had tried to force it with NeXT, and that had not gone well. It would be two years before he would make that leap again with the iPod and then online music. And, after that, with the iPhone.

Steve Jobs's answer that day—"to wait for the next big thing"—is not a general formula for success. But it was a wise approach to Apple's situation at that moment, in that industry, with so many new technologies seemingly just around the corner.

In hindsight we know Jobs's strategy worked but it could have just as easily backfired. The turnaround might have failed and landed Apple, now the world's largest company, in bankruptcy. Apple's strategy at the time wasn't easy to like — in fact, many people thought he was wrong. I imagine that Jobs would have been ok with being wrong — he was more worried about being mediocre.

We equate strategy with success but they are different things.

Real strategies—*good strategies*—can be wrong. And we don't want to be wrong. We're playing not to lose rather than playing to win. We all know how it feels to make a mistake — we'd rather watch other people make mistakes than make them ourselves. So we seek consensus because it's safe.

Yet consensus, when you think about it, is almost assured to fail. It's making everyone happy and alienating no one.

Consensus is the opposite of marshalling your resources towards a coordinated approach. And consensus, by definition, almost certainly assures a bad strategy because it doesn't make any choices. It's a sprinkle of this and a dash of that — it's something for everyone. Rather than risk being wrong, we hide behind puff that makes everyone happy. That's bad strategy.

The beauty of Good Strategy Bad Strategy is that it calls out the vast majority of public and private organizations that have horrible strategies. The bad news is that things are unlikely to change. After all, no one ever got fired for having a strategy to "increase the percentage of high school graduates." It's hard to argue with that as a goal but let's stop calling it a strategy.

There are plenty of good strategies out there. Lou Gestner developed one when he took over IBM in 1993 (for details see Gestner's book — Who Says Elephants Can't Dance?: Leading a Great Enterprise through Dramatic Change). He understood the problem and devised an approach that marshalled the organization towards dealing with the problem.

Step 117-Strategy vs. Tactics: Why the Difference Matters

In order to do anything meaningful, you have to know where you are going.

Strategy and tactics are two terms that get thrown around a lot, and are often used interchangeably in numerous contexts. But what exactly do they mean, what is the difference, and why is it important? In this article, we will look at the contrast between strategy and tactics, and the most effective ways to use each.

While strategy and tactics originated as military terminology, their use has spread to planning in many areas of life. Strategy is overarching plan or set of goals. Changing strategies is like trying to turn around an aircraft carrier—it can be done but not quickly. Tactics are the specific actions or steps you undertake to accomplish your strategy. For example, in a war, a nation's strategy might be to win the hearts and minds of the opponent's civilian population. To achieve this they could use tactics such as radio broadcasts or building hospitals. A personal strategy might be to get into a particular career, whereas your tactics might include choosing your educational path, seeking out a helpful mentor, or distinguishing yourself from the competition.

We might have strategies for anything from gaining political power or getting promoted, to building relationships and growing the audience of a blog. Whatever we are trying to do, we would do well to understand how strategy and tactics work, the distinction, and how we can fit the two together. Without a strategy we run the risk of ambling through life, uncertain and confused about if we are making progress towards what we want. Without tactics, we are destined for a lifetime of wishful thinking or chronic dissatisfaction. As Lawrence Freedman writes in *Strategy: A History*, "Without a strategy, facing up to any problem or striving for any objective would be considered negligent. Certainly, no military campaign, company investment, or government initiative is likely to receive backing unless there is a strategy to evaluate.... There is a call for strategy every time the path to a given destination is not straightforward." And without tactics you become dependent on pure luck to implement your strategy.

To achieve anything we need a view of both the micro and the macro, the forest and the trees—and how both perspectives slot together. Strategy and tactics are complementary. Neither works well without the other. Sun Tzu recognized this two and a half millennia ago

when he stated, “Strategy without tactics is the slowest route to victory. Tactics without strategy are the noise before defeat.” We need to take a long-term view and think ahead, while choosing short-term steps to take now for the sake of what we want later.

The Relationship Between Strategy and Tactics

Any time we decide on a goal and invest resources in achieving it, we are strategizing. Freedman writes:

One common contemporary definition describes it as being about maintaining a balance between ends, ways, and means; about identifying objectives; and about the resources and methods available for meeting such objectives. This balance requires not only finding out how to achieve desired ends but also adjusting ends so that realistic ways can be found to meet them by available means.

In *The Grand Strategy of the Roman Empire*, Edward N. Luttwak writes that strategy “is not about moving armies over geography, as in board games. It encompasses the entire struggle of adversarial forces, which need not have a spatial dimension at all....” When you think about winning a war, what does it mean to actually win? History is full of examples of wars that were “won” on paper, only to be restarted as soon as the adversary had time to regroup. So being precise in your goal, to encompass the entirety of what you want to achieve, is necessary to articulate a good strategy. It’s not about success in the moment, but success in the long term. It’s the difference between the end of WWI and WWII. World War I was about winning that war. World War II was about never fighting a war like that again. The strategies articulated and pursued by the Treaty of Versailles and the Marshall Plan were full of markedly different tactics.

In *Good Strategy, Bad Strategy*, Richard Rumelt writes: “The most basic idea of strategy is the application of strength against weakness. Or if you prefer, strength applied to the most promising opportunity...A good strategy doesn’t just draw on existing strength; it creates strength.” Rumelt’s definition of strategy as creating strength is particularly important. You don’t deplete yourself as you execute your strategy. You choose tactics that reinforce and build strength as they are deployed. Back to winning hearts and minds – the tactics require up-front costs. But as they proceed, and as the strategy unfolds, strength and further support are gained by having the support of the local population. A good strategy makes you stronger.

“Grand strategy is the art of looking beyond the present battle and calculating ahead. Focus on your ultimate goal and plot to reach it.”

— Robert Greene, *The 33 Strategies of War*

The Components of Strategy

The strategic theorist Henry Mintzberg provides a useful approach to thinking about strategy in adversarial situations. According to Mintzberg, there are five key components or types:

1. Plan: A consciously chosen series of actions to achieve a goal, made in advance.
2. Ploy: A deliberate attempt to confuse, mislead or distract an opponent.
3. Pattern: A consistent, repeated series of actions that achieve the desired result.
4. Position: A considered relationship between an entity (organization, army, individual etc) and its context.
5. Perspective: A particular way of viewing the world, a mindset regarding actions that lead to a distinct way of behaving.

Geoffrey P. Chamberlain offers a slightly different perspective on the components of strategy, useful when the strategy is more about a personal goal. He identifies seven parts:

1. A strategy is used within a particular domain.
2. A strategy has a single, well defined focus.
3. A strategy lays out a path to be followed.
4. A strategy is made up of parts (tactics).
5. Each of a strategy's parts pushes towards the defined focus.
6. A strategy recognises its sphere of influence.
7. A strategy is either intentionally formed or emerges naturally.

According to Rumelt, a strategy must include “premeditation, the anticipation of others’ behavior, and the purposeful design of coordinated actions. As a general rule, strategy is more important in situations where other parties have the potential to thwart or disrupt actions, or where our plans are at risk if we don’t take meaningful steps to achieve them. Good strategy requires us to both focus on a goal, and anticipate obstacles to reaching that goal. When we encounter obstacles, we may need to employ what Freedman calls “deceits, ruses, feints, manoeuvres and a quicker wit”—our tactics.

“The skillful tactician may be likened to the Shuai-Jan. Now the Shuai-Jan is a snake that is found in the Ch’ang mountains. Strike at its head, and you will be attacked by its tail; strike at its tail, and you will be attacked by its head; strike at its middle, and you will be attacked by head and tail both.”

— Sun Tzu, The Art of War

A Few Words on Tactics

Even the most elegant, well-planned strategy is useless if we do not take thoughtful steps to achieve it. While the overall goal remains stable, the steps we take to achieve it must be flexible enough to adjust to the short-term realities of our situation.

The word “tactic” comes from the Ancient Greek “taktikos,” which loosely translates to “the art of ordering or arranging.” We now use the term to denote actions toward a goal. Tactics often center around the efficient use of available resources, whether money, people, time, ammunition, or materials. Tactics also tend to be shorter-term and more specific than strategies.

Many tactics are timeless and have been used for centuries or even millennia. Military tactics such as ambushes, using prevailing weather, and divide-and-conquer have been around as long as people have fought each other. The same applies to tactics used by politicians and protesters. Successful tactics often include an ‘implementation intention’—a specific trigger that signals when they should be used. Simply deciding what to do is rarely enough. We need an “if this, then that” plan for where, when and why. The short-term nature and flexibility of tactics allow us to pivot as needed, choosing the right ones for the situation, to achieve our larger, strategic goals.

If you don't have a strategy, you are part of someone else's strategy.”

— Alvin Toffler

Conclusion

Although often regarded as interchangeable, strategy and tactics are somewhat different, though complementary concepts. According to the skilled strategist Sun Tzu, strategy is about winning before the battle begins, while tactics are about striking at weakness. Both are ancient concepts that have come to be an essential part of numerous disciplines and offer endless new ways of thinking.

Step 118 Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 119- Tiny Gains. Massive Results.

When we want to improve ourselves, we often pursue dramatic changes with little success. A better idea is to go for small, incremental improvements that add up over time.

Self-motivated, self-starting individuals are incredibly motivated to find their weaknesses. It's not far-fetched to say that some of us actually seek to make ourselves perfect — rational, calculating beings making the right type of decisions at just the right times. But we've learned from Star Trek; we don't look to eliminate emotion either and turn ourselves into Mr. Spock. We want *just the right amount* of emotion in our lives.

People often overestimate what they can accomplish in one year. But they greatly underestimate what they could accomplish in five years.

— Peter drucker

If we're night owls, we seek to become early risers. (Ben Franklin did it!). If we're procrastinators, we look to become doers. If we're always late to meetings, we look to be early to meetings. We want to eliminate our weaknesses and become a little More.

This is, of course, a laudable goal. But the self-starters among us have probably all run into the same problem: We don't actually follow through on the things we know will make us better. We don't eat the broccoli. We get a little too robotic. We get up at 8:30 when we said we'd do 5:30 from here on out. We leave that essay until the last second even though that was never going to happen again. We're five minutes late. We don't become lore at all, and the failure to get there makes us feel like less.

The culprit is the thought that any important change happens quickly. It doesn't matter whether you're trying to get up early or pick up and implement the Psychology of Human Misjudgment. Anything important happens slowly.

From Potential to Useful

And why should it be otherwise? If you were to truly understand, in-depth, and apply the *Psychology of Human Misjudgment* to your dealings, you'd be way far out ahead of your peers and your former self. The advantage of understanding human nature is incredible. But it takes deep, repeated study and a long gestation period to get there. It takes applying the ideas to the world, feeling them out, forgetting them, redoubling yourself, and trying again. Not giving up when you forget or fail. It is through the process of *refinement* that one learns new habits and ideas.

The visual mental model I like for self-improvement is imagining something like a Lathe.

A *lathe*, for the non-engineer, is a tool that molds a piece of material into some shapely form. A machinist would use a lathe to take a hunk of metal and turn it into a usable engine part, for example. The lathe takes something with *potential* and shapes it into something *useful* by slowly refining it and shaving away the excess.

Compounding works in other areas besides money.

The way I think about it, if I can get 5% wiser and better every year, then I will be about twice as wise as I am now in less than 15 years. (Go ahead, grab your calculators.) In less than 30 years, my return will be 4x. This is how the non-gifted among us can surpass otherwise more intelligent people.

Tiny Improvements, Massive Results

Tiny improvements add up to *massive* differences.

Compounding works in other areas besides money. And we want to compound worldly wisdom. These little mental tricks like the Lathe and the idea of 5% yearly improvement are just ways to remind myself that I'm not going to wake up wiser/nicer/healthier/smarter tomorrow morning or the morning after. And just as importantly, if I backslide on a goal I've set or I forget something I thought I'd learned well, that it's really not the end of the world. I don't need to give up and call it hopeless. All I have to do is figure out where I slipped, re-double my efforts, and go after it again. All I need is 5% a year to become 4x better in my adult lifetime. The truth is that whatever bad habits you have or whatever things you're struggling to learn, there's probably a good reason. Your biology and your experiences to date have set you in stone to a certain extent, and the older you are, the more likely that is to be true. The chains of habit are too light to be felt until they are too heavy to be broken. Billion-dollar industries have been built on convincing you that it's *easy* to make big changes or to get a lot wiser and better. But it honestly isn't. It's hard work.

Yet any study of great individuals reveals that the work is worth doing.

So just imagine if you could make slightly better decisions every year. Whether it's 5% better consideration of *all* of your decisions, or making 5% of your decisions differently, or some permutation thereof, it doesn't really matter. Every year you'll look back at some part of your old self and wonder how you could've been so dumb. And one day, in less than 30 years, you'll look back and see your old self as almost unrecognizably stupid.

What more could you ask for?

Step 120-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

*PART 17: Deep Work and
Leadership and Accountability*

Step 121-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

Step 122 - NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 123-You Have Required To Do The Work For Leadership.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 124-Use Rules of Reading for Leadership And Accountability

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Leadership And Accountability.
 - A. **VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. **VERY FAST READING- Entertainment.**
 - I. **Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. **Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. **Method 6-Devotional Bible Read. Pages 73-74.**

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books To Leadership.

Step 125-Leadership and Accountability

Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 15, before looking into Leadership and Accountability.**
2. **Listen, Follow and Apply the following Books.**
 - A. **How To Read A Book By Mortimer Adler**
 - B. **Socratic Logic, Method and Questioning.**
 - C. **Start with Why_ How Great Leaders Inspire Everyone to Take Action.**
 - D. **The Dichotomy of Leadership_ Balancing the Challenges of Extreme Ownership to Lead and Win.**
 - E. **The seven habits of highly effective people _ restoring the character ethic.**
 - F. **The-Art-of-Leadership.**
 - G. **Tools of Titans_ The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Performers.**
 - H. **Why Great Leaders Don't Take Yes for an Answer Managing.**
 - I. **Best Practices in Leadership Development and Organization Change_ How the Best Companies Ensure Meaningful Change and Sustainable.**
 - J. **Coaching for Leadership_ The Practice of Leadership Coaching from the World's Greatest Coaches.**
 - K. **Develop Your Leadership Skills_ Develop Yourself as a Leader - Lead at a Strategic Level - Grow Leaders in Your Organisation.**
 - L. **Educational Leadership_ Personal Growth for Professional Development.**
 - M. **Focus on Leadership_ Servant-Leadership for the 21st Century.**
 - N. **Good Leaders Ask Great Questions_ Your Foundation for Successful Leadership.**
 - O. **Strategic Leadership**
 - P. **The Leadership Challenge_ Activities Book (J-B Leadership Challenge.**
 - Q. **The Maxwell Leadership Bible.**
 - R. **The Only Leadership Book You'll Ever Need_ How to Build Organizations Where Employees Love to Come to Work.**
 - S. **The Bible on Leadership.**

- 3. Listen, Follow and Apply the following Books.**
- A. How To Read A Book By Mortimer Adler**
 - B. Socratic Logic, Method and Questioning.**
 - C. 12 Accountability Commitments.**
 - D. OZ Principle: Getting Results Through Individual and Organizational Accountability.**
 - E. Accountability in the WorkPlace.**
 - F. The Dichotomy of Leadership_ Balancing the Challenges of Extreme Ownership to Lead and Win.**
 - G. Summary of QBQ The Question Behind Question**
 - H. NDSU QBQ.**

Step 126-Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 127-Leaders and Followers, Planners and Doers

The author Marshall Goldsmith has a gift for taking classic theories and adding to them, or slightly modifying them, to construct something new and interesting.

A good example of this is what he does with Situational Leadership in the book Triggers: Creating Behavior That Lasts – Becoming the Person You Want to Be.

He takes the original ideas postulated by Paul Hersey and Ken Blanchard in their theory of Situational Leadership and adds an interesting spin, allowing us to use some of the insights more personally.

Situational leadership is the idea that one needs to constantly adapt their leadership style to the ever changing environment in which they operate.

If a specific style works in one situation with one particular individual, that doesn't mean we should adopt that style for all people and situations. However, in part because success is reinforced, that is generally what we do.

Hersey and Blanchard's premise is that leaders need to adapt their style to fit the performance readiness of their followers. Readiness not only varies by person, it also varies by task. Followers have different levels of motivation and ability for different tasks.

Leaders need to acknowledge that situations change along with the readiness of their staff. To be most effective, different people require different types of leadership.

Hersey and Blanchard outlined four distinct styles:

1. *Directing is for employees requiring a lot of specific guidance to complete the task. The leader might say, 'Chris, here's what I'd like you to do, step by step. And here's when I need it done.' It's primarily a one-way conversation, with little input from the employee.*
2. *Coaching is for employees who need more than average guidance to complete the task, but with above-average amounts of two-way dialogue. Coaching is for people who both want and need to learn. The leader might say, 'Chris, here's what I'd like you to do,' and then ask for input: 'What do you think, Chris?'*
3. *Supporting is for employees with the skills to complete the task but who may lack the confidence to do it on their own. This style features below-average amounts of*

direction. The leader might say, 'Chris, here's the task, How do you think it should be done? Let's talk about it. How can I help you on this one?'

4. *Delegating is for employees who score high on motivation, ability, and confidence. They know what to do, how to do it, and can do it on their own. The leader might say, 'Chris, here's the assignment. You have a great track record. If I can help, just ask. If not, you're on your own.'*

The four styles are quite different. The idea is to try and measure the need of your employee and choose the style that best fits them at that particular moment in time. The measuring process needs to happen continually for you to be most effective. The style which best helps Chris in situation X might not be the one that will help him in situation Y.

Now for the twist.

Hersey and Blanchard's situational leadership is a perfect analogue to a hidden dynamic that exists within us when we attempt to change our behavior. It's the same dynamic whether you call it leader and follower, planner and doer, or manager and employee. The terms are interchangeable as far as I'm concerned.

As we go through life making plans to be a better friend, partner, worker, athlete, parent, son, or daughter, inside each of us are two separate personas. There's the leader/planner/manager who plans to change his or her ways. And there's the follower/doer/employee who must execute the plan.

Goldsmith argues that whether you are trying to lead other people or lead yourself, the obstacles are very much the same. You still have to deal with all the variables in the environment: temptations pushing you away from your objective, motivation issues, and self-discipline issues. One result is that we tend to be superior planners but inferior doers. We talk a good game.

If you take a moment to think of a recent plan that you devised but never executed, you'll realize that Goldsmith is onto something here. Would a successful leader come up with a beautiful plan, throw it out to their employees, and then walk away and hope for the best? No.

To improve the odds of success, a leader would check in. They would look for obstacles to remove. They would want feedback on progression. They would be an active part of implementing the plan. We know this, yet we don't do it in our own work and lives. We don't manage execution.

What if the planner in each of us, like an effective leader with his or her subordinates, could size up the situation at any point during the day and adopt the appropriate management style for the doer in us? It's a simple two-step: measure the need, choose the style.

It gives you such a new perspective to think of your goals in this way. It allows you to step back from the situation and clearly see where you are getting off course. Just step into execution mode and out of planning mode, as any good hands-on leader would do.

We don't adequately weigh many of your past experiences/failures. This may be a willful denial of why you have failed at a task in the past or it could simply be that you've never taken the time for reflection.

It's not just environmental intrusions and unpredicted events that upset our plans. It's also our willful discounting of past experience. We make plans that are wholly contradicted by our previous actions.

The planner in us is convinced this time it will be different. Yet if you don't understand why you failed, you're doomed to repeat folly. Learning from our mistakes is key to increasing the odds to achieve our personal and professional goals.

Goldsmith's book is filled with insightful ideas. His decades of experience in coaching leaders is evident throughout the pages; both in the way he highlights his ideas with meaningful examples and the way he explains the evolution in his own thinking. You will find yourself identifying with his client's issues and walking through the solutions, endowing you with practical tools to help you change your own behavior, whatever your own "triggers" might be.

Step 128-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

*PART 18: Finance, Economics and
Investment.*

Step 129-Finance, Economics and Investment

Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 16, before looking Investment.**
2. **Listen, Follow and Apply the following Books.**
 - A. **How To Read A Book By Mortimer Adler**
 - B. **Socratic Method, Logic and Questioning**
 - C. **Benjamin Graham_ The Intelligent Investor.**
 - D. **Common Sense Investing_ The Papers of Benjamin Graham.**
 - E. **Common Sense on Mutual Funds.**
 - F. **guide_to_money.**
 - G. **Derivatives.**
 - H. **Investment Management_ Portfolio Diversification, Risk.**
 - I. **Little Book Of Common Sense Investing.**
 - J. **The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
 - K. **The Financial Peace Planner A Step-By-Step Guide to Restoring Your Family's Financial Health.**
 - L. **The Intelligent Investor_ The Definitive Book on Value Investing.**
 - M. **The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
 - N. **The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
 - O. **The Total Money Makeover_ A Proven Plan for Financial Fitness.**
 - P. **The-Richest-Man-In-Babylon.**
 - Q. **Thou Shall Prosper_ Ten Commandments for Making Money.**
 - R. **Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added, and Real Options.**
 - S. **Warren Buffett and the Interpretation of Financial Statements_ The Search for the Company with a Durable Competitive.**

T. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.

Step 130 - An Investment Approach That Works

There are as many investment strategies as there are investment opportunities. Some are good; many are terrible. Here's the one that I lean on the most when I'm looking for low risk and above average returns.

"The whole secret of investment is to find places where it's safe and wise to non-diversify. It's just that simple." Charlie Munger

Goal: An investment algorithm to lean on hard when it is available. Low-risk, long-duration, above-average returns.

There are many paths to investment heaven (and we've written on the topic before). The diversity of working approaches demonstrates that. However, fundamentally, any useful approach must do three things:

1. It must work in all conceivable financial environments.
2. It must be within the "circle of competence" and "circle of interestingness" of its user.
3. It must meet the moral criteria of its user.

I believe the system below satisfies the first criterion, and allows for all three. A 7-Element Algorithm for Equity Investing.

Everyone Wins

Successful businesses have indefinitely sustainable business systems: owners, employees, customers, suppliers, all content.

Ballast for the Storm

Look for a sustainable balance sheet, given the capricious nature of the world. Past bad events do not predict future bad events. Sometimes inefficient balance sheets allow companies to survive by positioning them for all environments, not just optimizing for one.

Different and Hard to Match

Candidates must occupy a structurally profitable, indefinitely sustainable business niche, allowing for the truism that all moats are subject to being crossed eventually. There must be an element of mystery.

Operational Soundness

Reliable execution of the “blocking and tackling” of operations is a must. Getting this wrong always costs big, and can ruin a good niche.

A Few Simple Variables

Allowing for the difficulty of predicting the future, candidates should have just a few reasonably predictable economic variables that will dominate their outcomes. In the words of Warren Buffett, “There are all kinds of businesses where we have no idea what they’ll earn this year, let alone any future year.” Look for boring investments, sexy is usually complicated and full of competition. Look for what’s staying the same.

Long Runway

You should be able to foresee an indefinite period of growth ahead, through some combination of market creation, market penetration, and pricing power.

Priced Attractively

Stock should be priced so that stock returns $\geq$ business returns, always including a margin for error in forward-looking estimates.

Seemingly missing is the concept of “good management,” but I consider this redundant in light of the first four elements. Any business meeting those criteria is being managed properly, and any investment going 7/7 has a very low probability of failure.

Notice that the word indefinite is used several times. This does not mean the same thing as infinite. There are no infinities in the business world. Indefinite means “as far out as can presently be seen.”

Caution: what psychologists call the “representativeness heuristic” puts us at risk of over-fitting to this or any algorithm. Always be on guard. In the words of Richard Feynman, “Never fool yourself, and remember that you are the easiest person to fool.”

Step 131-Investing: The Rules of the Road

Investing money can seem a little rudderless at times.

One day you hear that stocks are risky and the next that they're indispensable. Some days it seems like stocks only go up and sometimes that they only go down. Real estate used to seem like an automatic path to wealth, and then the housing crisis hit. For the uninitiated, it sometimes seems there are no central truths. And unlike certain fields, we all have to deal with money. We can't "opt out" from financial concerns unless we plan to live in a monastery, and it is useful for all of us to understand the basic ideas.

Investing is not a *science* but a *craft*, and a craftsman needs tools. In the case of investing, the tools are mostly mental. If we accumulate a few simple mental tools, we can start evaluating the claims of experts, salesmen, or simply well-intentioned friends.

The Rules of the Road

(1) The value of an asset depends entirely on the net cash it will generate from now to the hereafter.

This goes for a stock, an apartment house, a convenience store, a bakery, or an iPhone app startup. An asset only has value (in a financial sense) if it can generate net cash flow to its owner. The amount and timing of that cash determines the value of the business. The more cash to be expected and the sooner it's expected to come, the more valuable the asset is today. This is the fundamental truth about investing. Nothing escapes the orbit of future cash flows.

The other determinant of value is interest rates: The average future interest that could have earned if you bought a "risk-free" asset is the opportunity cost of the asset you're considering purchasing today. That risk-free interest rate determines the value of an asset's future cash flows to you today. (Although we don't recommend trying to compute the figure out to three decimal places.) If average risk-free interest rates are 6% over time and I offer you a chance to buy an apartment house that pays you 4% on cost, is that a good buy? You better feel confident that the 4% will grow over time, right? This basic form of reasoning can be applied to all types of cash-producing assets.

This is the thing you should be thinking about when you're instead thinking about what the Fed will be doing or what Jim Cramer said on TV or what the hot industry is or what the CEO of some company had for breakfast. Do you have any idea what the business or property will earn over the next five, ten, or twenty years in relation to what it earns now? This *Grand Unifying Theory* of investing gets discussed surprisingly little.

It also generates some sub-conclusions that aren't always recognized by lay investors and are frequently forgotten by professionals.

(A) What an asset has earned in the past does not determine its value. In stocks, looking at the last ten years of earnings is a useful exercise in trying to understand what type of business you're dealing with, but while it's a good guide, past earnings do not generate value. Future earnings do, and that goes for all types of assets. This means you must develop a view about the future, which we'll address again in point (2) below.

(B) An asset that never earns any net profit after all expenses has no financial value. Please let that sink in. It is common for businesses to obscure this basic fact, and promote all sorts of alternative methodologies with which you're supposed to see value. Book value, EBITDA, number of page views, number of users, brand recognition, and years of managerial experience do not, in and of themselves, tell you about the value of a business or an asset. The bare fact is that an asset must eventually generate net cash flows to its owner which are commensurate with the price paid in order for the investment to be worthwhile. Investing on another basis is, by definition, speculation.

(C) If you have no idea what an asset will earn in the future (at least in a general sense), then you have no idea what it's worth. And if you do not know what the asset is worth, then you have no idea whether you are over-paying or under-paying for it, and as an intellectually honest person, you should consider both possibilities at least equally likely.

(D) Any future cash flows out of an asset must also be subtracted in determining today's value. If a business is going to lose money for 10 years and only then start making it, it's worth a hell of a lot less than one which will make the same amount of money starting this year. This is another idea which gets surprisingly little play in relation to its obvious importance.

(2) Buying a share of stock is a buying share of the underlying business.

Although we're discussing general investment concepts, the stock market needs a bit more attention because of its seemingly abstract nature. No one gets confused as to what they're buying when they invest in a local dry-cleaner. Most fixed income instruments are priced in a fairly straightforward manner. But when it comes to businesses traded on the public exchanges, which we call stocks, all sorts of weird theories abound.

Stocks, for all of their labels and all of the strange fears and speculations around them, are no more than a piece of an underlying business pie. When you buy stock in a business, you are buying the right to the net cash flows that its assets produce. Stocks do not escape the orbit of financial gravity no matter what the Fed is doing or what CNBC is

saying. And buying into an index fund that owns many stocks means that you're now part-owner in all of the underlying businesses; your return comes from the success of their business operations. If American business as a whole keeps on trucking, the index fund will reflect their success, assuming you paid a rational price. That's why averaging into the indexes is such a common recommendation for non-professional investors. Buying individual businesses in the form of stocks carries a heavier burden of proof and much more specialized work.

One corollary to this idea is that stock prices tend to move around much more than intrinsic business values. If you were to take the ten year business record of any of a number of very stable corporations and then guess their high and low stock prices in the same period, you would almost certainly be surprised at the degree of variation. The reason for this can be found in point (3).

(3) Investing in any asset with uncertain cash flows requires an element of speculation about the future.

Discerning an asset's cash flows requires that we make intelligent guesses about a cloudy future. This idea has some deep corollaries:

(A) The more speculation needed to determine the value of the asset, the riskier it is all else equal, due to the higher probability of getting our estimates wrong. In the case of a 1-Year U.S. Treasury bill, we don't have to offer any speculation beyond assuming that the U.S. government will be solvent and paying 12 months from now and that the U.S. dollar will continue to be accepted as legal tender. (If this ceases to be true, we're all in big trouble.)

In the case of a biotechnology startup, on the other hand, our entire valuation is going to be based on speculation. In essence, the whole exercise of valuing such a start-up would be making difficult guesses about the future. The probability that we get all of our guesses correct approaches zero, although if we're correct enough about one or two important factors we might still make money. But we'll need great luck in doing so, whereas with the Treasury bill, we hardly need any luck at all.

(B) Investing in uncertain assets, including any kind of business-based investment like a farm or a technology stock, involves some difficult speculation, so it's easy to predict that at times, investors will get caught up in their enthusiasms and mis-price assets. Charlie Munger has commented that stocks are valued partly like Treasury bonds, with obvious cash flows estimated and discounted at rational rates, and partly like art or collectibles, with speculation that the price will go higher or lower because of popularity, trend, or hope.

The riskiest assets are the ones valued primarily on speculation because of our lack of ability to see into their economic future. That's why a corporate *bond* tends to be less risky than a *stock* — you only need to establish that the corporation will be solvent for the bond to be a good investment, whereas with the stock, you must make much more complicated estimates.

(C) We know from watching horse-race betting, casino gambling, and lottery participation that people are frequently willing to speculate on odds-against bets that can only hurt them financially in the long-run. We observe the same behavior in the stock market and in other markets as well. (There was, for example, a speculative farming boom in the 1980s.) Financial markets cannot be perfectly efficient because of the speculative element. As with (B) above, more uncertain assets tend to have a greater speculative element attached.

(D) Assets with predictable cash flows tend to be inherently lower-risk than ones without predictable cash flows. Let's use two different types of businesses to understand this point. We can be essentially certain that over the next year, Visa and MasterCard will make a tremendous amount of money which is closely related to the amount they made last year — their cash flows are based on the number of transactions made on their cards and the amount of money they collect per transaction. Both elements tend to be extremely stable on a day to day and year to year basis, with a tendency towards growth as new cards make it into circulation. Unless hundreds of millions of people stop using their credit and debit cards or million of merchants find a way to pay a lot less to these intermediaries (who collect very little to start), the businesses will maintain a useful degree of economic predictability. The number of transactions you made on your card last month and the month before pretty closely predicts how much you'll use it this month and the following one.

As we move out further to year 2, we can still be pretty sure that these characteristics will continue to hold, and thus we can predict with useful accuracy the kind of money Visa/Mastercard will make. The same goes for year 3. However, the longer we continue this exercise, the more our accuracy declines. Although things look pretty good this year, next year, and the year after, what about 30 years from now? By then, one can speculate on the possibility of certain changes to the financial system which might affect the economics of Visa/Mastercard. Our earnings estimate 30 years out is certain to be inaccurate even for a predictable business.

The opposite case is Twitter. Twitter has never shown a net profit to its shareholders and has not established a consistent business model which would allow it to do so. Thus, it would be very difficult to say what Twitter's earnings might be in the next year, let alone 30

years from now. On this basis, investing in the common stock of Twitter contains a much larger speculative element than Visa/Mastercard. An investment in Visa/Mastercard *at a fair price in relation to future earnings* can be said to have far less *risk* than an investment in Twitter. Notice that we don't come to this conclusion by saying that Visa/Mastercard are *riskless*, that we can predict their earnings *forever*, or that Twitter will never be a profitable investment. We are simply ranking potential investments on a sliding scale based on the predictability of their future cash flows. Any estimates will be necessarily imprecise, but they still have great value to us as investors.

(4) The price you pay determines the return you get.

Lower prices = higher returns.

You'll often hear fables about how now is the time to invest because "The market has done really well over the past few years" or because "My friend has made a lot of money on this stock, I think it's a good investment," or some similar statement about other kinds of financial assets; real estate properties, oil royalties, McDonald's franchises, etc.

Conversely, one frequently hears things like "That stock's gone way down recently, it seems pretty risky" or "My friend bought a bunch of real estate that went way down, I think real estate is risky" and other notions to that effect.

These thoughts are 180 degrees wrong because they fail to understand the point that low prices create high future returns and that high prices create low future returns. ("High" and "low" being in relation to underlying value.) If a stock trades at 50% of its recent high price, then you are buying the same future cash flows for half the price. If a stock trades at 200% of a recent low price, then the opposite is true; you're getting exactly half the value you would have before.

You should seek to buy assets with future cash earnings you can (roughly) estimate at prices that offer a fair return. The rest is almost always noise.

(5) Everyone has a unique circle of competence which allows them to understand certain things best and other things not at all.

We discussed above in point (3) that certain investment situations are inherently speculative, as with the case of Twitter common stock. But even within the realm of *knowable* investment choices, each investor has his or her own unique circle of competence which they bring to the analysis. In the circle are the things that, through life experience and/or accumulated study, one can fairly evaluate and expect to end up in the right ballpark. Outside of the circle are things we don't have the experience to understand.

Although this point seems simple to the point of banality, it is constantly violated even by smart and financially-savvy people. Many an expert in construction businesses or plumbing businesses or restaurant businesses have tried their hand at buying apartment houses or energy stocks only to find out that their expertise did not carry over. And it is thus for all of us: We are prisoners to our talents, and we're wise to think long and hard about what we really know and don't know.

For example, if you do not have the ability to read financial statements, understand microeconomics, and assess the future underlying cash flows of an individual business, are stocks truly in your circle of competence? If you don't know cap rates from Captain America, is it wise for you to try to get rich buying real estate properties? Unless and until we learn to be honest with ourselves, we will make mistakes that we don't need to make.

Investing does not have to be rocket science. Once you understand the central concepts and begin learning to apply them, all it takes is discipline and intellectual honesty. Anyone can be a successful investor, broadly defined, by sticking to their circle of competence and not straying outside of it, by not speculating when they think they're investing, and by always looking to pay a fair price in relation to what they're buying. These three central tenets, closely followed, can allow any intelligent person to operate safely in the financial world.

Step 132 - Use Rules of Reading for Finance, Economics and Investment

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Investment.

A. VERY VERY FAST Reading- Skimming. Pages 47-51.

B. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

C. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary, Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books To Investment

Step 133-Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 134-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. The world never tells you that you're wrong; it only gives you outcomes.
3. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
4. **Reality will do a lot of the work for us if we simply align with it.** Most of the time we're simply adding friction because we want the world to work in the way we think it should.
5. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care

about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.
- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything

outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models

allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself “If I do X, what will happen *after* that?”. I sum this up using the ecologist Garrett Hardin's simple question: “*And then what?*” A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves “And then what?” We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they “reorganize their incentive programs,” but practically, they've simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's

got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do

put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

*PART 19: Deep Work, Shallow
Work, Thinking, Logic and
Mental Model*

Step 135-Slow Down

- 1. Do Not Rush Any Tasks I will do At Any Time.**
- 2. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”**
- 3. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.**

- I. We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- II. The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- III. But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- IV. Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- V. We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- VI. As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always seems that the time-train is

pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

VII. Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.

VIII. When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.

IX. The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom — the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one

French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- X. Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

4. Do The Tasks Slowly, and Step By Step.

5. The Art of Slowing down and Do Not Rush Anything.

- I. The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- II. Too many of us see going nowhere as turning away from something rather than turning towards something.
- III. Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- IV. The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.
- V. The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- VI. “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

Step 136-NOT MULTITASK.

1. Of course you can do more than one thing at once. The catch is you can't do more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time. When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.
2. There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.
3. I think people that multitask pay a huge price. They think they're being extra productive, and I think they're (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don't have time to think about anything deeply. You're giving the world an advantage you shouldn't do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can't succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
4. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: "You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube."
5. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don't do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.
6. Listen and Apply The Following Books:

A. The Multitasking Mind By Dario Saliveci

Step 137-You Have Required To Do The Work For Deep Work, Thinking, Logic and Mental Model.

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what

happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.

II. First Left Hand Column Are My Arguments.

III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.

IV. Third Left Column are My Responses to the Opponent responses.

V. Fourth Left Hand Column are My Rebuttal.

VI. Fifth Left Hand Column are Opponent Rebuttal.

VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.

VIII. Seventh Left Hand Column is the Final My Rebuttal.

IX. Eight Left Hand Column is The opponent Rebuttal.

X. Ninth Left Hand Column is my closing statements.

XI. Tenth Left Hand Column is the opponent closing statements.

XII. Eleventh Left Hand Column is the Cross Examination.

- My Answer.

- Opponent Answer.

- My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 138-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important?

1. After Reading, Analyse, Research and Arguing with the text, then I need to Decide and apply the Logic, Mental Models and thinking model that helps to understand the complexity of the world.
2. If you can think through things better than others, you'll have fewer problems and more free time. If you can't, you're going to spend a lot of time fixing your mistakes. Good decisions make the future easier, bad ones make it harder.
3. The investigators wanted to figure out how today's college students were able to multitask so much more effectively than adults. How do they manage to do it, the researchers asked? The answer, they discovered—and this is by no means what they expected—is that they don't. The enhanced cognitive abilities the investigators expected to find, the mental faculties that enable people to multitask effectively, were simply not there. In other words, people do not multitask effectively. And here's the really surprising finding: the more people multitask, the worse they are, not just at other mental abilities, but at multitasking itself.
4. Multitasking, in short, is not only not thinking, it impairs your ability to think. Thinking means concentrating on one thing long enough to develop an idea about it. Not learning other people's ideas, or memorizing a body of information, however much those may sometimes be useful. Developing your own ideas.
5. The best way to improve your ability to think is to spend large chunks of time thinking. Immersing ourselves in the problem offers insights that can't be gained otherwise. One way to force yourself to slow down and think is to write. Good writing requires good thinking.
6. Good writing, like good thinking, takes time.

7. One heuristic to tell how good someone is at making decisions is by how much time they have. The busiest people are often the ones who make the worst decisions. Not only do they have less time to dedicate to thinking about the problem, but they are often busy correcting poor decisions from the past.
8. Good thinking is expensive. Bad thinking costs a fortune. Rather than accept that good thinking requires time, most people try to bargain with reality. Unfortunately, that is not how the world works. If you want to think better, schedule time to write out your thoughts.
9. Why is important Different type of Thinking to the reality:
 - I. Using Multidisciplinary Thinking to Approach Problems in a Complex World. Complex outcomes in human systems are a tough nut to crack when it comes to deciding what's really true. Any phenomena we might try to explain will have a host of competing theories, many of them seemingly plausible.
 - II. Cross-checks" from a variety of sources of data, developing a 3D view of the landscape he's trying to assess
 - III. So why is it important to be a multidisciplinary thinker? The answer comes from the Austrian philosopher Ludwig Wittgenstein, who said, "To understand is to know what to do." Could there be anything that sounds simpler than that? And yet it's a genius line—"to understand is to know what to do." How many mistakes do you make when you understand something? You don't make any mistakes. Where do mistakes come from? They come from blind spots, a lack of understanding. Why do you need to be multidisciplinary in your thinking? Because as the Japanese proverb says, "The frog in the well knows nothing of the mighty ocean."
 - IV. You may know everything there is to know about your specialty, your silo, your "well," but how are you going to make any good decisions in life—the complex systems of life, the dynamic system of life—if all you know is one well?
 - V. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring. So out of necessity, we must approach the problem in a different way
 - VI. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).

- VII. Cross-checks” from a variety of sources of data, developing a 3D view of the landscape he’s trying to assess.
- VIII. *Look* we can’t just rely on “plausible narratives” generated by folks like the historians. There are too many possibilities that could be correct. Nor can we rely purely on correlations (i.e., the rise in literacy statistically tracking the decline in violence) — they don’t necessarily offer us a causative explanation. (Does the rise in literacy *cause* less violence, or is it vice versa? Or, does a third factor cause both?) However, if we layer in some other known facts from areas we can experiment on — say, psychology or cognitive neuroscience — we can sometimes establish the causal link we need or, at worst, a better hypothesis of reality.
- IX. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; “Demonstrable” aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- X. What we end up with is not necessarily a bulletproof explanation, but probably the best we can do if we think carefully. A good cross-disciplinary examination with quantitative and qualitative sources coming into equal play, and a good dose of judgment, can be far more rigorous than the gut instinct or plausible nonsense type stories that many of us lazily spout.
- XI. A Word of Caution: Although Pinker’s “multiple vertices” approach to problem solving in complex domains can be powerful, we always have to be on guard for phenomena that we simply cannot explain at our current level of competence: We must have a “too hard” pile when competing explanations come out “too close to call” or we otherwise feel we’re outside of our circle of competence. Always tread carefully and be sure to follow Darwin’s Golden Rule: Contrary facts are more important than confirming ones. Be ready to change your mind, like Darwin, when the facts don’t go your way.
- XII. Using a true multidisciplinary understanding of things, Peter identifies two often overlooked, parabolic “Big Ideas”: 1) Mirrored Reciprocation (go positive and go first) and 2) Compound Interest (being constant). A great “Life Hack” is to simply combine these two into one basic approach to living your life: “Go positive and go first, and be constant in doing it.” There may be no better formula for living the best life you could possibly live.

Step 139-Intradisciplinary Thinking

1. Step 1 Define Intradisciplinary Thinking-Intradisciplinary Thinking. Intradisciplinary Thinking is within a single academic discipline. This is simply thinking within a scope of one academic discipline. Intradisciplinary working is within one discipline. Like a single ingredient, clearly distinguishable. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.

IV. Listen and Apply The Following Books:

- **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
- **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a

clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.
 - Thermodynamics.
 - Inertia.

- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.
 - Supporting Idea: Complex Adaptive Systems.
 - Critical mass.

- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by INDI YOUNG.**
- IX. Seeking Wisdom_ From Darwin to Munger.**
- X. Thinking, Fast and Slow.**
- XI. Investing_ The Last Liberal Art.**
- XII. Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**
- XIII. General Mental Models.**
- XIV. The sense of style _ the thinking person's guide to writing in the 21st century.**
- XV. Extreme Ownership.**
- XVI. Good Strategy and Bad Strategy.**
- XVII. The Complete Art of War.**
- XVIII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XV. Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XVI. Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XVII. Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**

XVIII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.

XIX.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.

XX.Listen, Use and Apply Understanding Argument By Walter Sinnott Armstrong For Thinking.

XXI.CRITICAL THINKING_ Consider the Verdict

XXII.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.

XXIII.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.

XXIV.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.

XXV.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.

- Use Socratic Logic and Introduction to Logic for Thinking.
- Basic Concepts and Terms and Words.
- Language and definition.
- Informal Fallacies.
- Sentences, proposition, judgements.
- Immediate inference.
- Conversion.
- Observion.
- Contraposition.
- Contradition.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.

- **Science and Superstition.**

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.**
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.**
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.**
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.**
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.**
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.**
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.**
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.**
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.**

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX.**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

K. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

L. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**

- XIII.Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV.Warren Buffett and the Interpretation of Financial Statements.**
- XV.Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI.The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII.The Intelligent Investor.**
- XVIII.The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX.Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX.Competitive Advantage of Nations.**
- XXI.Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

- I. CORPORATE FINANCE An Introduction.**

P. Biology.

- I. Developmental Biology.**
- II. Encyclopedia of Biology.**
- III. Encyclopedia of evolutionary biology.**
- IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.**
- V. Human Embryology and Developmental Biology.**
- VI. Introduction to the Biology of Marine Life**
- VII.The Encyclopedia Of Molecular Biology.**

Q. Physics.

- I. College Physics - Physics and Astronomy.**
- II. Encyclopedia of applied physics.**
- III. Fundamentals of Physics Textbook.**
- IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.**
- V. Physics for Scientists & Engineers & Modern Physics.**

R. Chemistry.

- I. Physical_chemistry.**
- II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.**
- III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.**
- IV. Organic Chemistry.**
- V. Ullmann's Encyclopedia of Industrial.**

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

I. Treasons, Strategems and Spoils.

II. 36 Strategems.

III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?

IV. Stratagem, deception and surprise in war.

V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.

VI. Stratagem and spoils.

VII. STRATAGEM Deception and Surprise in War.

VIII. Secrecy and stratagem understanding Chinese strategic culture.

IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.

X. The Thirty-Six Strategies of Ancient China.

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.

20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.

Step 140 - Multidisciplinary Thinking

1. **Step 1 Define Multidisciplinary Thinking.** Multidisciplinary thinking taking combination of various disciplines that maintain their unique perspective unchanged. They share a connection that is not collaborative, but collective and can work together to create a more complicated picture of Reality. The topic of analysis will best expose its different characteristics by exploring different perspectives, using the techniques and observations provided by variety of developed disciplines. Multidisciplinary is characterised within the literature as the least integrative form of integrated research—yet, equally, it is arguably the most attainable. Multidisciplinary features several academic disciplines in a thematically based investigation with multiple goals—essentially, studies “co-exist in a context” . While researchers aim to share knowledge and compare results from the studies there is no attempt to cross boundaries or generate new integrative knowledge. Each member is able to contribute a professional perspective on the issue. Thus the advantage of this approach is that, while the research approaches are disciplinary, the different perspectives on the issue can be gathered into one report for assessment. There is some debate on the extent to which research is coordinated and integrated. While some suggest that multidisciplinary research is coordinated, but not integrated; others contend that there is no coordination, but there is integration at a low level. In general, it is hard to imagine that the research is not, in some way coordinated whilst maintaining even a slight degree of coherence, but it may indeed not be integrated. Multidisciplinary working brings disciplines together so they can learn from each other, drawing on the mix of disciplinary knowledge. It's like a salad: the original ingredients are intact, but the flavours begin to blend. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; “Demonstrable” aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- IV. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
 - **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a

clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.
 - Thermodynamics.
 - Inertia.

- Friction and Viscosity.
- Velocity
- Leverage.
- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,
- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.
 - Supporting Idea: Complex Adaptive Systems.
 - Critical mass.

- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by INDI YOUNG.**
- IX. Seeking Wisdom_ From Darwin to Munger.**
- X. Thinking, Fast and Slow.**
- XI. Investing_ The Last Liberal Art.**
- XII. Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**
- XIII. General Mental Models.**
- XIV. The sense of style _ the thinking person's guide to writing in the 21st century.**
- XV. Extreme Ownership.**
- XVI. Good Strategy and Bad Strategy.**
- XVII. The Complete Art of War.**
- XVIII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XV. Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XVI. Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XVII. Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**

XVIII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.

XIX.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.

XX.Listen, Use and Apply Understanding Argument By Walter Sinnot Armstrong For Thinking.

XXI.CRITICAL THINKING_ Consider the Verdict

XXII.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.

XXIII.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.

XXIV.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.

XXV.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.

- Use Socratic Logic and Introduction to Logic for Thinking.
- Basic Concepts and Terms and Words.
- Language and definition.
- Informal Fallacies.
- Sentences, proposition, judgements.
- Immediate inference.
- Conversion.
- Observion.
- Contraposition.
- Contradition.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.

- **Science and Superstition.**

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX.**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.

XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.

XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategen.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategens.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 141 - CrossDisciplinary Thinking

1. **Step 1 Define CrossDisciplinary Thinking.** Crossdisciplinary thinking applies to several types of cross border interactions, looking at one discipline from an other's viewpoint. You will be working together to move knowledge from one discipline to the other. For example, views from political science are being used in fictional literature to understand political dispute. As part of the current university, cross-disciplinarity has a long background, particularly among disciplines that share borders or those with a shared focus. Physics and astronomy disciplines demonstrate this background. Physics studies a law that determines the universe; these laws extend to non-Earthly contexts (to the best of modern knowledge). Physics and astronomy programs are therefore usually located in the same academic department, providing for cross-disciplinary interaction. Crossdisciplinary working views one discipline from the frame of reference of another. It's like lots of different ingredients on a plate, but without chopping them up and mixing them. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.

IV. Listen and Apply The Following Books:

- **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**

- **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a

clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.
 - Thermodynamics.
 - Inertia.

- Friction and Viscosity.
- Velocity
- Leverage.
- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,
- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.
 - Supporting Idea: Complex Adaptive Systems.
 - Critical mass.

- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by INDI YOUNG.**
- IX. Seeking Wisdom_ From Darwin to Munger.**
- X. Thinking, Fast and Slow.**
- XI. Investing_ The Last Liberal Art.**
- XII. Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**
- XIII. General Mental Models.**
- XIV. The sense of style _ the thinking person's guide to writing in the 21st century.**
- XV. Extreme Ownership.**
- XVI. Good Strategy and Bad Strategy.**
- XVII. The Complete Art of War.**
- XVIII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XV. Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XVI. Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XVII. Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**

XVIII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.

XIX.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.

XX.Listen, Use and Apply Understanding Argument By Walter Sinnott Armstrong For Thinking.

XXI.CRITICAL THINKING_ Consider the Verdict

XXII.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.

XXIII.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.

XXIV.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.

XXV.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.

- Use Socratic Logic and Introduction to Logic for Thinking.
- Basic Concepts and Terms and Words.
- Language and definition.
- Informal Fallacies.
- Sentences, proposition, judgements.
- Immediate inference.
- Conversion.
- Observion.
- Contraposition.
- Contradition.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.

- **Science and Superstition.**

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX.**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

- XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.**
- XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.**
- XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.**

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

I. CORPORATE FINANCE An Introduction.

P. Biology.

I. Developmental Biology.

II. Encyclopedia of Biology.

III. Encyclopedia of evolutionary biology.

IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.

V. Human Embryology and Developmental Biology.

VI. Introduction to the Biology of Marine Life

VII. The Encyclopedia Of Molecular Biology.

Q. Physics.

I. College Physics - Physics and Astronomy.

II. Encyclopedia of applied physics.

III. Fundamentals of Physics Textbook.

IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.

V. Physics for Scientists & Engineers & Modern Physics.

R. Chemistry.

I. Physical_chemistry.

II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.

III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.

IV. Organic Chemistry.

V. Ullmann's Encyclopedia of Industrial.

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 142 - Interdisciplinary Thinking

1. **Step 1 Define Interdisciplinary Thinking.** "Interdisciplinary" comes from the process of merging and integrating different disciplines together with their methodologies and presumptions. It includes crossing the formal borders between sciences and combining their methods in favor of a common purpose. "Methodologies and assumptions belonging to different disciplines are connected and modified in order to adapt to the needs of the research, creating new tools which allow for the investigation of difficult subjects that surpass the possibilities of a single discipline. In the field of architecture, for instance, complex topics such as SDGs, urban transitional, sustainability, and design imply various approaches that combine chemistry, drafting for design, engineering design, fundamentals of physics, architectural illumination and electrical systems. Interdisciplinarity may be regarded as a step up from multidisciplinary. Interdisciplinary studies focus on addressing specific 'real world' system problems and, as a result, the research process forces participants (from a variety of unrelated disciplines) to cross boundaries to create new knowledge. Essentially the major difference from multidisciplinary lies in the *level of integration and cooperation* as these projects seek to bridge disciplinary viewpoints and potentially enable the examination of existing accumulated knowledge from the perspective of a neighboring discipline. Huutoniemi *et al.* provide a relatively comprehensive typology of interdisciplinarity along with specific indicators for research teams to grasp on to. At the same time, Schmidt outlines the importance of a basic literacy in the philosophy of science related to doing such work as well as the kinds of interdisciplinarity. The necessity of bridging disciplinary viewpoints generally (as with transdisciplinarity) stems from the need to address complex "problems that involve an interface of human and natural systems" and, as such, the integration of natural and social scientists is standard practice for interdisciplinary research. This approach involves bringing people and ideas together from different disciplines to jointly frame a problem, agree on a methodological approach, and analyze data. Thus interdisciplinary research requires a much more collaborative approach to problem formulation and methodological development than multidisciplinary research. Interdisciplinary

working starts to take a new form, integrating knowledge and methods from different disciplines and synthesising into a new whole. It's like a stew: the original ingredients are still partly distinguishable, but the overall is a blended pot of mixed flavours. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.

IV. Listen and Apply The Following Books:

- **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
- **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the

complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- **You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.**
- **When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.**
- **Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.**

II. Beyond The Hurry Culture

- **Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.**
- **All of these things increase pressure in the work environment and repeatedly reinforce the “hurry up!” message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.**
- **The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, “*Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking.*”**

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.
 - Thermodynamics.
 - Inertia.

- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.
 - Supporting Idea: Complex Adaptive Systems.
 - Critical mass.

- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - **Algebra.**
 - **Permutations and combinations.**
 - **Algorithms.**
 - **Scale.**
 - **Compound interest.**
 - **Inflection point.**

- **Physics.**
 - **Scientific Method.**
 - **Breakpoint.**
 - **Critical mass.**
 - **Reciprocity.**
 - **Velocity.**
 - **Relativity.**
 - **Leverage.**
 - **Newton's Laws of Motion.**
 - **Chaos Theory.**
 - **Complex Adaptive Systems.**
 - **Activation Energy.**
 - **Laws of Thermodynamics.**
 - **Heisenberg Uncertainty Principle.**

- **Statistics.**
 - **Probabilistic thinking.**
 - **Bayes Theorem.**
 - **Power Law.**
 - **Regression to the Mean.**
 - **Game Theory.**
 - **Correlation and Causation.**
 - **Standard Deviation.**
 - **Law of large numbers.**
 - **Inversion.**
 - **Fragility / Robustness / Antifragility.**
 - **Black Swan.**

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by
INDI YOUNG.**
- IX. Seeking Wisdom_ From Darwin to Munger.**
- X. Thinking, Fast and Slow.**
- XI. Investing_ The Last Liberal Art.**
- XII. Thinking_ The New Science of Decision-Making, Problem-Solving, and
Prediction.**
- XIII. General Mental Models.**
- XIV. The sense of style _ the thinking person's guide to writing in the 21st
century.**
- XV. Extreme Ownership.**
- XVI. Good Strategy and Bad Strategy.**
- XVII. The Complete Art of War.**
- XVIII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XV. Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XVI. Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XVII. Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**

XVIII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.

XIX.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdyllvan Barn For Thinking.

XX.Listen, Use and Apply Understanding Argument By Walter Sinnot Armstrong For Thinking.

XXI.CRITICAL THINKING_ Consider the Verdict

XXII.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.

XXIII.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.

XXIV.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.

XXV.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.

- Use Socratic Logic and Introduction to Logic for Thinking.
- Basic Concepts and Terms and Words.
- Language and definition.
- Informal Fallacies.
- Sentences, proposition, judgements.
- Immediate inference.
- Conversion.
- Observion.
- Contraposition.
- Contradition.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.

- **Science and Superstition.**

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.**
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.**
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.**
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.**
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.**
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.**
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.**
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.**
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.**

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX.**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.

XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.

XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

- I. CORPORATE FINANCE An Introduction.**

P. Biology.

- I. Developmental Biology.**
- II. Encyclopedia of Biology.**
- III. Encyclopedia of evolutionary biology.**
- IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.**
- V. Human Embryology and Developmental Biology.**
- VI. Introduction to the Biology of Marine Life**
- VII. The Encyclopedia Of Molecular Biology.**

Q. Physics.

- I. College Physics - Physics and Astronomy.**
- II. Encyclopedia of applied physics.**
- III. Fundamentals of Physics Textbook.**
- IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.**
- V. Physics for Scientists & Engineers & Modern Physics.**

R. Chemistry.

- I. Physical_chemistry.**
- II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.**
- III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.**
- IV. Organic Chemistry.**
- V. Ullmann's Encyclopedia of Industrial.**

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

7. **Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
8. **Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around? As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality? In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas? The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate? Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles? A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress? Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 143-Transdisciplinary Thinking

1. **Step 1 Define Transdisciplinary Thinking.** Transdisciplinary For one of the first times was stated in a 1973 OECD report on environmental education. Transdisciplinarity describes a study that focuses on issues that cross the borders of two or even more disciplines “when a common set of axioms prevail, related to but lying beyond and complementing traditional disciplines. With the other word, principles or techniques originally developed by one discipline but now commonly used by others. Transdisciplinarity is probably the most desirable and yet difficult to obtain form of integrated research. Some researchers are, in fact, skeptical about whether it can be achieved at all. For example, Pohl observes that the extent of the requirements for transdisciplinary research suggest that it is to some extent “a ‘megalomaniac’ endeavour.” In addition, Tress *et al.* note that, despite the best intentions, “Transdisciplinary landscape research is an exception, even interdisciplinarity is seldom reached.” Such studies seek a transcendence of disciplinary perspectives (in some cases “redrawing the disciplinary map” into a broader framework in “true systemic fashion” that involves practical engagement with “local and regional issues of concern”. In this sense transdisciplinarity is the highest form of integrated project, involving not only multiple disciplines, but also multiple *non-academic participants* (e.g., land managers, user groups, the general public) in a manner that combines interdisciplinarity with participatory approaches. Walter *et al.* suggest that transdisciplinary research is characterised by “a process of collaboration between scientists and non-scientists on a specific real world problem” and combines scientific research with the generation of decision-making capacity for the involved stakeholders or as Schmidt describes it a “problem with the problems”. While Mobjörk *et al.* suggest that transdisciplinarity can be divided into “consulting” (stakeholders are consulted but not incorporated in the research process) and “participatory” (stakeholders are incorporated and considered equally valuable) forms, we argue that non-participatory forms of transdisciplinarity are, in fact, interdisciplinarity as transdisciplinary approaches are widely defined by their engagement of non-scientists in the research process. The variety included in many transdisciplinary frameworks is largely the result of the strong problem solving

objectives of the research and the need for flexible methodologies in transdisciplinary research is driven by this problem solving approach as “methodologies employed in transdisciplinary research needs to correspond to and reflect the problem and context under investigation”. To ensure that all relevant disciplines are represented within transdisciplinary projects, a pluralistic (rather than unitary) approach to methodology is standard. This focus on the problem, rather than the disciplines excludes the possibility of unidirectional research. As Hadorn *et al.* observe, within a transdisciplinary environment, no single discipline has intellectual precedence. In fact, some researchers go so far as to equate transdisciplinarity with holism, arguing that “It solves disagreements and differences in knowledge and scientific approaches through dialectic thinking, not majority rule, tradition or compromise” [5] or that it is “a different manner of seeing the world, more systematic and more holistic”. As such, Rapport suggests that “the essential element of transdisciplinarity is ‘transcendence’—a creative process whereby a framework for characterizing larger level processes transcends frameworks used to characterize the parts”. (For more on creativity and serendipity involved in research that reaches beyond a single discipline.) Political ecology is an example of a transdisciplinary sub-discipline that has emerged from the transcendence of a number of disciplines—and has existed under the umbrella of a larger disciplinary body (Geography) since the 1970s though others associate with interdisciplinary work . In promoting a holistic perspective, transdisciplinarity requires considerable effort on the part of engaged researchers to open up their research to alternative ways of thinking, or, as Giri suggests to “overcome one’s disciplinary chauvinism” and develop “an openness to perspectives of other disciplines”. The adoption of a holistic perspective leads to another key feature of transdisciplinarity—that it has high aims of reconstituting and rearranging the nature of disciplinary knowledge thus creating, through fusion across arbitrary intellectual boundaries, new synthesized disciplines with which to address the real-world problems at hand explicitly through collaboration. The demands placed on researchers to collaborate and ‘overcome chauvinism’ means that transdisciplinarity, of all the integrated research forms, has a strong focus on the building of personal relationships and joint understandings. Establishing trust and understanding between researchers within the projects is thus a key objective of building

transdisciplinary capacity. Transdisciplinary working produces a new, novel form or way of working beyond the original disciplinary boundaries. It's like a cake: you can no longer see the form of the ingredients as they have taken on a different shape and flavour. Let's review the process that Pinker has laid out, one that we might think about emulating as we examine the causes of complex phenomena in human systems:

- I. We observe an interesting phenomenon in need of explanation, one we feel capable of exploring.
- II. We propose and examine competing hypotheses that would explain the phenomena (set up in a falsifiable way, in harmony with the divide between science and pseudoscience laid out for us by the great Karl Popper).
- III. We examine a cross-section of: Empirical data relating to the phenomena; sensible qualitative inference (from multiple fields/disciplines, the more fundamental the better), and finally; "Demonstrable" aspects of nature we are nearly certain about, arising from controlled experiment or other rigorous sources of knowledge ranging from engineering to biology to cognitive neuroscience.
- IV. Listen and Apply The Following Books:
 - **How we can Assess the Level of Interdisciplinarity and Transdisciplinarity of Academic Institutions? By Mahmood Ramezanzade**
 - **Detection of Distributed Denial of Service (DDoS) Attacks in IOT Based Monitoring System of Banking Sector Using Machine Learning Models By Muhsmmmsf Shafiq**

2. Step 2-Do Work Required to Have an Opinion on Any Topic and Anything.

- I. Most people go through life not really getting any smarter. Why? They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
- II. You can acquire knowledge if you want it. In fact, there is a simple formula, which if followed is almost certain to make you smarter over time. Simple but not easy. It involves a lot of hard work. "The best thing a human being can do is to help another human being know more."
- III. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
- IV. Knowledge accumulation as an acquired, rather than natural, genius. And he'd give all the credit to the studying;.
- V. The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage ... the list goes on.
- VI. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some op-ed in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
- VII. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

VIII. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?

- I have to do the reading.
- I have to do Thinking and mental model.
- I have to talk to competent people and understand their arguments.
- I have to think about the key variables and how they interact over time.
- I have to listen and chase down arguments that run counter to your views.
- I have to think about how you might be fooling yourself.
- I have to see the issue from multiple perspectives.
- I have to think.
- I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.

IX. If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."

X. We all are learning, modifying, or destroying ideas all the time. Rapid destruction of your ideas when the time is right is one of the most valuable qualities you can acquire. You must force yourself to consider arguments on the other side. As Rabbi Moses ben Maimon (1135–1204), commonly known as Maimonides, said: "Teach thy tongue to say I do not know, and thou shalt progress."

XI. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.

XII. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

XIII. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

- Circle of Competence:

- **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve —after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time,

work to expand that circle but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

- The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.
 - The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
 - How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge. Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the

complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

- Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful. Mimic and the Real Thing:
 - “There’s two kinds of snakes you come across. There’s the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it’s venomous, it can kill you in a minute. The Mexican Milk Snake can’t do anything to you; it’s an impostor.”How is it that these two look alike? It’s due to a phenomenon called Batesian Mimicry.
 - In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the “models”) were able to operate freely and relatively unmolested, there had also developed a “mimic” population of butterflies which wasn’t toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the “model” was and the more frequently they appeared in the local population, the easier it was for its “mimics” to get by! Predators simply wouldn’t take the risk of mixing up the two. If there aren’t as many “models” around or they aren’t that dangerous, the mimics have a harder time.
 - This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or “pretenders to the throne” are often very effective, very convincing “mimics” of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the “model,” the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many “future” Warren Buffett’s. For every Steve Jobs, there have been many “next” Steve Jobs’. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

XIV. The ability to destroy your ideas rapidly instead of slowly when the occasion is right is one of the most valuable things. You have to work hard on it. Ask yourself what are the arguments on the other side. It's bad to have an opinion you're proud of if you can't state the arguments for the other side better than your opponents. This is a great mental discipline.

XV. Doing the work means you can't make up your mind with a high degree of confidence right away. Doing the work forces you to challenge your beliefs because you have to argue from both sides. You become the somewhat impartial judge. What's on trial is your opinion. If you want to work with the world rather than against it, one of the major leverage points you can put effort into is how to distinguish between the people who've done the work and those who haven't. The ones who have will pass the Batesian Mimicry Test.

XVI. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

XVII. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.

XVIII. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

XIX. We read a lot. I don't know anyone who's wise who doesn't read a lot. But that's not enough: You have to have a temperament to grab ideas and do sensible things. Most people don't grab the right ideas or don't know what to do with them.

XX. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. "Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day."

3. Step 3- Slow Down

I. Do Not Rush Thinking Process, and Do it Very Slow.

II. Do Not Rush Any Task I will do At Any Time.

III. Listen and Apply Book “The Slow Fix Solve Problems, Work Smarter, and Live Better in a World Addicted to Speed”

IV. Listen and Apply Book *In Praise Of Slowness Challenging the Cult of Speed BY Carl Honore.

- We live in a world scarce of understanding and abundant with information. We complain that we never have any free time yet we seek distraction. If work can't distract us, we distract ourselves. We crave perpetual stimulation and motion. We're so busy that our free time comes in 20 second bursts, just long enough for us to read the gist and assume we understand. If we are to synthesize learning and understanding we need time to think.
- The modern storm of bits and stimulation, relents only when we sleep. (And then only if we remember to turn off the phone.) Lost in all of this is the art of stillness. We live in a world with more information than ever and yet we understand less. We have come into the belief that the simple act of reading confers understanding. Worse, most of our reading is elementary reading, or skimming — a far cry from syntopical reading, which seems more fertile for the mind willing to do the work.
- But that's just it. We don't want, or can't find the time, to do the work that's required to hold an opinion. It's much easier to simply read the opinions of another and let them think for us.
- Understanding comes from focusing, chewing, and relentlessly ragging on a problem. It comes with false starts, dead ends, and frustration. Thinking requires time and space. It's slow. It means saying I don't know. In short, thinking is everything the modern workplace is designed to eradicate.
- We're expected to have an opinion about everything and yet our time to think is near zero. We hold more opinions than ever but have less understanding. We don't even understand ourselves. How could it be otherwise?
- As Milan Kundera wrote in his 1996 novella Slowness, “When things happen too fast, nobody can be certain about anything, about anything at all, not even about himself. “In our fast-moving modern world, it always

seems that the time-train is pulling out of the station just as we reach the platform. No matter how fast we go, no matter how cleverly we schedule, there are never enough hours in the day.”

- Carl Honore, wrote a book, In Praise of Slowness: Challenging the Cult of Speed, to explore why we’re always in such a rush, what if anything is the cure for time-sickness, and whether it’s desirable to slow down. The book is not an all-out declaration of war against speed. Speed has helped to remake our world in ways that are wonderful and liberating. Who wants to live without the Internet or jet travel? The problem is that our love of speed, our obsession with doing more and more in less and less time, has gone too far; it has turned into an addiction, a kind of idolatry. Even when speed starts to backfire, we invoke the go-faster gospel.
- When we rush, we skim the surface, and fail to make real connections with the world or other people.” Moreover we don’t make connections with ideas. We don’t synthesize. We don’t test theories over time. We don’t play with ideas.
- The implications on thinking are fascinating. We are all fast-thinkers now. We have forgotten how to look forward to things, and how to enjoy the moment when they arrive. Restaurants report that hurried diners increasingly pay the bill and order a taxi while eating dessert. Many fans leave sporting events early, no matter how close the score is, simply to steal a march on the traffic. Then there is the curse of multi-tasking. Doing two things at once seems so clever, so efficient, so modern. And yet what it often means is doing two things not very well. Like many people, I read the paper while watching TV— and find that I get less out of both. In this media-drenched, data-rich, channel-surfing, computer-gaming age, we have lost the art of doing nothing, of shutting out the background noise and distractions, of slowing down and simply being alone with our thoughts. Boredom— the word itself hardly existed 150 years ago— is a modern invention. Remove all stimulation, and we fidget, panic and look for something, anything, to do to make use of the time. When did you last see someone just gazing out the window on a train? Everyone is too busy reading the paper, playing video games, listening to iPods, working on the laptop, yammering into mobile phones. Instead of thinking deeply, or letting an idea simmer in the back of the mind, our instinct now is to reach for the

nearest sound bite. In modern warfare, correspondents in the field and pundits in the studio spew out instant analyses of events as they occur. Often their insights turn out to be wrong. But that hardly matters nowadays: in the land of speed, the man with the instant response is king. With satellite feeds and twenty-four-hour news channels, the electronic media is dominated by what one French sociologist dubbed “le fast thinker”— a person who can, without skipping a beat, summon up a glib answer to any question.

- Fast eats time. One consequence of fast is that we make poor decision after poor decision. Those decisions don’t go away never to be seen again. It’s not like we make a bad decision and we’re done with it. No, the consequences are much worse. Poor decisions eat time. They come back to haunt you. They create issue after issue. They feed into the perpetual motion machine of busyness. And in a culture where people wear busyness as a badge of honor bad decisions actually lead us to think that we’re doing more.

V. Do The Tasks Slowly, and Step By Step.

VI. The Art of Slowing down and Do Not Rush Anything.

- The Art of Stillness is a persuasively argued case for the pleasures of slowing down and being in one place. Today we’re going faster and faster in search of contentment and meaning. This is largely a recipe for ensuring we will never be happy. We have the sense, too often, of running at top speed and never being able to catch up.
- Too many of us see going nowhere as turning away from something rather than turning towards something.
- Going nowhere isn’t about turning your back on the world; it’s about stepping away now and then so that you can see the world more clearly and love it more deeply. “There is nothing either good or bad, but thinking makes it so.”
- The idea behind choosing to sit still long enough to learn about yourself is simple and has been around for ages. Marcus Aurelius and Epictetus reminded us many millennia ago that it’s how we respond to our experiences, not the experiences themselves, which shape us.

- The greatest weapon against stress is our ability to choose one thought over another. Part of making better decisions is making time to think. Something that few of us are able to do.
- “Our creations come not when we’re out in the world, gathering impressions, but when we’re sitting still, turning those impressions into sentences.

4. Step 4- Do not Multitask.

- I. Of course you can do more than one thing at once. The catch is you can’t do more more than one thing at once that requires concentration. You can walk and chew gum, but you can’t write an email and a report at the same time. When you’re doing two things at once that are cognitively demanding, what you’re really doing is switching back and forth very quickly from one task to another.
- II. There is a mental cost—called a switching cost—to all of this multitasking. But that’s not all it makes deep thinking impossible.
- III. I think people that multitask pay a huge price. They think they’re being extra productive, and I think they’re (out of their mind). I use the metaphor of the one-legged man in the ass-kicking contest. I think when you multi-task so much, you don’t have time to think about anything deeply. You’re giving the world an advantage you shouldn’t do. Practically everybody is drifting into that mistake. Concentrating hard on something that is important is. I can’t succeed at all without doing it. I did not succeed in life by intelligence. I succeeded because I have a long attention span.
- IV. It sounds counter-intuitive but if you want to increase discretionary time and reduce stress you need to schedule time to think. The tiny fragments of time many of us find ourselves with have a negative effect on our ability to think deeply about a problem. Furthermore they impede our ability to learn — we stay at a surface level and never move into a deep understanding. Deresiewicz warns: “You simply cannot (think) in bursts of 20 seconds at a time, constantly interrupted by Facebook messages or Twitter tweets, or fiddling with your iPod, or watching something on YouTube.”
- V. The opposite approach is to focus on a problem or subject and try to achieve a deep fluency. How many of us, however, have time? We don’t do the work required to have an opinion. Instead we operate with surface knowledge. We tackle problems with the first thought that comes to mind. Because we make a

poor initial decision, we spend countless hours attempting to correct it. No wonder we have no time to think. We're not heeding the advice of Joseph Tussman and letting the world do the work for us.

VI. Listen and Apply The Following Books:

- **The Multitasking Mind By Dario Saliveci**

5. Step 5-What is Thinking/

I. Thinking Rate

- You can't force yourself to think faster. If you try, you're likely to end up making much worse decisions. Here's how to improve the actual quality of your decisions instead of chasing hacks to speed them up.
- When the product of your job is your decisions, you might find yourself wanting to be able to make more decisions more quickly so you can be more productive overall.
- Chasing speed is a flawed approach. Because decisions—at least good ones—don't come out of thin air. They're supported by a lot of thinking.

II. Beyond The Hurry Culture

- Everyone is trying to work faster at all times, and they pressure everyone around them to work faster, too.
- All of these things increase pressure in the work environment and repeatedly reinforce the "hurry up!" message. They make managers feel like they're moving things along faster. That way if work isn't getting done, it's not their fault. But, DeMarco writes, they don't lead to meaningful changes in behavior that make the whole organization more productive. Speeding up often results in poor decisions that create future problems.
- The reason more pressure doesn't mean better productivity is that the rate at which we think is fixed. We can't force ourselves to start making faster decisions right now just because we're faced with an unrealistic deadline. DeMarco writes, *"Think rate is fixed. No matter what you do, no matter how hard you try, you can't pick up the pace of thinking."*

III. Elements of Effective Thinking

- **Understand Deeply.** Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.
- **Make Mistakes.** Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers — they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.
- **Raise Questions.** Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air — the right questions will bring them out and help you see connections that otherwise would have been invisible.
- **Follow the Flow of Ideas.** Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A new idea is a beginning, not an end. Ideas are rare— milk them. Following the consequences of small ideas can result in big payoffs. These are the four basic building blocks for effective thinking. The fifth is Change.
- **Change.** The unchanging element is change— by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

6. Step 6-Collect As Many mental models as Possible from diverse domains and academic disciplines That I think is suitable for my situation or Information provided by the Text, Book, Speech etc. Research a broad range of industries to identify mental models that can be integrated and Most Suitable into area of work or focus. In identifying the Great Mental Models we have to look for elementary principles, the ideas from multiple disciplines that form a time tested foundation, these mental models would be from Elementary Mental Models to most Advanced Mental Models. It may seem counterintuitive, to work on developing knowledge that is available to everyone, but the universe works in the same way no matter where you are in it or how you think the universe should be working. What you need is to understand the principles, so that when the details change you are still able to identify what is really going on. Listen and Follow Every Book on Each Mental models.

A. General Mental Models For Thinking.

I. The Great Mental Models Volume 1 By Fs Blog.

- The Map is Not The Territory.
- Circle of Competence.
- The first Principles Thinking.
- Though Experiment.
- Second Order Thinking.
- Probabilistic Thinking.
- Inversion.
- Occam's Razor.
- Hanlon's Razor.
- Supporting Ideas.
- Falsifiability.
- Necessity and Sufficiency.
- Causation vs Correlation.

II. The Great Mental Models Volume 2 By Fs Blog.

- Physics.
 - Relativity.
 - Reciprocity.
 - Thermodynamics.
 - Inertia.

- Friction and Viscosity.
- Velocity
- Leverage.

- Chemistry.
 - Activation Energy.
 - Catalysts.
 - Alloying,

- Biology.
 - Evolution Part One: Natural Selection and Extinction.
 - Evolution Part two: Adaptation Rate and The Red Queen Effect.
 - Supporting Idea: Competition.
 - Ecosystem.
 - Niche.
 - Self Preservation.
 - Replication.
 - Cooperation.
 - Supporting Idea: Dunbar's Number.
 - Hierarchical Organisation.
 - Incentives.
 - Tendency to Minimize energy Output.

III. The Great Mental Models Volume 3 By Fs Blog.

- Systems.
 - Feedback Loops.
 - Equilibrium.
 - Bottlenecks.
 - Scale.
 - Margin of Safety.
 - Churn.
 - Algorithms.
 - Supporting Idea: Complex Adaptive Systems.
 - Critical mass.

- Emergence.
- Supporting Idea: Chaos Dynamics.
- Irreducibility.
- Law of Diminishing Returns.
- Mathematics.
 - Supporting Idea: Distribution.
 - Compounding.
 - Supporting Idea; Network Effect.
 - Sampling.
 - Randomness.
 - Supporting idea: Pareto Principle.
 - Regression to the mean.
 - Multiplying by ZERO.
 - Equivalence.
 - Supporting idea: order of Magnitude.
 - Surface Area.
 - Global and local Maxima.

IV. The Great Mental Models By Tommy Tedford.

- First Principles Mental model.
- Classical Condition.
- Cognitive Biases.
- Circle Of Competence Mental Model.
- Eisenhower Matrix.

V. 100 Mental Models- Be Rational by Wisdom Theory.

- Philosophy.
 - Meaning Of Life.
 - Stoicism.
 - Cave of plato.
 - Golden Rule.
 - Constructivism.

- **Maths.**
 - Algebra.
 - Permutations and combinations.
 - Algorithms.
 - Scale.
 - Compound interest.
 - Inflection point.

- **Physics.**
 - Scientific Method.
 - Breakpoint.
 - Critical mass.
 - Reciprocity.
 - Velocity.
 - Relativity.
 - Leverage.
 - Newton's Laws of Motion.
 - Chaos Theory.
 - Complex Adaptive Systems.
 - Activation Energy.
 - Laws of Thermodynamics.
 - Heisenberg Uncertainty Principle.

- **Statistics.**
 - Probabilistic thinking.
 - Bayes Theorem.
 - Power Law.
 - Regression to the Mean.
 - Game Theory.
 - Correlation and Causation.
 - Standard Deviation.
 - Law of large numbers.
 - Inversion.
 - Fragility / Robustness / Antifragility.
 - Black Swan.

- **Engineering.**
 - **Redundancy: Margin of safety.**
 - **Backup system model.**
 - **Breakpoint.**
 - **Quality control.**
 - **Feedback loops.**

- **Chemistry.**
 - **Atoms, Molecules, and Ions.**
 - **The Chemical Bond.**
 - **Molecular Shape and Geometry.**
 - **The Kinetic Theory.**
 - **The Chemical Reaction.**
 - **Autocatalyst.**

- **Biology.**
 - **Modern Darwinian Synthesis.**
 - **Incentives.**
 - **Scarcity.**
 - **Cooperation.**
 - **Adaptation.**
 - **Replication.**
 - **Hierarchical and Other Organizing Instincts.**
 - **Self-Preservation Instincts.**
 - **Resilience.**
 - **The Red Queen Effect.**
 - **Ecosystems.**
 - **Niches.**

- **Psychology.**
 - **Reward and Punishment Superresponse Tendency.**
 - **Liking/Loving Tendency.**
 - **Disliking/Hating Tendency.**
 - **Doubt/Avoidance Tendency.**
 - **Inconsistency-Avoidance Tendency.**
 - **Curiosity Tendency.**
 - **Kantian Fairness Tendency.**
 - **Envy/Jealous tendency.**
 - **Reciprocation Tendency.**
 - **Influence-from-Mere-Association Tendency.**
 - **Simple, Pain-Avoiding Psychological Denial.**
 - **Excessive Self-Regard Tendency.**
 - **Overoptimism Tendency.**
 - **Deprivation-Superreaction Tendency.**
 - **Social-Proof Tendency.**
 - **Contrast-Misreaction Tendency.**
 - **Stress-Influence Tendency.**
 - **Availability-Misweighing Tendency.**
 - **Use-It-or-Lose-It Tendency.**
 - **Drug Misinfluence Tendency.**
 - **Senescence-Misinfluence Tendency.**
 - **Authority-Misinfluence Tendency.**
 - **Twaddle Tendency.**
 - **Reason-Respecting Tendency.**
 - **Lollapalooza Tendency.**

- **Economics.**
 - **Double Entry Accounting.**
 - **Opportunity Costs.**
 - **Circle of Competence.**
 - **Pareto Principle.**
 - **Creative Destruction.**
 - **Supply and Demand.**
 - **Moats.**
 - **Network Effects.**
 - **Switching Costs.**
 - **Specialization.**
 - **Tragedy of the Commons.**
 - **Mr. Market.**
 - **Principal-agent problem.**
 - **Skin in the game.**

- **History.**
 - **The importance of geography.**
 - **Inclusive economic and political institutions.**
 - **Extremely intense ideology.**
 - **Historic recurrence.**

- VI. Mental Models, Investing and you volume 1 by Anshul Khare.**
- VII. Mental Models- 349 Models Explained to Carry Around in Your Head.**
- VIII. MENTAL MODELS Aligning Design Strategy with Human Behavior by INDI YOUNG.**
- IX. Seeking Wisdom_ From Darwin to Munger.**
- X. Thinking, Fast and Slow.**
- XI. Investing_ The Last Liberal Art.**
- XII. Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**
- XIII. General Mental Models.**
- XIV. The sense of style _ the thinking person's guide to writing in the 21st century.**
- XV. Extreme Ownership.**
- XVI. Good Strategy and Bad Strategy.**
- XVII. The Complete Art of War.**
- XVIII. The Art of War_ Complete Text and Commentaries.**

B. Accounting Mental Models.

- I. ACCA F1 - ACCOUNTANT IN BUSINESS.**
- II. ACCA F2 - Management Accounting.**
- III. ACCA F3 Financial accounting.**
- IV. ACCA F4 - Corp and Business Law.**
- V. ACCA F5-Performance_Management.**
- VI. ACCA F6 UK TAXATION.**
- VII. ACCA F7 INT Study Text Financial Reporting.**
- VIII. ACCA F8 UK Study Text Audit and Assurance.**
- IX. ACCA f9-FINANCIAL MANAGEMENT.**
- X. ACCA P1_ Governance, Risk and Ethics.**
- XI. ACCA P2 - Corporate Reporting.**
- XII. ACCA P3 Business Analysis.**
- XIII. ACCA P4 - Advanced Financial Management.**
- XIV. ACCA P5 - Advanced Performance Management.**
- XV. ACCA P6 Advanced Taxation.**
- XVI. ACCA P7 - Advanced Audit and Assurance.**
- XVII. Wiley CPA Exam Review 2013, Auditing and Attestation.**
- XVIII. Wiley CPA Exam Review 2013, Business Environment and Concepts.**
- XIX. Wiley CPA Exam Review 2013, Financial Accounting and Reporting.**
- XX. Wiley CPA Examination Review 2012-2013 Volume 2 _ Problems and Solutions.**

C. CFA Mental Model

I. CFA Program Curriculum Level 1 Volumes 1-6.

II. CFA Program Curriculum Level 2 Volumes 1-6.

III. CFA Program Curriculum Level 3 Volumes 1-6.

- **Ethics.**
- **Economics**
- **Financial Reporting and Analysis.**
- **Corporate Finance and Portfolio Management/**
- **Equity.**
- **Equity and Fixed Income.**
- **Derivatives and Alternative Investments.**
- **Behaviour Finance and Individual investors and institutional Investors.**
- **Application of Economic analysis and asset allocation.**
- **Risk Management.**
- **Trading and rebalancing, performance evaluation.**

D. Logic and Critical Thinking Mental Method.

- I. Listen, Use and Apply Socratic Logic By Peter Kreeft For Thinking.**
- II. Listen, Use and Apply Introduction of Logic By Patrick Hurley for Thinking.**
- III. Listen, Use and Apply New Introduction to Modal Logic By G.e Hughes For Thinking.**
- IV. Listen, Use and Apply Argumentation and Debate By Austin Freeley for Thinking.**
- V. Listen, Use and Apply Attacking Faulty Reasoning by Edward Damer for Thinking.**
- VI. Listen, Use and Apply Bad Arguments By Robert Arp For Thinking.**
- VII. Listen, Use and Apply Everything's An Argument By Andrea Lunsford For Thinking.**
- VIII. Listen, Use and Apply Logic and Language By J. Van Benthem For Thinking.**
- IX. Listen, Use and Apply Introduction to Logic and Critical Thinking By Merrilee Salmon For Thinking.**
- X. Listen, Use and Apply Critical Thinking Consider the Verdict by Bruce Waller For Thinking.**
- XI. Listen, Use and Apply Critical Thinking by Simon Bradley For Thinking.**
- XII. Listen, Use and Apply Critical Thinking Skills, Problem solving and Academic and Occupational Competence by Lowell Hedges For Thinking.**
- XIII. Listen, Use and Apply Critical Thinking and Creativity by Joe Lau For Thinking.**
- XIV. Listen, Use and Apply Mastermind, How to Think Like Sherlock Holmes For Thinking.**
- XV. Listen, Use and Apply Learning To Think Like Lawyer By Elizabeth Mertz For Thinking.**
- XVI. Listen, Use and Apply The art of Deception by Nicolas Capaldi For Thinking.**
- XVII. Listen, Use and Apply The Art of Thinking Clearly by Rolf Dobelli For Thinking.**

XVIII.Listen, Use and Apply The Art of Thinking in System by Steven Schuster for Thinking.

XIX.Listen, Use and Apply Critical Thinking, Reading and Writing By Sdylvan Barn For Thinking.

XX.Listen, Use and Apply Understanding Argument By Walter Sinnott Armstrong For Thinking.

XXI.CRITICAL THINKING_ Consider the Verdict

XXII.Listen, Use and Apply Logically Falacious By Bo Bennet For Thinking.

XXIII.Listen, Use and Apply Meaning and Argument by Ernest Lepore For Thinking.

XXIV.Listen, Use and Apply Common Fallacy by Philip Ward For Thinking.

XXV.Listen, Use and Apply Modal Logic by Brian Chellas For Thinking.

- Use Socratic Logic and Introduction to Logic for Thinking.
- Basic Concepts and Terms and Words.
- Language and definition.
- Informal Fallacies.
- Sentences, proposition, judgements.
- Immediate inference.
- Conversion.
- Observion.
- Contraposition.
- Contradition.
- Burden of Proof.
- Syntax.
- Categorical Propositions.
- Categorical Syllogism.
- Propositional Logic.
- Natural Deduction in Propositional Logic.
- Predicate Logic.
- Analogy and Legal and Moral Reasoning.
- Causality and Mill's Reasoning.
- Probability.
- Statistical Reasoning.
- Hypothetical Scientific Reasoning.

- **Science and Superstition.**

E. Mathematical Mental Model.

- I. Listen, Use and Apply How Not To Be Wrong, Mathematical Thinking by Jordan Ellenberg For Thinking.
- II. Listen, Use and Apply Advanced Engineering Mathematics By Erwin Kreyszig For Thinking.
- III. Listen, Use and Apply Basic Mathematics By Tussy For Thinking.
- IV. Listen, Use and Apply Calculus By Anton BAivens For Thinking.
- V. Listen, Use and Apply Calculus 1-2 By Patrick MJT For Thinking.
- VI. Listen, Use and Apply Fundamental of Mathematics Differential Calculus by Sanjay Mishra For Thinking.
- VII. Listen, Use and Apply Handbook of Mathematical by Milton Abramowitz For Thinking.
- VIII. Listen, Use and Apply Higher Engineering Mathematic by John Bird For Thinking.
- IX. Listen, Use and Apply Mathematics For Economics and Business by Ian Jacques For Thinking.

F. Thinking Like Mental Tools.

- I. How to Think Like a Mathematician.**
- II. How to Think Like Einstein_ Simple Ways to Break the Rules and Discover Your Hidden Genius.**
- III. How to Think Like Leonardo da Vinci.**
- IV. Think Like a Futurist_ Know What Changes, What Doesn't, and What's Next.**
- V. Think Like an Engineer_ Use systematic thinking to solve everyday challenges & unlock the inherent values in them.**
- VI. Think Like an Entrepreneur, Act Like a CEO.**
- VII. How Successful People Think_ Change Your Thinking, Change Your Life.**
- VIII. How Professors Think.**
- IX. Learning To Think Like Lawyer.**
- X. Mastermind_ How to Think Like Sherlock Holmes.**
- XI. How to Think Like Scientist.**
- XII. How Doctors Think.**
- XIII. How to Think Like Bill Gates.**
- XIV. How to Think Like Sherlock.**
- XV. How to think like Leonardo Da Vinci _ seven steps to genius every day.**
- XVI. Think Like A Lawyer.**
- XVII. Act Like a Leader, Think Like a Leader.**
- XVIII. How not to be wrong. The power of mathematical thinking .**
- XIX.**

G. Thinking System Mental Tools.

- I. Deep Thinking_ What Mathematics Can Teach Us About the Mind.**
- II. Deep Thinking_ Where Machine Intelligence Ends and Human Creativity Begins.**
- III. Design Thinking Research_ Making Design Thinking Foundational.**
- IV. Design thinking_ integrating innovation, customer experience and brand value.**
- V. Design Thinking_ Understand – Improve – Apply.**
- VI. Super Thinking.**
- VII. Debugging by Thinking.**
- VIII. Scientific Thinking.**
- IX. Scientific-writing-thinking-in-words.**
- X. Strategic Thinking for Leaders, The Systems Thinking Approach.**
- XI. Strategic Thinking in Complex Problem Solving**
- XII. Strategic Thinking_ A Nine Step Approach to Strategy and Leadership for Managers and Marketers.**
- XIII. The Art Of Thinking In Systems_ Improve Your Logic, Think More Critically, And Use Proven Systems To Solve Your Problems - Strategic.**
- XIV. Think Strategically.**
- XV. Thinking Like Lawyer.**
- XVI. Thinking strategically _ the competitive edge in business, politics, and everyday life.**
- XVII. Thinking in Systems.**

H. Risk Management Mental Tools.

- I. The-essentials-of-risk-management.**
- II. COSO-ERM-Integrating-with-Strategy-and-Performance-Executive-Summary.**
- III. Advanced Financial Risk Management_ Tools and Techniques for Integrated Credit Risk and Interest Rate Risk Management.**
- IV. Compliance-Risk-Management-Appling-the-COSO-ERM-Framework.**
- V. COSO Enterprise Risk Management_ Establishing Effective Governance, Risk, and Compliance Processes.**
- VI. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VII. Credit Risk Management_ Basic Concepts_ financial risk components, rating analysis, models, economic and regulatory capital.**
- VIII. Enterprise Risk Management-Tools and Techniques for Implementation_Part II.**
- IX. Enterprise_risk_management.**
- X. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XI. Financial Risk Management_ A Practitioner's Guide to Managing Market and Credit Risk.**
- XII. Financial Risk Management_ Applications in Market, Credit, Asset and Liability.**
- XIII. Fundamentals of Enterprise Risk Management_ How Top Companies Assess Risk, Manage Exposure, and Seize.**
- XIV. Fundamentals of Risk Management_ Understanding, Evaluating and Implementing Effective Risk Management.**
- XV. Fundamentals of Risk Management_ Understanding, evaluating and implementing effective risk management.**
- XVI. Implementing Enterprise Risk Management.**
- XVII. Managing Operational Risk_ Practical Strategies to Identify and Mitigate Operational Risk within Financial Institutions.**
- XVIII. Principles of Risk Management and Insurance.**
- XIX. Quantitative Financial Risk Management.**
- XX. CFA Risk Management.**
- XXI. Risk Management_ Concepts and Guidance.**

XXII.Margin of Safety_ Risk-Averse Value Investing Strategies for the Thoughtful Investor.

XXIII.Value at Risk_ The New Benchmark for Managing Financial Risk.

XXIV.The Oxford Guide to Financial Modelling Applications for Capital Markets, Corporate Finance, Risk Management and Financial.

I. Economic Mental Tool.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Economics.**
- III. Economics for Investment Decision Makers_ Micro, Macro, and International Economics.**
- IV. Economics.**
- V. Intermediate Microeconomics.**
- VI. Microeconomics.**
- VII. Microeconomic Analysis.**
- VIII. Modern Macroeconomics.**
- IX. Macroeconomics, 7th.**
- X. Macroeconomics [9th Edition].**
- XI. Macroeconomic theory_ a textbook on macroeconomic knowledge and analysis.**
- XII. Macroeconomic Theory_ A Dynamic General Equilibrium Approach.**
- XIII. Foundations of modern macroeconomics exercise and solutions manual.**

J. Pareto Principle

- I. Eat That Frog.**
- II. The 80 20 principle.**
- III. 80/20 sales and marketing.**
- IV. Pareto's 80 20 Rule for Corporate Accountants.**
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.**

K. Statistics Mental Tools.

- I. Applied Statistics and Probability for Engineers.**
- II. Basic Business Statistics.**

L. Biblical Thinking Mental Tool.

- I. Think Biblically!_ Recovering a Christian Worldview.**

M. Econometric Mental Tools,

- I. Econometrics**
- II. Econometric Analysis.**
- III. Palgrave Handbook of Econometrics_ Volume 2_ Applied Econometrics.**
- IV. Introductory econometrics. A modern approach.**
- V. Introductory Econometrics.**
- VI. Introductory Econometrics_ A Modern Approach.**
- VII. Handbook of Financial Econometrics and Statistics.**
- VIII. Econometrics for Financial Applications.**
- IX. Econometrics For Dummies.**
- X. Econometric Analysis of Cross Section and Panel Data.**
- XI. Econometric Analysis.**
- XII. Basic econometrics._ Student solutions manual for use with Basic econometrics.**
- XIII. Basic Econometrics.**

N. Investment Mental Model.

- I. Benjamin Graham_ The Intelligent Investor.**
- II. Common Sense Investing.**
- III. Common Sense on Mutual Funds.**
- IV. Complete_guide_to_money.**
- V. Derivatives, options by Hull.**
- VI. The Basics of Finance_ An Introduction to Financial Markets, Business Finance, and Portfolio Management.**
- VII. The Financial Peace Planner_ A Step-By-Step Guide to Restoring Your Family's Financial Health.**
- VIII. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Return.**
- IX. The Little Book of Common Sense Investing_ The Only Way to Guarantee Your Fair Share of Stock Market Returns.**
- X. The Total Money Makeover_ A Proven Plan for Financial Fitness.**
- XI. The-Richest-Man-In-Babylon.**
- XII. Thou Shall Prosper_ Ten Commandments for Making Money.**
- XIII. Valuation Techniques_ Discounted Cash Flow, Earnings Quality, Measures of Value Added.**
- XIV. Warren Buffett and the Interpretation of Financial Statements.**
- XV. Why Didn't They Teach Me This in School__ 99 Personal Money Management Principles to Live.**
- XVI. The Little Book of Valuation_ How to Value a Company, Pick a Stock and Profit.**
- XVII. The Intelligent Investor.**
- XVIII. The Attacker's Advantage_ Turning Uncertainty into Breakthrough Opportunities.**
- XIX. Competitive advantage_ creating and sustaining superior performance _ with a new introduction .**
- XX. Competitive Advantage of Nations.**
- XXI. Fundamental_&_Technical Analysis_Manual.**

O. Corporate Finance.

- I. CORPORATE FINANCE An Introduction.**

P. Biology.

- I. Developmental Biology.**
- II. Encyclopedia of Biology.**
- III. Encyclopedia of evolutionary biology.**
- IV. Encyclopedia of Molecular Cell Biology and Molecular Medicine.**
- V. Human Embryology and Developmental Biology.**
- VI. Introduction to the Biology of Marine Life**
- VII. The Encyclopedia Of Molecular Biology.**

Q. Physics.

- I. College Physics - Physics and Astronomy.**
- II. Encyclopedia of applied physics.**
- III. Fundamentals of Physics Textbook.**
- IV. Modern classical physics_ optics, fluids, plasmas, elasticity, relativity, and statistical physics.**
- V. Physics for Scientists & Engineers & Modern Physics.**

R. Chemistry.

- I. Physical_chemistry.**
- II. Encyclopedia of Analytical Chemistry_ Applications, Theory, and Instrumentation.**
- III. March's Advanced Organic Chemistry_ Reactions, Mechanisms, and Structure.**
- IV. Organic Chemistry.**
- V. Ullmann's Encyclopedia of Industrial.**

S. Engineering.

- I. Encyclopedia of Automotive Engineering.**
- II. Encyclopedia of Information Science and Technology.**
- III. Encyclopedia of RF and Microwave Engineering.**
- IV. Encyclopedia-Environmental-Science.**
- V. Wiley Encyclopedia of Biomedical Engineering, 6-Volume Set.**
- VI. Encyclopedia of Aerospace Engineering.**

T. Psychology.

- I. Handbook of Psychology Volume 1-12.**
- II. Encyclopedia of Psychology.**

U. Philosophy.

- I. Routledge Encyclopedia of Philosophy.**
- II. Stanford Encyclopedia of Philosophy.**

V. Strategem.

- I. Treasons, Strategems and Spoils.**
- II. 36 Strategems.**
- III. The 36 Strategies of the Chinese: Can It Be a Eurasian Strategic Model in a Global Context?**
- IV. Stratagem, deception and surprise in war.**
- V. THE 36 CHINESE STRATEGIES APPLIED TO NEGOTIATION.**
- VI. Stratagem and spoils.**
- VII. STRATAGEM Deception and Surprise in War.**
- VIII. Secrecy and stratagem understanding Chinese strategic culture.**
- IX. Chinese Stratagem and Chinese Business Negotiating Behaviour: An Introduction.**
- X. The Thirty-Six Strategies of Ancient China.**

- 7. Step 7-Getting familiar:** At this starting point, users decide if they can use an existing mental model (maybe one used for another similar product) or if they need to start from scratch. The existing mental model may be void of useful knowledge or worse, contain the wrong knowledge. The core components missing at this stage include an understanding of the language the product uses and the actionable steps needed to complete core tasks.
- 8. Step 8-Apply simple criteria to which mental models you use.** When selecting mental models to include into your own latticework, consider whether they support you to better understand yourself and/or the world around you, so you might better effective and impactful action. Also Mental models do two things: they help you assess how things work and they help you make better decisions. Ask some Questions:
 - I. How long has this model been around?** As a general rule, mental models which have been around for a long time (such as Occam's razor) will have been subjected to a great deal of scrutiny. Time is an excellent curator, trimming away inefficient ideas. A mental model which is new may not be particularly refined or versatile. Many of our mental models originate from Ancient Greece and Rome, meaning they have to be functional to have survived this long.
 - II. Is it a representation of reality?** In other words, does it reflect the real world? Or is it based on abstractions?
 - III. Does this model apply to multiple areas?** The more elastic a model is, the more valuable it is to learn about. (Of course, be careful not to apply the model where it doesn't belong. Mind Feynman: "You must not fool yourself, and you're the easiest person to fool.")
 - IV. How did this model originate?** Many mental models arise from scientific or mathematical concepts. The more fundamental the domain, the more likely the model is to be true and lasting.
 - V. Is it based on first principles?** A first principle is a foundational concept which cannot be deduced from any other concept and must be known.
 - VI. Does it require infinite regress?** Infinite regress refers to something which is justified by principles, which themselves require justification by other principles. A model based on infinite regress is likely to

required extensive knowledge of a particular topic, and have minimal real-world application.

9. **Step 9- *Becoming proficient*:** Users begin to understand the language of the situation or text, especially if this language uses technical or unfamiliar vernacular. Understanding terminology and use of product language is one of the first building blocks that form the foundation of the model. This is also when users start to understand the step-by-step procedures required to perform basic operations to get some desired outcome. Here, they are usually learning the bread-and-butter operations of the product so they can receive enough value to motivate them to keep using it. Later, they will be able to build on this knowledge.
10. **Step 10- Make connections between mental models.** We need to know full context and not isolated facts. Rather than holding siloed mental models in your mind, consider how they interact, connect and complement one another.
11. **Step 11-Think, what light the mental model can bring on the situation, idea, text , speech etc.** Do I see the situation, idea, text, speech etc, in the new way? What new way can I see the situation? Does This Makes easier to make a decision in my life?
12. **Step 12- Think very carefully, if each chosen Mental model applicable to situation, idea, text, speech etc.**
13. **Step 13-Use the Chosen Mental Models tool.** The canvas, below, will help you to identify high-value areas where new mental models can make the biggest impact on your work and life. It also provides a simple framework to begin to embed using your chosen models.
14. **Step 14-*Mastering*:** Users build on the core step-by-step tasks they already know, expanding their knowledge to more complex or niche capabilities. If they make it this far they most likely have an accurate understanding of most or all of the language the product uses.
15. **Step 15-Regularly reassess their priorities without fear of changing them.** They don't fall prey to inertia.
16. **Step 16-Be biased toward taking action—not lazily deferring.** If they encounter a mental model they value, they make sure they use it.
17. **Step 17-Be always looking to prove yourselves wrong.** Ego should not get in the way of mental models.

18. Step 18-Accepting that all models are wrong in certain instances is not a license to ignore the facts. As a society, we should search for better answers, look for evidence, and strive to increase the accuracy of our knowledge.

- I. That's not to say all lenses (or models) apply to all problems. They don't. And it's not to say that having more lenses (or models) will be a advantage in all problems. It won't. This is why learning and applying the Great Mental Models is a process that takes some work. But the truth is, most problems are multidimensional, and thus having more lenses often offers significant help with the problems we are facing.**
- II. The more you use them, the more you will be able to build the knowledge of indicators that can trigger the use of the most appropriate model. Using and failing, as long as you acknowledge, reflect, and learn from it, is also how you build your repertoire. You need to be deliberate about choosing the models you will use in a situation. As you use them, a great practice is to record and reflect. That way you can get better at both choosing models and applying them. Take the time to notice how you applied them, what the process was like, and what the results were. Over time you will develop your knowledge of which situations are best tackled through which models. Don't give up on a model if it doesn't help you right away. Learn more about it, and try to figure out exactly why it didn't work. It may be that you have to improve your understanding. Or there were aspects of the situation that you did not consider. Or that your focus was on the wrong variable.**

- 19. Step 19-After all Analysis, decide what models are the most suitable after all to apply.**
- 20. Step 20-Apply The Mental Model in Real Life or Reality, and let the world do the work for You.**

Step 144-Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**

Step 145-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding

Step 146 Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**
2. **Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.**
 - **First, he would learn everything he could about it and prepare physically as best as possible.**
 - **Once the physical prep was done, he'd take care of the mental prep with visualization.**
 - **Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.**
 - **Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.**
 - **Side note: visualization is great, but it's no substitute for preparation.**

Step 147-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
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6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
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circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
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- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
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- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 20: Deep Work and Performance

Step 148-Performance Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 18, before looking Performance.**
2. **Listen, Follow and Apply the following Books.**
 - A. Managing Employee Performance and Reward_ Concepts, Practices, Strategies.
 - B. Performance Management and Performance Measurement.
 - C. PERFORMANCE MANAGEMENT Performance management key strategies and practical.
 - D. PERFORMANCE MANAGEMENT Performance Management, A New Approach for Driving Business Results.
 - E. Execution_ The Discipline of Getting Things Done.
 - F. High Commitment High Performance_ How to Build A Resilient Organization for Sustained Advantage.
 - G. Key Performance Indicators (KPI) _ Developing, Implementing, and Using Winning KPIs.
 - H. Key Performance Indicators (KPI) The 75 measures every manager needs to know.
 - I. Key performance indicators for government and non profit agencies _ implementing winning KPIs.
 - J. Performance Management and Performance Measurement.
 - K. The Little Book of Big Management Theories_ ... and how to use them.

Step 149- Tiny Gains. Massive Results.

When we want to improve ourselves, we often pursue dramatic changes with little success. A better idea is to go for small, incremental improvements that add up over time.

Self-motivated, self-starting individuals are incredibly motivated to find their weaknesses. It's not far-fetched to say that some of us actually seek to make ourselves perfect — rational, calculating beings making the right type of decisions at just the right times. But we've learned from Star Trek; we don't look to eliminate emotion either and turn ourselves into Mr. Spock. We want *just the right amount* of emotion in our lives.

People often overestimate what they can accomplish in one year. But they greatly underestimate what they could accomplish in five years.

— Peter drucker

If we're night owls, we seek to become early risers. (Ben Franklin did it!). If we're procrastinators, we look to become doers. If we're always late to meetings, we look to be early to meetings. We want to eliminate our weaknesses and become a little More.

This is, of course, a laudable goal. But the self-starters among us have probably all run into the same problem: We don't actually follow through on the things we know will make us better. We don't eat the broccoli. We get a little too robotic. We get up at 8:30 when we said we'd do 5:30 from here on out. We leave that essay until the last second even though that was never going to happen again. We're five minutes late. We don't become lore at all, and the failure to get there makes us feel like less.

The culprit is the thought that any important change happens quickly. It doesn't matter whether you're trying to get up early or pick up and implement the Psychology of Human Misjudgment. Anything important happens slowly.

From Potential to Useful

And why should it be otherwise? If you were to truly understand, in-depth, and apply the *Psychology of Human Misjudgment* to your dealings, you'd be way far out ahead of your peers and your former self. The advantage of understanding human nature is incredible. But it takes deep, repeated study and a long gestation period to get there. It takes applying the ideas to the world, feeling them out, forgetting them, redoubling yourself, and trying again. Not giving up when you forget or fail. It is through the process of *refinement* that one learns new habits and ideas.

The visual mental model I like for self-improvement is imagining something like a Lathe.

A *lathe*, for the non-engineer, is a tool that molds a piece of material into some shapely form. A machinist would use a lathe to take a hunk of metal and turn it into a usable engine part, for example. The lathe takes something with *potential* and shapes it into something *useful* by slowly refining it and shaving away the excess.

Compounding works in other areas besides money.

The way I think about it, if I can get 5% wiser and better every year, then I will be about twice as wise as I am now in less than 15 years. (Go ahead, grab your calculators.) In less than 30 years, my return will be 4x. This is how the non-gifted among us can surpass otherwise more intelligent people.

Tiny Improvements, Massive Results

Tiny improvements add up to *massive* differences.

Compounding works in other areas besides money. And we want to compound worldly wisdom.

These little mental tricks like the Lathe and the idea of 5% yearly improvement are just ways to remind myself that I'm not going to wake up wiser/nicer/healthier/smarter tomorrow morning or the morning after. And just as importantly, if I backslide on a goal I've set or I forget something I thought I'd learned well, that it's really not the end of the world. I don't need to give up and call it hopeless. All I have to do is figure out where I slipped, re-double my efforts, and go after it again. All I need is 5% a year to become 4x better in my adult lifetime.

The truth is that whatever bad habits you have or whatever things you're struggling to learn, there's probably a good reason. Your biology and your experiences to date have set you in stone to a certain extent, and the older you are, the more likely that is to be true. The chains of habit are too light to be felt until they are too heavy to be broken. Billion-dollar industries have been built on convincing you that it's *easy* to make big changes or to get a lot wiser and better. But it honestly isn't. It's hard work.

Yet any study of great individuals reveals that the work is worth doing.

So just imagine if you could make slightly better decisions every year. Whether it's 5% better consideration of *all* of your decisions, or making 5% of your decisions differently, or some permutation thereof, it doesn't really matter. Every year you'll look back at some part of your old self and wonder how you could've been so dumb. And one day, in less than 30 years, you'll look back and see your old self as almost unrecognizably stupid.

What more could you ask for?

Step 150 - The Ultimate Deliberate Practice Guide: How to Be the Best

Everything You Need to Know to Improve Your Performance at Anything—For Beginners and Experts

Deliberate practice is the best technique for achieving expert performance in every field—including writing, teaching, sports, programming, music, medicine, therapy, chess, and business. But there's much more to deliberate practice than 10,000 hours. Read this to learn how to accelerate your learning, overcome the "OK" plateau, turn experience into expertise, and enhance your focus.

What is deliberate practice?

*"Engaged in the creative process we feel more alive than ever, because we are making something and not merely consuming, masters of the small reality we create. In doing this work, we are in fact creating ourselves." —Robert Greene, *Mastery**

Deliberate practice is what turns amateurs into professionals. Across every field, deliberate practice is what creates top performers and what they use to stay at the top of their game. It's absolutely essential for expert performance.

As a general concept, "practice" means preparing. It's the act of repeatedly performing certain activities with the intention of improving a specific associated skill. We rehearse what to do in low-pressure situations so we'll be better when we use a skill in situations where something is actually at stake, such as in a competition or in the workplace. Although this definition may seem obvious, it's crucial to distinguish between doing something and practicing it, because they're not always synonymous.

The key distinction between doing and practicing is that we're only practicing something when we do it in a way that makes us better at it—or at least with that intention.

Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them. Unlike regular practice, in which we work on a skill by repeating it again and again until it becomes almost mindless, deliberate practice is a laser-focused activity. It requires us to pay unwavering attention to what we're doing at any given moment and whether it's an improvement or not.

Geoff Colvin summarizes deliberate practice as such in *Talent Is Overrated*:

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

The extraordinary power of deliberate practice is that it aims at constant progress. Practitioners are not content with repeating a skill at the same level. They have metrics for measuring their performance. And they aspire to see those metrics get continuously better. While engaging in deliberate practice, we are always looking for errors or areas of weakness. Once we identify one, we establish a plan for improving it. If one approach doesn't work, we keep trying new ones until something does.

Using deliberate practice, we can overcome many limitations that we might view as fixed. We can go further than we might even think possible when we begin. Deliberate practice creates new physical and mental capabilities—it doesn't just leverage existing ones.

The more we engage in deliberate practice, the greater our capabilities become. Our minds and bodies are far more malleable than we usually realize.

Deliberate practice is a universal technique, and you can employ it for whatever you're trying to be the best (or just get a little bit better) at. It's easiest to apply to competitive fields with clear measurements and standards, including music, dance, football/soccer, cricket, hockey, basketball, golf, horse riding, swimming, and chess.

But deliberate practice is also invaluable for improving performance in fields such as teaching, nursing, surgery, therapy, programming, trading, and investing. It can even accelerate your progress in widely applicable skills such as writing, decision-making, leadership, studying, and spoken communication.

The key in any area is to identify objective standards for performance, study top performers, and then design practice activities reflecting what they do. Recent decades have seen dramatic leaps in what people are capable of doing in many fields. The explanation for this is that we're getting better at understanding and applying the principles of deliberate practice. As a field advances, people can learn from the best of what those who came before them figured out. The result is that now average high-schoolers achieve athletic feats and children advance to levels of musical prowess that would have seemed unthinkable a century earlier. And there's little evidence to suggest we've reached the limits of our physical or mental abilities in any area whatsoever.

Many of us spend a lot of time each week practicing different skills in our lives and work. But we don't automatically get better just because we repeat the same actions and

behaviors, even if we spend hours per day doing it. Research suggests that in areas such as medicine, people with many years of experience are often no better than novices—and may even be worse.

If we want to improve a skill, we need to know *what* exactly has to change and what might get us there. Otherwise, we plateau.

Some people will tell you it's only possible for anyone to improve at anything through deliberate practice, and any other sort of practice is a waste of time. This is an exaggeration. In reality, regular practice works for reinforcing and maintaining skills. It can also help us improve skills, particularly in the early stages of learning something. However, deliberate practice *is* the only way to:

1. Reach expert-level performance and enjoy competitive success
2. Overcome plateaus in our skill level
3. Improve at a skill much faster than through regular practice

If you're just doing something for fun and don't care about constantly improving at it, you don't need deliberate practice. For example, maybe you like to go for a walk around a local park in the afternoons to clear your head. Although you're practicing that walk each time you go, you probably don't care about increasing your walking speed day by day. It's enough that the repetitions further ingrain the habit and help maintain a certain level of physical fitness. Not everything in life is a competition! But if you want to keep getting better at something as fast as possible or reach an expert level, deliberate practice is vital. Another important point to note is that deliberate practice isn't just a catchy name we came up with out of thin air. The term is largely attributed to Karl Anders Ericsson, one of the most influential figures of all time in the field of performance psychology. It's something many scientists have studied for decades. Everything we say here is supported by substantial academic research, particularly Ericsson's work.

We'll also debunk the numerous myths swirling around deliberate practice as a concept and reveal some of its significant limitations. So if you're looking for quick hacks for overnight success, you might want to look elsewhere. If you want a realistic roadmap for improving your performance, read on.

The elements of deliberate practice

“Life is not always a matter of holding good cards, but sometimes, playing a poor hand well.” —Jack London

In this section, we'll break down the fundamental elements of deliberate practice and exactly how to incorporate them into your practice sessions. As Ericsson wrote in *Peak*, *“No matter what the field, the most effective approach to improving performance is to follow a single set of principles.”* We'll explain why each component is crucial and how they apply to different fields, and we'll cover multiple ways to implement them depending on your goals.

Deliberate practice is structured and methodical

“Everyone has talent. What's rare is the courage to follow it to the dark places where it leads.” —Erica Jong

As humans, we're wired to want to do the easiest thing at all times in order to conserve energy. Put more simply, it's in our nature to be lazy. When we practice something a lot, we develop habits that become almost effortless to enact. While that's beneficial in many areas of our lives (and helps us survive), it's something we have to overcome in order to engage in deliberate practice. We can't expect constant improvement if we keep repeating the elements of a skill we already know how to do with ease. That's only enough if we're just having fun or want to reinforce our habits.

Deliberate practice is structured to improve specific elements of a skill through defined techniques. Practitioners focus above all on what they *can't* do. They seek out areas of weaknesses impacting their overall performance, then target those. At every stage, they set tailored, measurable goals in order to gauge whether their practice is effective at moving them forwards. Numbers are a deliberate practitioner's best friend.

If you want to reach an expert level of performance, you need to begin practice sessions with a plan in mind. You need to know what you're working on, why, and how you intend to improve it. You also need a way to tell if your improvement efforts aren't working and if you need to try a new tactic. Once you reach your goal for that particular component of the skill, it's time to identify a new area of weakness to work on next.

Having lots of little, realistic goals with a game plan for achieving them makes deliberate practice motivating. There's a sense of ongoing movement, yet the next step is always a realistic stretch. Day by day, the gains from deliberate practice may feel modest. But when we look back over a longer period of time, small bits of progress compound into gigantic leaps.

How to implement this: Take the skill you're aiming to improve and break it down into the smallest possible component parts. Make a plan for working through them in a logical order, beginning with the fundamentals, then building upon them. Decide which parts you'd like to master over the next month. Put your practice sessions in your calendar, then plan precisely which parts of the skill you're going to work on during each session.

Don't expect your plan to be perfect. You'll likely need to keep modifying it as you discover new elements or unexpected weaknesses. The most important thing is to always go into practice with a plan for what you're working on and how. Knowing what you're doing next is the best way to stay on track and avoid aimless time-wasting. That means seeking to keep figuring out what separates you from the next level of performance so you can concentrate on that.

Deliberate practice is challenging and uncomfortable

"One must develop an instinct for what one can just barely achieve through one's greatest efforts." —Albert Einstein (attributed)

Imagine the world from the perspective of a baby learning to walk for the first time. It's not usually an easy process. They need to develop a lot of new skills and capabilities. They need to build enough muscular strength to stand upright without support. And they need to learn how to coordinate their limbs well enough to move around. Along the way, a baby needs to develop numerous sub-skills, such as how to grip supports to pull themselves up. It likely takes thousands of attempts to master walking—as well as numerous, falls, collisions, and other mishaps. We might not remember the process as adults, but a baby learning to walk needs to spend many hours challenging themselves and moving incrementally out of their comfort zone.

If we want to use deliberate practice, we could do with learning a thing or two from babies. Deliberate practice isn't necessarily fun while we're doing it. In fact, most of the time it's a process of repeated frustration and failure. We have to fall down a dozen times for every step we take. That's the whole point.

Seeing as deliberate practice requires us to keep targeting our weakest areas, it means spending time doing stuff we're not good at. In the moment, that can feel pretty miserable. But the quickest route to improvement involves stepping outside of our comfort zones.

The reason why people who have spent decades doing something are not necessarily better than newbies is that they're liable to get complacent and stop pushing themselves. We need to keep attempting to do things that feel out of reach at the moment.

In his studies of elite violinists, Ericsson asked them to rate different practice activities by how enjoyable they were and how much they contributed to improving performance. Invariably, there was an inverse correlation between the usefulness of an activity and its enjoyability. As Ericsson puts it in *Peak*:

The reason that most people don't possess these extraordinary physical capabilities isn't because they don't have the capacity for them, but rather because they're satisfied to live in the comfortable rut of homeostasis and never do the work that is required to get out of it. They live in the world of "good enough." The same thing is true for all the mental activities we engage in.

Elsewhere in the book, he writes “*This is a fundamental truth about any sort of practice: If you never push yourself beyond your comfort zone, you will never improve.*” The interesting part is the more time you spend deliberately practicing, the more comfortable you'll become with being uncomfortable.

Daniel Coyle writes in *The Little Book of Talent*:

There is a place, right on the edge of your ability, where you learn best and fastest. It's called the sweet spot....The underlying pattern is the same: Seek out ways to stretch yourself. Play on the edges of your competence. As Albert Einstein said, "One must develop an instinct for what one can just barely achieve through one's greatest efforts."

The key word is 'barely.'

A quick way to assess if you're doing deliberate practice or just regular rote practice is to ask yourself if you ever feel bored or zone out during practice sessions. If the answer is yes, you're probably not practicing deliberately.

Deliberate practice isn't boring. Frustrating, yes. Maddening, yes. Annoying, even. But never boring. As soon as practicing a skill gets comfortable, it's time to up the stakes. Challenging yourself is about more than trying to work harder—it means doing new things. Pushing ourselves just beyond the limits of our abilities is uncomfortable, yet it's how we do our best—and indeed, it can be the source of some of our greatest moments of satisfaction. According to psychologist Mihaly Csikszentmihalyi, we often experience happiness as a result of entering a “flow” state, which occurs when we intensely focus on an activity that is challenging yet achievable. During moments of flow, we become so immersed in the activity that we lose any sense of time or of ourselves.

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time when we're practicing, we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed, as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of our reach.

Repetition inside the comfort zone does not equal deliberate practice. Deliberate practice requires that you operate in the learning zone and you repeat the activity a lot with feedback.

How to implement this: Each time you practice a component of a skill, aim to make it 10% harder than the level you find comfortable.

Once per month, have a practice session where you set yourself an incredibly ambitious stretch goal—not impossible, just well above your current level. Challenge yourself to see how close you can get to it. You might surprise yourself and find you perform far better than expected.

A common deliberate practice mistake is to plan a long practice session, then adjust the intensity of your practice to allow you to engage in a skill for the whole time. It's far more effective to engage in "sprints." Practice with the most intense focus you can manage for short periods of time, then take breaks. Seeing as you learn most when you stretch yourself beyond your current capabilities, shorter, more challenging practice periods are the way to go.

Deliberate practice requires rest and recovery time

"There is a time for many words, and there is also a time for sleep." —Homer, *The Odyssey*

Seeing as deliberate practice is so challenging, it's impossible to do it all day long. Across fields, top practitioners rarely spend more than around three to five hours per day on deliberate practice, at the high end. They may work for more hours than that per day, but few can sustain the mental energy to engage in deliberate practice for eight hours a day. Additional hours often result in diminishing negative returns, meaning more practice makes performance worse because it results in burnout. Geoff Colvin writes:

The work is so great that it seems no one can sustain it for very long. A finding that is remarkably consistent across disciplines is that four or five hours a day seems to be the upper limit of deliberate practice, and this is frequently accomplished in sessions lasting no more than an hour to ninety minutes.

Ericsson's studies of elite violinists found they often took afternoon naps and slept an average of eight hours per night, considerably more than the average person. They were highly aware of the importance of sleep.

Even fitting in a single hour per day of deliberate practice is ample time to make substantial improvements, especially when we're consistent with committing to it over the long haul. Continuous investments in success compound. In the long run, commitment pays off.

Not only do most deliberate practitioners not spend all day at it, they also devote a lot of time to recuperation and recovery. They sleep as much as their bodies need. They nap if necessary. They take frequent, refreshing breaks. Most of us understand that rest is necessary after physical activity. But we can underestimate its importance after mental activity, too. Deliberate practice needs to be sustainable for the long term. How long a person keeps at a skill is often far more important than how many hours a day they spend on it.

When you're practicing deliberately, truly practice. When you're recuperating, truly relax. No one can spend every waking hour on deliberate practice.

Sleep is a vital part of deliberate practice. Being asleep doesn't mean you're not still improving your skill. We consolidate memories at night, moving them from short-term to long-term memory. And we can't exactly benefit from deliberate practice sessions if we don't remember what we learn each time. Not only that, but sleep deprivation also results in a plethora of negative cognitive effects that impact performance. If we skimp on sleep, we're likely to forget far more of what we learn during deliberate practice sessions, rendering them less useful.

When you're not engaging in deliberate practice, your brain is still at work. During deliberate practice, we're in focused mode. When we let our minds wander freely while at rest, we're in diffuse mode. Although that time feels less productive, it's when we form connections and mull over problems. Both modes of thinking are equally valuable, but it's the harmony between them that matters. We can't maintain the effort of the focused mode for long. At some point, we need to relax and slip into the diffuse mode. Learning a complex skill—a language, a musical instrument, chess, a mental model—requires both modes to work together. We master the details in focused mode, then comprehend how everything fits together in diffuse mode. It's about combining creativity with execution.

How to implement this: Make a list of activities you can engage in without too much conscious thought, letting yourself daydream while you do them. Common examples include going for a walk, washing the dishes, taking a shower, free-writing in a journal,

playing with a toy like Lego, driving a familiar route, gardening, cooking, listening to music, or just gazing out the window. When you feel yourself getting tired or hitting a roadblock during deliberate practice, don't keep pushing for too long. You want to be stretching yourself, not exhausting yourself. Instead, switch to one of those more relaxing activities for at least five minutes. You'll likely come back to practice with new connections or at last feeling refreshed.

Deliberate practice involves constant feedback and measurement

"Deliberate practice is hard. It hurts. But it works. More of it equals better performance and tons of it equals great performance." —Geoff Colvin, *Talent Is Overrated*

Practicing something without knowing whether you are getting better is pointless. Yet that is what most of us do every day without thinking.

As we saw before, deliberate practice involves continuously stretching yourself to improve on weak areas of a skill. For that to work, practitioners require constant feedback about their current level of performance so they can identify what works for making it better.

What gets measured gets managed. To engage in deliberate practice, you need a way of measuring the most instructive metrics related to your performance. Seeing how those metrics change is the sole way to know if practice is working or not. Top performers across fields tend to spend time examining their past performance with care to identify areas for improvement. For example, a tennis player might film themselves playing a match so they can go through the footage frame by frame afterward. This provides valuable feedback, because they can figure out what might have held them back during weaker moments.

In fields such as sports and chess, measuring performance tends to be straightforward. In other areas such as business, measurements are harder to take, and there may be no established markers of success. The influence of random factors may also be stronger, making it less clear whether technique changes are actually having an influence or not. When you engage in deliberate practice, it's always important to be aware of how strongly correlated your practice and your performance are likely to be.

When measuring your performance, beware of vanity metrics. These are numbers that are easy to calculate and feel good to boost. But they don't actually move the needle towards the real improvements in performance that help you reach your goals. For example, let's say you're using deliberate practice to improve the skill of email marketing, as part of the wider goal of getting more customers for your business. The number of email subscribers is a vanity metric; the number of paying customers is a useful metric. It's completely possible to increase the former without a corresponding increase in the latter.

How to implement this: Identify the most significant metrics related to performance in your chosen skill and keep a record of them each time you practice. It's easy to fool yourself without a clear record of how you're doing. You might want to break the skill down into a few different parts to measure it, but make sure you're not fixating on vanity metrics.

Deliberate practice is most effective with the help of a coach or some kind of teacher

"The best teacher is not the one who knows most but the one who is most capable of reducing knowledge to that simple compound of the obvious and wonderful." —H.L. Mencken (attributed)

Deliberate practice is most effective when conducted with some kind of coach who can give feedback, point out errors, suggest techniques for improvement, and provide vital motivation. Although mastering any skill requires a lot of time engaging in solitary practice, working with a coach at least some of the time is incredibly valuable. In some fields such as sports and music, it's common for a coach to be present all of the time. But most top performers benefit from a combination of coaching and solitary practice.

When we look at the lives of people who achieved great things, we often find that those who did so at a young age or in a shorter time than expected benefited from having fantastic teachers. For example, physicist Werner Heisenberg had the epiphany that led to the formulation of matrix mechanics a mere five years after commencing serious study of physics. But he no doubt benefited from the mentorship of Niels Bohr and Max Born, two of the foremost physicists at the time.

Even people at the most elite levels of performance across fields can benefit from specialist coaching. Engaging in something and teaching that thing are separate skills in themselves. The best practitioners are not always the best teachers because teaching is a skill in itself.

Ericsson explained that *"the best way to get past any barrier is to come at it from a different direction, which is one reason it is useful to work with a teacher or coach."* We often make the same mistakes again and again because we simply don't realize what we're doing. Our performance falls into ruts and we can't figure out why we're running into the same problem yet again.

A coach can see your performance from the outside, without the influence of overconfidence and other biases. They can identify your blind spots. They can help you interpret key metrics and feedback.

Ericsson went on to say that *"even the most motivated and intelligent student will advance more quickly under the tutelage of someone who knows the best order in which to learn things, who understands and can demonstrate the proper way to perform various skills,*

who can provide useful feedback, and who can devise practice activities designed to overcome particular weaknesses.” An experienced coach will have worked with many people on the same skill so they’ll be able to advise on the best ways to structure practice. They’ll know when you’re just repeating what you find easy, and they’ll be able to push you to the next level.

Teachers or coaches see what you miss and make you aware of where you’re falling short. Geoff Colvin writes:

In some fields, especially intellectual ones such as the arts, sciences, and business, people may eventually become skilled enough to design their own practice. But anyone who thinks they’ve outgrown the benefits of a teacher’s help should at least question that view. There’s a reason why the world’s best golfers still go to teachers.

But what if you don’t have access to a coach? What if you don’t have the means to hire one or one isn’t available for your particular skill? In that case, it’s still possible to apply the same principles that make a coach useful by yourself. Top performers across fields build the skill of metacognition, essentially making it possible for them to coach themselves. Colvin explains:

The best performers observe themselves closely. They are in effect able to step outside themselves, monitor what is happening in their own minds, and ask how it’s going. Researchers call this metacognition—knowledge about your own knowledge, thinking about your own thinking. Top performers do this much more systematically than others do; it’s an established part of their routine.

...A critical part of self-evaluation is deciding what caused those errors. Average performers believe their errors were caused by factors outside their control: my opponent got lucky; the task was too hard; I just don’t have the natural ability for this. Top performers, by contrast, believe they are responsible for their errors. Note that this is not just a difference of personality or attitude. Recall that the best performers have set highly specific, technique-based goals and strategies for themselves; they have thought through exactly how they intend to achieve what they want. So when something doesn’t work, they can relate the failure to specific elements of their performance that may have misfired.

How to implement this: Don’t expect the same teacher to suit you forever. We usually need different teachers as our skill level progresses because we outgrow them. One attribute of a good teacher is that they know when to tell a student to move on. As we reach expert levels of performance, we need teachers who are themselves experts. If they’re always a step ahead, we can learn from their mistakes instead of making our own.

You get the best results from working with a coach if you show yourself to be receptive to constructive criticism, even if it's uncomfortable to hear. If you respond badly, you disincentivize them from telling you what's most useful to know. Top performers know the goal is to get better, not just to hear you're already great.

Deliberate practice requires intrinsic motivation

Persisting with deliberate practice despite its innate difficulty and discomfort requires a lot of motivation. But that motivation needs to be intrinsic, meaning that it comes from inside us because we find an activity enjoyable for its own sake. This is in contrast to extrinsic motivation, where we participate in an activity to gain an external reward or avoid a negative consequence. Yet another reason why rest is important for deliberate practice is because it helps sustain motivation.

Although deliberate practice can lead to external rewards for using a skill (such as winning a competition or getting a promotion), this should not be the sole reason for practicing it. Extrinsic motivation is unlikely to be enough to get us through the long period of struggle necessary to master a skill. Becoming proficient at anything means spending time failing repeatedly at it, during which there are few external rewards. But if we enjoy getting better for its own sake, we have more of a chance of persevering until our practice starts paying off. We can navigate obstacles because we want to see where the road might take us—the obstacles aren't roadblocks.

If you want to use deliberate practice to master a skill, you need to be willing to keep practicing it no matter what. Although brute force and rewarding yourself can be effective in the short run, it won't work forever. If you're planning to engage in deliberate practice to reach expert-level performance, make sure it's a prospect you feel excited about even if it won't always be fun.

Extrinsic motivation isn't always ineffective, however. People who engage in consistent, sustainable deliberate practice tend to be adept at knowing when and how they need to employ external incentives. It's important to reward yourself when you make progress in your practice and reflect on how far you've come, not just how far is left to go.

The need for intrinsic motivation is one reason why children who are pushed to develop a skill from a young age by their parents don't always end up reaching a high level of performance and often quit as soon as they can.

How to implement this: Make a list of the reasons you want to work on a skill and the benefits getting better at it might bring. Before you begin a deep practice session, reread the list to remind you of why you're bringing your full focus to something difficult. You could

also list some of the benefits you've experienced from it in the past or include quotes from top performers in your field you find inspiring. It might feel cheesy, but it can provide a powerful boost during particularly difficult practice moments. Try to focus on intrinsic reasons and benefits, such as feeling fulfilled.

Keep a "motivation diary" for one week (or longer if possible.) Try setting an alarm to go off every fifteen minutes during each practice session. When the alarm sounds, score your motivation level out of ten (or whichever scale you prefer.) At the end of the week, review your notes to look for any patterns. For example, you might find that you begin to feel demotivated once you've been practicing for more than an hour, or that you feel more motivated in the morning, or some other pattern. This information could be enlightening for planning future deliberate practice sessions, even if it may disrupt your focus at the time. Another method is to simply take notes each day, documenting your current level of motivation to work on your chosen skill. Pay attention to any recurring influences. For example, you might feel more motivated to improve your skill after speaking with a more proficient friend, but less motivated after a bad night's sleep.

One potent option for sustaining motivation is to find someone who can be a reliable cheerleader for you. In an Ask Me Anything session for [Farnam Street members](#), Tesla co-founder Marc Tarpenning explained that having a cofounder is vital for entrepreneurs because partnering with someone else helps sustain motivation. It's rare that both founders feel demotivated on the same day. So if one is struggling, the other can provide the encouragement needed to stay resilient. Having someone to provide extrinsic motivation when you need it can help you persevere at deliberate practice. Your cheerleader doesn't necessarily need to be working on the same skill themselves. They just need to understand your reasons and be willing to remind you of them when you start to doubt whether the hard work is worthwhile.

Deliberate practice takes time and can be a lifelong process

Although deliberate practice tends to result in much faster progress than normal practice, truly mastering a skill is a lifelong process. Reaching the top of a field can take years or even decades, depending on its competitiveness. As the bar for success in many areas keeps rising, more deliberate practice is required to stand out.

When we applaud the top people in any field, we often fail to appreciate that their success almost always came after many years of deliberate practice, which Robert Greene refers to in *Mastery* as "*a largely self-directed apprenticeship that lasts some five to ten years [and] receives little attention because it does not contain stories of great achievement or discovery.*" They may have ultimately benefited from a lucky break, but their extensive

preparation meant they were ready for it. Great achievements tend to come later in life or even near the ends of careers. Those who succeeded young started very young.

Throughout Ericsson's decades of research, he searched high and low for an example of a true prodigy: someone born with an innate, remarkable talent. He never found a single proven example. Instead, he discovered that people labeled as prodigies invariably put in enormous amounts of deliberate practice—they just often obscured it on purpose or started at a young age.

Although innate differences count when beginning to learn something (and people who begin with advantages may be more likely to persist), in the long run, deliberate practice always wins out.

David Shenk writes in *The Genius in All of Us*: “*Short-term intensity cannot replace long-term commitment. Many crucial changes take place over long periods of time. Physiologically, it's impossible to become great overnight.*”

According to psychologist John Hayes, creative genius tends to come after ten years of studying relevant knowledge and developing skills. Hayes referred to this as the “ten years of silence.” In a study of seventy-six composers with sufficient biographical data available listed in *The Lives of the Great Composers*, Hayes found they almost always created their first notable works (defined as being those for which at least five different recordings were available at the time) at least ten years after commencing a serious study of music. Just three of the five hundred works Hayes included in his sample were composed after less than a decade of preparation—and those were produced in years eight or nine. In additional studies, Hayes found similar patterns for painters and poets.

Later research reinforces Hayes' findings, and any casual survey of the lives of people widely considered to be geniuses tends to show a similar pattern. Making a breakthrough takes time. When it seems like someone was an overnight success, there's almost always a long period of silent deliberate practice preceding it. Innate talents are just a starting point. If we want to master a skill, we need to commit to working on it for a lengthy period of time, likely with few rewards. While there are no assurances that with struggle comes reward, without it the odds are lower.

Not only do world-class performers spend a long time getting good at their core skill, those in creative fields tend to produce an enormous quantity of work before gaining recognition. For every piece of work we're familiar with, there are likely dozens or even hundreds of others few people remember or ever saw.

For example, British prime minister Winston Churchill was known for his masterful public speaking. One of his best-known speeches “We Shall Fight on the Beaches,” given in

June 1940, displayed the extent of his command of oration and helped build morale at the time. But it's hard to overstate how prolific Churchill was as a speaker, giving an estimated 3,000 speeches during his political career. For every speech—an average of one per week between 1900 and 1955—he used deliberate practice to prepare. He engaged in focused rehearsals in front of a mirror, taking notes as he went to inform modifications. Churchill also left nothing to chance, planning his pauses and movements in advance. As well as devising his own techniques for added impact, he memorized the works of some of history's most inspiring orators.

Although he doubtless began with a degree of innate talent (his father, Randolph Churchill, was also an admired orator), Churchill clearly used extensive deliberate practice to build upon it. While this impressive resume and history solidified his place on the throne of oratorical excellence, it's important to note that he wasn't a "born speaker"—in fact, he made many mistakes. And he learned from them. If you want to produce a masterpiece, you need to accept that you'll make a lot of less remarkable work first.

Deliberate practice requires intense focus

"You seldom improve much without giving the task your full attention." —Karl Anders Ericsson

The deeper we focus during deliberate practice sessions, the more we get out of them. Intense focus allows us to increase skills and break through plateaus. Developing your attention span can have a huge impact on your life. When asked about his success, Charlie Munger once said, *"I succeeded because I have a long attention span."*

The authors of *The Game Before the Game* write, *"If you can pay attention for only five minutes in practice, then take a break every five minutes. If you can pay attention for only twenty balls, don't hit fifty. To be able to practice longer and maintain the quality of the practice, train yourself to pay attention for longer periods of time....Productive practice is about how present you can stay with your intention and is measured in the quality of the experience as opposed to the quantity of time used."*

A benefit of getting constant feedback is that it shows you what moves the needle towards improved performance and what is just running in place. Certain practice activities can feel good without having any impact. Top performers prioritize knowing what to prioritize. They always start with the most important thing because anything else is a distraction.

Intense focus is a multiplier of everything else. Keeping an eye on key metrics enables top performers to identify and systematically remove distractions from their lives. To be the best, you need to focus on both the micro and macro level. You need to pay full attention to what you're doing in the current practice sessions, and you need to know how it fits into

the bigger picture of your desired trajectory. Deliberate practice is part of the exploit phase of selecting opportunities.

As the authors of the *International Handbook of Research in Professional and Practice-Based Learning* write, “*Practicing the right things is at the core of the theory of deliberate practice.*”

How to implement this: Put the big rocks in first. You can do anything, but you can’t do everything. Figure out which practice activities have the biggest influence on your performance and plan to engage in those first before you even consider activities that offer marginal gains.

Deliberate practice leverages the spacing effect

One reason why consistent deliberate practice sessions over the course of years are more effective than longer sessions for a shorter period of time relates to the spacing effect. We can’t approach learning a skill through deliberate practice in the same way we quite likely approached studying for tests in school. If we better understand how our minds work, we can use them in the optimal way for learning. By leveraging the spacing effect, we can encode valuable knowledge related to our particular skill for life during practice sessions.

Memory mastery comes from repeated exposure to the same material. The spacing effect refers to how we are better able to recall information and concepts if we learn them in multiple sessions with increasingly large intervals between them. The most effective way to learn new information is through spaced repetition. It works for learning almost anything, and research has provided robust evidence of its efficacy for people of all ages—and even for animals.

Spaced repetition is also satisfying because it keeps us on the edge of our abilities (which, as we saw earlier, is a core element of deliberate practice.) Spaced sessions allow us to invest less total time to memorize than one single session, whereas we might get bored while going over the same material again and again in a single session. Of course, when we’re bored we pay less and less attention. The authors of *Focused Determination* put it this way:

There is also minimal variation in the way the material is presented to the brain when it is repeatedly visited over a short time. This tends to decrease our learning. In contrast, when repetition learning takes place over a longer period, it is more likely that the materials are presented differently. We have to retrieve the previously learned information from memory and hence reinforce it. All of this leads us to become more interested in the content and therefore more receptive to learning it.

We simply cannot practice something once and expect it to stick.

By engaging in deliberate practice on a regular basis, even if each practice session is short, we leverage the power of the spacing effect. Once we learn something through spaced repetition, it actually sticks with us. After a certain point, we may only need to revisit it every few years to keep our knowledge fresh. Even if we seem to forget something between repetitions, it later proves easier to relearn.

How to implement this: Forget about cramming. Each time you're learning a new component of a skill, make a schedule for when you'll review it. Typical systems involve going over information after an hour, then a day, then every other day, then weekly, then fortnightly, then monthly, then every six months, then yearly. Guess correctly and the information moves to the next level and is reviewed less often. Guess incorrectly and it moves down a level and is reviewed more often.

The history of deliberate practice

Karl Anders Ericsson: The expert on expertise

"Learning isn't a way of reaching one's potential but rather a way of developing it." —Karl Anders Ericsson, *Peak*

The concept of deliberate practice is attributed to Florida State University psychologist Karl Anders Ericsson, who along with his collaborators performed pioneering research in the field of expert performance. Ericsson spent decades seeking to answer the question of what it takes to become really good at something difficult. His research often focused on medicine, music, and sports.

Ericsson's interest in expert performance kicked off in the late 1970s, when he began working with psychologist Bill Chase at Carnegie Mellon University to study short-term memory. Together, they began a series of experiments to see how many random digits it's possible to memorize after hearing them once. Ericsson and Chase used an undergrad named Steve Faloon as their guinea pig. For a few hours each week, they read out numbers and Faloon repeated as many as he could recall.

Although the experiment might sound dull, they uncovered something intriguing. In a 1982 paper entitled "Exceptional Memory," Ericsson and Chase summarized their findings. Previously, researchers believed the average person could hold just seven random digits in their short-term memory. Yet with careful practice, Faloon began to remember more and more numbers. At his peak and after 200 hours of practice, he could recall 82 digits. To assess if this was a fluke, Ericsson tried the same with a friend, Dario Donatelli. Five years later, Donatelli could recall 113 digits. Both he and Faloon went far beyond what seemed to be an immovable ceiling on human performance and blew past existing world records.

The experience of seeing two people who started off with ordinary memories enhance their capabilities in such a drastic way inspired Ericsson to further study the effects of practice on skills. Could it be that extraordinary abilities came from extraordinary practice, not just innate ability?

Through his studies of expert performers in a range of fields, Ericsson concluded they practiced their skills in a fundamentally different way than amateur practitioners. Ericsson described this kind of practice as “deliberate” due to its methodical, hyper-conscious nature. He argued that experts become experts largely as a result of the way they practice. They may benefit from innate advantages, but their talents themselves are not innate.

Ericsson also believed that the standards in many additional fields could be improved far beyond their current level if practitioners employed the principles of deliberate practice. Indeed, many fields have seen remarkable increases in their standards for high performance over time. Today, high-schoolers manage athletic feats that were once Olympic level and children play music once considered world-class. This is possible because of better training and knowledge of what it takes to be the best. The more we improve how we train, the more we expand our range of possible performance.

In 2016, Ericsson published *Peak: Secrets from the New Science of Expertise*, a popular science book condensing his learnings from thirty years of research. He also co-edited the 2006 *Cambridge Handbook of Expertise and Expert Performance*.

Malcolm Gladwell: The 10,000 hour rule

The widespread awareness of Ericsson’s work outside the scientific community is in part a result of Malcolm Gladwell’s 2008 book, *Outliers: The Story of Success*. In the book, Gladwell attributed unusual success in different fields to a mixture of lucky factors (such as when or where a person was born) and around 10,000 hours of practice. He based this figure on research, including Ericsson’s, that suggested top performers tended to have put in about that amount of time before reaching peak performance.

Gladwell showed how the success of Bill Gates, the Beatles, and other outstanding performers is not so much to do with what they are like but rather where they come from. “*The people who stand before kings may look like they did it all by themselves,*” Gladwell writes. “*But in fact they are invariably the beneficiaries of hidden advantages and extraordinary opportunities and cultural legacies that allow them to learn and work hard and make sense of the world in ways others cannot.*”

The so-called “10,000 hours rule” caught on. It’s a catchy idea, and many people took it to mean that anyone can master anything if they just put the time in. Ericsson himself disputed Gladwell’s representations of his research, which led to the widespread belief that

the time someone spends practicing predicts their success, without emphasizing the quality of their practice.

Although the backlash against Gladwell's calculation has arguably been exaggerated, it's important to stress that research into deliberate practice emphasizes quality of practice, not quantity. It's all too possible to spend 10,000 hours engaging in a skill without serious improvements. For example, most of us spend hours per day typing, yet we don't see continuous improvements in speed and quality because we're not using deliberate practice.

The useful takeaway from the "10,000 hours rule" is simply that it takes a lot of work to become the best. There's no magic number of practice sessions, and everyone's path will look different. Just because successful people in a given field have spent around 10,000 hours practicing their key skill, that doesn't mean every person who practices that skill for 10,000 hours will become successful.

The limitations and downsides of deliberate practice

Part of us wants to believe expert performance is something innate and magical so we can recuse ourselves from hard work. The other part of us wants to believe that it's something earned through blood, sweat, and tears—that we too could achieve amazing performance, if only we could devote ourselves to something.

Deliberate practice, in reality, is far more complex and nuanced than many people would have you believe. It's not a panacea, and it won't solve all of your work- and art-related problems. Let's take a look at some of the limitations of deliberate practice.

First of all, deliberate practice is a necessary but insufficient part of becoming a world-class performer. You can't rise to the top without it. But it's not enough on its own to be the absolute best in any field. Once you reach higher echelons for any skill, everyone is engaging in a lot of deliberate practice.

If you're aiming at expertise or just really good performance, deliberate practice will most likely get you there. But the higher you rise, the more luck and randomness end up mattering. However much you engage in deliberate practice, you can't control the chance events (good or bad) that dictate a great deal of life.

When we look at the lives of top performers, they often benefited from specific backgrounds or opportunities, in addition to engaging in deliberate practice. For example, if you're trying to become a champion chess player, it's a big boost if your mother was a champion chess player. Not only will you have potential genetic advantages, you'll have

also likely grown up hearing about chess, been encouraged to practice it from a young age, and have someone to turn to for advice.

Seeing as it takes years of consistent deliberate practice to master a skill, people who begin early in life have an advantage over those who start later on. That doesn't mean you can't become exceptional at something you discover well into adulthood (just look at [Julia Child](#) or check out the book [Guitar Zero](#)). But it does mean that people who begin deliberate practice as kids are more likely to enjoy the success that makes it possible to keep committing to it. If you're trying to master a skill while also having to work an unrelated job, care for your family, and deal with the other myriad responsibilities of adult life, you likely will have less room for it than a ten-year-old.

People who discover they want to master a skill or are encouraged to do so by others early in life have an advantage. Once the opportunity for practice is in place, the prospects of high achievement take off. And if practice is denied or diminished, no amount of talent is going to get you there.

In addition to lucky circumstances, high performers benefit from a combination of deliberate practice and innate talents or physical advantages. However much you practice, certain physical limitations are insurmountable. For example, if you're 165 centimeters tall, you're unlikely to become a professional basketball player. There are some physical abilities, such as particular kinds of flexibility, that can only be developed at a young age when a person's skeletal structure is still forming. It's important to be realistic about your starting point and be aware of any limitations. But that doesn't mean you can't develop workarounds or even use them to your advantage.

Another downside of deliberate practice is that the level of focus it requires can mean practitioners miss out on other parts of life. Top performers often devote almost every waking hour to practice, recuperation from practice, and support activities. For example, a professional dancer might spend several hours a day on deliberate practice with all of the remaining hours going toward sleep, low-impact exercise, stretching, preparing nutritious food, icing his feet, and so on. There is enormous satisfaction in the flow states produced by deliberate practice, but practitioners can absolutely miss out on other sources of happiness, such as spending time with friends.

Deliberate practice is part of the exploit phase of new opportunities. Yet sometimes we can end up having too much [grit](#). We can keep persevering with the skill we're practicing right now, remaining overly passionate, past the point where it serves us. We can wear ourselves out or get hurt or fail to realize when it's no longer worth practicing a skill. For example, a new technology might mean our skill is no longer valuable. If we keep on

deliberate practicing due to sunk costs, we'll be unlikely to see many long-term benefits from it. A crucial skill in life is knowing when to pivot. Focusing too much on our goals can blind us to risks.

In some fields, expertise is hard to quantify or measure, which makes it less clear how to structure practice. There may be no single target to hit or universal rule for what improves performance.

A final limitation to keep in mind is that, as Ericsson explained, "*the cognitive and physical changes caused by training require upkeep. Stop training and they go away.*" If someone can't practice for a period of time, such as due to an injury or having a child, they're likely to see the skills they developed through deliberate practice deteriorate.

Summary

Deliberate practice isn't everything, but if you want to keep improving at a skill or overcome a plateau, you'll benefit from incorporating the principles mentioned in this article. To recap:

- Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them.
- The more we engage in deliberate practice, the greater our capabilities become.
- Our minds and bodies are far more malleable than we usually realize.
- Deliberate practice is structured and methodical.
- Deliberate practice is challenging because it involves constantly pushing yourself out of your comfort zone.
- Deliberate practice requires constant feedback and measurement of informative metrics—not vanity metrics.
- Deliberate practice works best with the help of a teacher or coach.
- Continuing deliberate practice requires a great deal of intrinsic motivation.
- Deliberate practice requires constant, intense focus.
- Deliberate practice leverages the spacing effect—meaning a consistent commitment over time is crucial.
- If you're content with your current level of skill or just doing something for fun, you don't necessarily need to engage in deliberate practice
- Deliberate practice is best suited to pursuits where you're actively aiming for a high level of performance or to break beyond some kind of supposed limit.

1. Jeffrey Pfeffer: Why Performance Won't Get You Promoted

If you're going to play the game you should at least educate yourself on the unwritten rules. If you don't, you'll always be at a disadvantage.

In an NPR interview (audio below), Stanford business professor Jeffrey Pfeffer highlights why performance won't get you promoted and why power corrupts.

Here are my notes on the audio interview:

1. Performance is elusive and thus can be shaped and managed;
2. You can do your job too well;
3. The world doesn't work the way you want it to – the way to change it is to go out and make something happen;
4. Power corrupts — when you attain power you don't think you have to follow the rules anymore;
5. When you're in a position of power everyone is trying to curry your favor and you end up surrounded by sycophants;
6. Power can be converted into money;
7. Power gives you control over your work (time and pace);
8. You need power to get things done;
9. The more powerful you are the less people will be willing to forgive you;
10. Influence is power in action; and
11. You can have power or autonomy but not both.

Some of you might be skeptical of Pfeffer's tactics; but he points out, that if the ends don't justify the means then what does?

My favorite part of the interview was the quote from a newsman saying: if you don't like today's news, go out and make some of your own.

According to Pfeffer's book Power: Why Some People Have It And Others Don't, there are seven personal qualities that help to build power: ambition, energy, focus, self-knowledge, confidence, empathy with others, and capacity to tolerate conflict. Intelligence and high performance didn't make the cut.

The book recommends a few simple steps you can take to increase your power:

1. Be visible;
2. Emphasize the aspects you're good at;
3. Make those in power feel good about themselves;
4. If you must point out a mistake by someone in power, blame the situation or others; and
5. Shower those above with flattery.

4. The Myth of Multitasking: Why the Key to Better Work is Developing Forgotten Skills

Of course you can do more than one thing at once. The catch is you can't do more more than one thing at once that requires concentration. You can walk and chew gum, but you can't write an email and a report at the same time.

When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.

The brain is a pretty smooth operator when it knows what direction to head. Transitioning from one task to another, however, dramatically reduces its horsepower.

There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.

Steven Yantis, a professor of psychological and brain sciences at Johns Hopkins, says:

In addition to the switch cost, each time you switch away from a task and back again, you have to recall where you were in that task, what you were thinking about. If the tasks are complex, you may well forget some aspect of what you were thinking about before you switched away, which may require you to revisit some aspect of the task you had already solved (for example, you may have to re-read the last paragraph you'd been reading).

Deep thinking about a complex topic can become nearly impossible.

Multitasking ensures the brain is operating sub-optimally.

When you try to do two or more cognitively demanding things at once, it's as if you have a 1000 h.p. motor (your brain) but your throttling only gets you 100 h.p. of output.

There is a difference between the appearance of being busy—busywork—and actually moving the needle. Attempting to do more things may signal to others how busy you are, but if you care about actual results, you need to do fewer things better.

Our most valuable mental habits—things like deep and focused thought—must be learned through concentrated practice. This is a skill we're starting to lose as more and more of our time gets fragmented away into small and smaller increments thanks to screens. Nicolas Carr, author of The Shallows: What the Internet Is Doing To Our Brain, comments on his blog:

Our most valuable mental habits – the habits of deep and focused thought – must be learned, and the way we learn them is by practicing them, regularly and attentively. And that's what our continuously connected, constantly distracted lives are stealing from us: the encouragement and the opportunity to practice reflection, introspection, and other contemplative modes of thought. Even formal research is increasingly taking the form of "power browsing," according to a 2008 University College London study, rather than attentive and thorough study.

Patricia Greenfield, a professor of developmental psychology at UCLA, warns that our growing use of screens appears to weaken our "higher-order cognitive processes," including "abstract vocabulary, mindfulness, reflection, inductive problem solving, critical thinking, and imagination."

Busywork leads to overwork and sub-optimal outputs. Busywork is a psychological signal to others (and ourselves) that we're needed. That we're important. After-all, look how busy I am. This delusion is the reason we take on so many things and fail to say no. This delusion keeps us so busy that we're not learning new things or even getting better at what we already do. This delusion inhibits us from deriving meaning in our work and our lives.

This delusion keeps us from understanding how the world works and adapting to the changing reality.

The world is a competitive place. That means we have to learn how to do difficult things—things that other people value, things other people can't do. This isn't as easy as it sounds.

What we really need to develop is not so much the specific traits that will be valued as much as a system to constantly reinvent ourselves and adapt.

This is the hard part and in an odd way, we need to go backwards to go forward. We need to develop skills we've once had and lost: The ability to read better, the ability to make better decisions, the ability to focus, and strategies to make sure we're not consumed by busywork. These are the skills that will enable us to have quality ideas that other people don't have. These are the foundational skills that underpin adaptability.

5. The Myth of Multitasking: Why the Key to Better Work is Developing Forgotten Skills

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When you're doing two things at once that are cognitively demanding, what you're really doing is switching back and forth very quickly from one task to another.

The brain is a pretty smooth operator when it knows what direction to head. Transitioning from one task to another, however, dramatically reduces its horsepower.

There is a mental cost—called a switching cost—to all of this multitasking. But that's not all it makes deep thinking impossible.

Steven Yantis, a professor of psychological and brain sciences at Johns Hopkins, says:

In addition to the switch cost, each time you switch away from a task and back again, you have to recall where you were in that task, what you were thinking about. If the tasks are complex, you may well forget some aspect of what you were thinking about before you switched away, which may require you to revisit some aspect of the task you had already solved (for example, you may have to re-read the last paragraph you'd been reading).

Deep thinking about a complex topic can become nearly impossible.

Multitasking ensures the brain is operating sub-optimally.

When you try to do two or more cognitively demanding things at once, it's as if you have a 1000 h.p. motor (your brain) but your throttling only gets you 100 h.p. of output.

There is a difference between the appearance of being busy—busywork—and actually moving the needle. Attempting to do more things may signal to others how busy you are, but if you care about actual results, you need to do fewer things better.

Our most valuable mental habits—things like deep and focused thought—must be learned through concentrated practice. This is a skill we're starting to lose as more and more of our time gets fragmented away into small and smaller increments thanks to screens. Nicolas Carr, author of The Shallows: What the Internet Is Doing To Our Brain, comments on his blog:

Our most valuable mental habits – the habits of deep and focused thought – must be learned, and the way we learn them is by practicing them, regularly and attentively. And that's what our continuously connected, constantly distracted lives are stealing from us: the encouragement and the opportunity to practice reflection, introspection, and other contemplative modes of thought. Even formal research is increasingly taking the form of "power browsing," according to a 2008 University College London study, rather than attentive and thorough study.

Patricia Greenfield, a professor of developmental psychology at UCLA, warns that our growing use of screens appears to weaken our "higher-order cognitive processes," including "abstract vocabulary, mindfulness, reflection, inductive problem solving, critical thinking, and imagination."

Busywork leads to overwork and sub-optimal outputs. Busywork is a psychological signal to others (and ourselves) that we're needed. That we're important. After-all, look how busy I am. This delusion is the reason we take on so many things and fail to say no. This delusion keeps us so busy that we're not learning new things or even getting better at what we already do. This delusion inhibits us from deriving meaning in our work and our lives. This delusion keeps us from understanding how the world works and adapting to the changing reality.

The world is a competitive place. That means we have to learn how to do difficult things—things that other people value, things other people can't do. This isn't as easy as it sounds. What we really need to develop is not so much the specific traits that will be valued as much as a system to constantly reinvent ourselves and adapt.

This is the hard part and in an odd way, we need to go backwards to go forward. We need to develop skills we've once had and lost: The ability to read better, the ability to make better decisions, the ability to focus, and strategies to make sure we're not consumed by busywork. These are the skills that will enable us to have quality ideas that other people don't have. These are the foundational skills that underpin adaptability.

6. Why is it so Hard to Kill a Cockroach with your Shoe?

The Cockroach Papers by Richard Schwied is an interesting book if you are looking to learn more about biology or evolution. Cockroaches are built for survival no matter what the world throws at them. Their ability to adapt is just amazing.

Here are some of my notes from the book.

Food and Water

German cockroaches, *Blattella germanica*, the most common domestic roach in the United States, have been observed to live 45 days without food, and more than two weeks with neither food nor water.

Cockroaches will eat almost anything including glue, feces, hair, decayed leaves, paper, leather, banana skins, other cockroaches, and dead or alive humans. They will not, however, eat cucumbers. They are particularly fond of dried milk around a baby's mouth. The roaches are not confined to any particular environment and live in a tremendous variety of places, from underneath woodpiles in Alaska to high in the jungle canopy in the tropics of Costa Rica. They are even found in the caves of Borneo and under the thorn bushes in arid stretches of Kenya. Wherever they live, they are masters at surviving. They are, Schwied writes, "undeniably one of the pinnacles of evolution on this planet."

Why is it so hard to kill a cockroach with your shoe?

Schweid observes that "when a cockroach feels a breeze stirring the hairs on its cerci, it does not wait around to see what is going to happen next, but leaves off whatever it is doing and goes immediately into escape mode in something remarkably close to instantaneous fashion." Studies show that a cockroach can respond in about 1/20th of a second, so "by the time a light comes on and human sight can register it, much less react by reaching for and hoisting something with which to squash it, a roach is already locomoting towards safety."

Blood

Cockroach blood is a pigments, clear substance circulating through the interior of its body, and what usually spurts out of a roach when its hard, , outer shell—its exoskeleton—is penetrated or squashed is a cream-colored substance resembling nothing so much as pus or smegma.

Brains

Cockroaches have two brains—one inside their skulls, and a second, more primitive brain that is back near their abdomen.

Copulation

Schweid says "Pheromones, chemical signals of sexual readiness, operate between a male and female cockroach to initiate courtship and copulation. A sexually receptive female assumes a posture with her abdomen lowered and her wings raised and gives off a pheromone that attracts males." If he finds a virgin female, a male cockroach after some antenna rubbing foreplay will turn away from the female and raise his wings, "an invitation to her to mount." Copulation frequently lasts an hour. After sex, female cockroaches store the sperm and use them as needed. The sperm may last her a lifetime.

"The evolutionary strategy employed by cockroaches to reproduce is considerably more efficient than that employed by humans." Oddly, there are certain species of cockroaches that can, at least for a generation or two, reproduce without any sperm. Schweid says "the females unfertilized eggs will develop and hatch—always producing new females."

Partying

Betty Faber, the former staff entomologist for the New York Natural History Museum, says "Females go to bed—by which I mean disappear back to the harborage—at night earlier than males."

Socialness

Schweid writes, "cockroaches, while not social insects in the entomological sense of bees

or ants with clearly assigned tasks that benefit the whole community, do clearly take pleasure in the company of other roaches, and the aggression pheromones draw them together, eliciting their effects regardless of the sex or age.” Cockroaches reared singly develop more slowly and take longer between molts than do those reared in a group. Although those groups can be too big “just as development is delayed in young cockroaches if they are isolated, over-crowding also extends the time between molts. So there is yet another kind of pheromone, called a “dispersal pheromone,” and it serves as the chemical signal that it is time to look for a new, slightly roomier harborage. This chemical is found in the insects’ saliva, and has just the opposite effect of the aggression attractant, in that it repulses cockroaches and causes them to look elsewhere for harborage.”

Radiation

In case you’re thinking we can just nuke the little critters you should know that cockroaches survived the atomic bombs test blast at Bikini. “There is such a thing as a lethal dose of radiation for a cockroach, but it is a lot higher than our own.”

Predators

“While few humans may eat them, the roach has both external and internal predators and parasites. There are centipedes that have a primary diet of cockroaches. Mantises, ants, and scorpions will eat them, as will a variety of larger animals including toads, frogs, possums, hedgehogs, armadillos, mongooses, monkeys, lizards, spiders, mice, cats, and birds”

Sleeping

Roaches are nocturnal and pass their days sleeping.

Male aggression

“Cockroaches, like so many other species including our own, have male aggression rituals. They have their own inventory of aggressive behaviors, a scale of conflict that begins with threatening postures. Beyond that they graduate to antenna lashing—a form of which is also present in male/female encounters to determine if a female is sexually receptive—and biting. Sex and territory seem to be the primary motivations for fighting between male cockroaches: These clashes never end in death, but always in the retreat of one fighter.”

Trapping a cockroach

“Stale white bread moistened with warm, slightly soured beer” is the most reliable and effective. “This is typically placed at the bottom of a small jar—a Gerber’s baby food jar, say—around the interior rim of which a petroleum jelly like Vaseline has been applied. The cockroach can climb in from the outside but can’t climb back out.”

What should you do if you get a cockroach stuck in your ear?

“It is, according to all accounts, painful and horrifying, although a little mineral oil or lidocaine sprayed into the ear is usually enough to dislodge the intruder.”

Exterminators

Exterminators primarily employ two methods to kill the cockroach: gas and gel. The gel is way more effective but many still rely on the spray. Why? “The major problem that exterminators have with the gel is that it has no immediate knockdown effect.”

John Wickham, an English pest control consultant defined knockdown as: “The inability of the insect to move in a sufficiently coordinated manner to right itself and progress normally.” When a roach eats gel bait—the safer of the two methods—it heads home before the active poison kills it.

“Customers who are paying \$75 an hour like to see these roaches struggling to get up, in agony and convulsions, and the sprays, with substantial knockdown effect, provide them that gratifying visual reassurance that the problem is being solved and that they are getting their money’s worth.

It’s unlikely this poison will have much long term impact. “Almost as soon as an effective poison goes into widespread use, cockroaches begin to develop Resistance. And,

typically, the most efficacious products developed, those that do the best job, turn out to be more detrimental to our own health than are the roaches.”

7. Top Athletes And Singers Have Coaches. Should You?

Getting better at something you're decent at, isn't as easy as it sounds. Consider driving. A skill you likely learned as a teenager. Within a few hundred hours under the wheel, you went from a petrified know nothing to a competent and predictable driver.

Let's say you're mid-30s now and you want to get better at driving. How would you do it? The easiest way is to hire a back seat driver — someone to tell you that you're taking the turns too sharply, or not coming to a complete stop. Basically, their job would be to point out all the little things you do that keep you from getting better.

Isn't not hard to find this person. The hard part is putting your pride and reputation on the line.

We can't do this for everything but we can do it for some things. The things that matter the most.

With that in mind, here is a wonderful essay by Atul Gawande in the New Yorker on whether we need a personal coach.

...I'd paid to have a kid just out of college look at my serve. So why did I find it inconceivable to pay someone to come into my operating room and coach me on my surgical technique?

...Elite performers, researchers say, must engage in "deliberate practice"—sustained, mindful efforts to develop the full range of abilities that success requires. You have to work at what you're not good at. In theory, people can do this themselves. But most people do not know where to start or how to proceed. Expertise, as the formula goes, requires going from unconscious incompetence to conscious incompetence to conscious competence and finally to unconscious competence. The coach provides the outside eyes and ears, and makes you aware of where you're falling short.

...Osteen watched, silent and blank-faced the entire time, taking notes. My cheeks burned; I was mortified. I wished I'd never asked him along. I tried to be rational about the situation—the patient did fine. But I had let Osteen see my judgment fail; I'd let him see that I may not be who I want to be.

This is why it will never be easy to submit to coaching, especially for those who are well along in their career. I'm ostensibly an expert. I'd finished long ago with the days of being tested and observed. I am supposed to be past needing such things. Why should I expose myself to scrutiny and fault-finding?

If you're interested in learning more about effective coaching, check out Barbara Lourie Sand's book "Teaching Genius," which describes the methods of the legendary Juilliard violin instructor Dorothy DeLay. DeLay trained an amazing roster of late-twentieth-century virtuosos, including Itzhak Perlman, Nigel Kennedy, Midori, and Sarah Chang.

8. Learning Effectively From Experience: Distinguishing High from Low Performers

High performers learn from both success and failure making small adjustments.

Conversely, low performers learned more from success.

Learning effectively from experience is a daunting task for any organism. For every good or bad outcome, there are an immense number of potential causes and associations to be considered. For many decisions, it can be nearly impossible to pick out the few relevant factors from the many irrelevant factors, even with extensive experience. A major stumbling block for learning in these multi-dimensional environments is the tendency to form spurious beliefs: i.e., to attribute a causal role to factors that have no actual bearing on the outcome.

The formation of spurious beliefs is universal, from Skinner's observations of superstitious pigeons [1] to an athlete's belief in a lucky hat. In some situations, these beliefs are essentially harmless; by-products of learning mechanisms, but in other settings their impact can be severe. For example, spurious associations can have literal life-or-death consequences when they affect the complex decisions made by physicians. These expert decision-makers must extract and distill relevant features from a myriad of tests, symptoms, and personal histories, and employ these features to make critical medical decisions. Consequently, it is important to understand how spurious associations form and how they can bias subsequent decisions.

Spurious learning and false belief formation happens when the dorsolateral prefrontal cortex fails to distinguish correctly between important and unimportant associations.

The authors conclude:

High performers learned from both successes and failures, and made smaller rule adjustments after feedback. Conversely, low performers learned disproportionately from successes, and made larger rule adjustments ...

Taken together, the behavioral and neuroimaging results suggest that success-chasing and confirmation bias may underlie the relative pervasiveness of premature, asymmetric learning and the resultant poor performance of the majority of physician subjects in the present study. The general human bias towards confirmation over disconfirmation in hypothesis-testing has been extensively documented in a variety of non-medical contexts, such as the Wason Card Task. Conversely, the necessity for disconfirmation learning in empirical investigations is a key principle identified by the philosopher of science, Karl Popper [28]. Conceivably, providing medical professionals with formal training in disconfirmation learning could improve their ability to learn effectively from clinical experience in real-world settings. Exploring this possibility would be an important area for future research.

In conclusion, the results of this study show distinct patterns of learning, both behaviorally and neurally, between effective and ineffective learners among physicians making decisions in a medically framed learning task. The tendency to chase successes and ignore failures provides a simple computational model of how spurious beliefs might be formed, and how different individuals seeing similar data might learn very different sets of associations. The neural differences observed could conceivably be developed into useful biomarkers for essential differences in individual learning styles. These may in turn prove useful in identifying those individuals who can resist the impulse to chase successes, and hence learn most effectively from experience. Finally, we note that although this study focused upon the specific case of medical decision-making, the findings may be also be relevant to many other fields in which experts must make high-stakes decisions by drawing upon personal experience.

Abstract:

Accurate associative learning is often hindered by confirmation bias and success-chasing, which together can conspire to produce or solidify false beliefs in the decision-maker. We performed functional magnetic resonance imaging in 35 experienced physicians, while they learned to choose between two treatments in a series of virtual patient encounters. We estimated a learning model for each subject based on their observed behavior and this model divided clearly into high performers and low performers. The high performers showed small, but equal learning rates for both successes (positive outcomes) and failures (no response to the drug). In contrast, low performers showed very large and asymmetric learning rates, learning significantly more from successes than failures; a tendency that led to sub-optimal treatment choices. Consistently with these behavioral findings, high performers showed larger, more sustained BOLD responses to failed vs. successful outcomes in the dorsolateral prefrontal cortex and inferior parietal lobule while low performers displayed the opposite response profile. Furthermore, participants' learning asymmetry correlated with anticipatory activation in the nucleus accumbens at trial onset, well before outcome presentation. Subjects with anticipatory activation in the nucleus accumbens showed more success-chasing during learning. These results suggest that high performers' brains achieve better outcomes by attending to informative failures during training, rather than chasing the reward value of successes. The differential brain activations between high and low performers could potentially be developed into biomarkers to identify efficient learners on novel decision tasks, in medical or other contexts.

9. The Science Of Habit Formation And Change

From The Power of Habit: Why We Do What We Do in Life and Business

Chunking — The Root of Habits

The process—in which the brain converts a sequence of actions into an automatic routine—is known as ‘chunking,’ and it’s at the root of how habits form.

Why do Habits Emerge?

Habits, scientists say, emerge because the brain is constantly looking for ways to save effort. Left to its own devices, the brain will try to make almost any routine into a habit, because habits allow our minds to ramp down more often. This effort-saving instinct is a huge advantage. An efficient brain requires less room, which makes for a smaller head, which makes childbirth easier and therefore causes fewer infant and mother deaths. An efficient brain also allows us to stop thinking constantly about basic behaviors ...

The Three Step Loop of Habit Formation:

This process within our brains is a three-step loop. First, there is a cue, a trigger that tells your brain to go into automatic mode and which habit to use. Then there is the routine, which can be physical or mental or emotional. Finally, there is a reward, which helps your brain figure out if this particular loop is worth remembering for the future: Over time, this loop—cue, routine, reward; cue, routine, reward—becomes more and more automatic. The cue and reward become intertwined until a powerful sense of anticipation and craving emerges. Eventually... a habit is born.

Does the Brain Stop Working?

When a habit emerges, the brain stops fully participating in decision making. It stops working so hard, or diverts focus to other tasks. So unless you deliberately fight a habit—unless you find new routines—the pattern will unfold automatically.

How To Change A Habit:

We know that a habit cannot be eradicated—it must, instead, be replaced. And we know that habits are most malleable when the Golden Rule of habit change is applied: If we keep the same cue and the same reward, a new routine can be inserted. But that’s not enough. For a habit to stay changed, people must believe change is possible. And most often, that belief only emerges with the help of a group.

Does a Habit Disappear?

Habits never really disappear. They’re encoded into the structures of our brain, and that’s a huge advantage for us, because it would be awful if we had to relearn how to drive after every vacation. The problem is that your brain can’t tell the difference between bad and good habits, and so if you have a bad one, it’s always lurking there, waiting for the right cues and rewards.”

10. What is Deliberate Practice?

Deliberate practice is a method for improving your performance at anything, based on constant feedback and working at the edge of your abilities. Elite people in every field use it to build up their expertise. Let's take a look at exactly what deliberate practice is, how to do it, and why it works.

You've probably been doing your job for a while. If you're like most people, your performance has plateaued. Simply put, you've stopped getting better at what you do. This is because you don't use deliberate practice to your advantage.

Despite repetition, most people fail to become experts at what they do. It doesn't matter how many years they spend they stop getting better.

Experience does not equate to expertise.

In Geoff Colvin's book Talent Is Overrated he writes:

In field after field, when it comes to centrally important skills—stockbrokers recommending stocks, parole officers predicting recidivism, college admissions officials judging applicants—people with lots of experience were no better at their jobs than those with less experience.

Society has always recognized extraordinary individuals whose performance is truly superior. If I were to ask you why some people excel and others don't, you'd probably say talent and effort. These responses are misleading.

Conveniently, claiming that talent is the basis for success means we can absolve ourselves of our own performance (or, as the case may be, lack thereof). The talent argument, despite its popularity, is wrong. Yet research tells a very different story on how people become experts (for a more detailed argument read Talent Is Overrated, the source of most of the quotes in this article).

Deliberate Practice

Research concludes that we need *deliberate* practice to improve performance.

Unfortunately, deliberate practice isn't something that most of us understand, let alone engage in on a daily basis. This helps explain why we can work at something for decades without really improving our performance.

Deliberate practice is hard. It hurts. But it works. More of it equals better performance and tons of it equals great performance.

Most of what we consider practice is really just playing around — we're in our comfort zone.

When you venture off to the golf range to hit a bucket of balls what you're really doing is having fun. You're not getting better. Understanding the difference between fun and deliberate practice unlocks the key to improving performance.

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

Let's take a look at each of those to better understand what's meant.

Designed to Improve Performance

The word designed is key. While enjoyable, practice lacking design is play and doesn't offer improvement.

"In some fields, especially intellectual ones such as the arts, sciences, and business, people may eventually become skilled enough to design their own practice. But anyone who thinks they've outgrown the benefits of a teacher's help should at least question that view. There's a reason why the world's best golfers still go to teachers."

But it's more than just the teachers' knowledge that helps — it's their ability to see you in ways you can't see yourself.

“A chess teacher is looking at the same boards as the student but can see that the student is consistently overlooking an important threat. A business coach is looking at the same situations as a manager but can see, for example, that the manager systematically fails to communicate his intentions clearly.”

In theory, with the right motivations and some expertise, you can design a practice yourself. It's likely, however, that you wouldn't know where to start or how to structure activities.

*Expertise, as the formula goes, requires going from unconscious incompetence to conscious incompetence to conscious competence and finally to unconscious competence. **

Teachers, or coaches, see what you miss and make you aware of where you're falling short.

With or without a teacher, great performers deconstruct elements of what they do into chunks they can practice. They get better at that aspect and move on to the next.

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time we're practicing we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of reach.

Consider a chess tournament:

*Skill improvement is likely to be minimized when facing substantially inferior opponents, because such opponents will not challenge one to exert maximal or even near-maximal effort when making tactical decisions, and problems or weaknesses in one's play are unlikely to be exploited. At the same time, the opportunity for learning is also attenuated during matches against much strong opponents, because no amount of effort or concentration is likely to result in a positive outcome.**

Repeat

Repetition inside the comfort zone does not equal practice. Deliberate practice requires that you should be operating in the learning zone and you should be repeating the activity a lot with feedback.

*Let us briefly illustrate the difference between work and deliberate practice. During a three hour baseball game, a batter may only get 5-15 pitches (perhaps one or two relevant to a particular weakness), whereas during optimal practice of the same duration, a batter working with a dedicated pitcher has several hundred batting opportunities, where this weakness can be systematically exploited. **

It's no coincidence that Ted Williams, baseball's greatest hitter, would literally practice hitting until his hands bled.

Feedback on results is continuously available

Practicing something without knowing whether you are getting better is pointless. Yet that is what most of us do everyday without thinking.

“You can work on technique all you like, but if you can't see the effects, two things will happen: You won't get any better, and you'll stop caring.”

Feedback gets a little tricky when someone must subjectively interpret the results. While you don't need a coach, this can be an area they add value.

“These are the situations in which a teacher, coach, or mentor is vital for providing crucial feedback.”

Mentally Demanding

Doing things we know how to do is fun and does not require a lot of effort. Deliberate practice, however, is not fun. Breaking down a task you wish to master into its constituent parts and then working on those areas systematically requires a lot of effort.

“The work is so great that it seems no one can sustain it for very long. A finding that is remarkably consistent across disciplines is that four or five hours a day seems to be the upper limit of deliberate practice, and this is frequently accomplished in sessions lasting no more than an hour to ninety minutes.”

Ben Franklin, an interesting example

Ben Franklin intuitively grasped the concept of deliberate practice. As a teenager Ben received a letter from his father saying his writing was inferior: “in elegance of expression, in method and in perspicuity, of which he convinced me by several instances,” as Franklin recalled.

“Ben responded to his father’s observations in several ways. First, he found examples of prose clearly superior to anything he could produce, a bound volume of the Spectator, the great English periodical written by Joseph Addison and Richard Steele. Any of us might have done something similar. But Franklin then embarked on a remarkable program that few of us would have ever thought of.

It began with his reading a Spectator article and marking brief notes on the meaning of each sentence; a few days later he would take up the notes and try to express the meaning of each sentence in his own words. When done, he compared his essay with the original, “discovered some of my faults, and corrected them.

One of the faults he noticed was his poor vocabulary. What could he do about that? He realized that writing poetry required an extensive “stock of words” because he might need to express any given meaning in many different ways depending on the demands of rhyme or meter. So he would rewrite Spectator essays in verse. ...

Franklin realized also that a key element of a good essay is its organization, so he developed a method to work on that. He would again make short notes on each sentence in an essay, but would write each note on a separate slip of paper. He would then mix up the notes and set them aside for weeks, until he had forgotten the essay. At that point he would try to put the notes in their correct order, attempt to write the essay, and then compare it with the original; again, he “discovered many faults and amended them.”

Even without a teacher, Ben Franklin grasped deliberate practice.

The Role of Solitude

In her book, Quiet: The Power of Introverts in a World That Can’t Stop Talking, Susan Cain writes:

Deliberate Practice is best conducted alone for several reasons. It takes intense concentration, and other people can be distracting. It requires deep motivation, often self-generated. But most important, it involves working on the task that’s most challenging to you personally. Only when you’re alone, Ericsson told me, can you “go directly to the part that’s challenging to you. If you want to improve what you’re doing, you have to be the one who generates the move. Imagine a group class—you’re the one generating the move only a small percentage of the time.”

11. The clarity paradox — why success is a catalyst for failure

Greg McKeown explains why successful people don't become very successful in The Disciplined Pursuit of Less.

Why don't successful people and organizations automatically become very successful?

One important explanation is due to what I call "the clarity paradox," which can be summed up in four predictable phases:

Phase 1: When we really have clarity of purpose, it leads to success.

Phase 2: When we have success, it leads to more options and opportunities.

Phase 3: When we have increased options and opportunities, it leads to diffused efforts.

Phase 4: Diffused efforts undermine the very clarity that led to our success in the first place.

12. “That’s as far as they go. They can’t take it any further. And why not? Because they won’t put in the effort”

A brilliant passage from Haruki Murakami’s Norwegian Wood on talent.

There just happen to be people like that. They’re blessed with this marvelous talent, but they can’t make the effort to systematize it. They end up squandering it in little bits and pieces. I’ve seen my share of people like that. At first you think they’re amazing. Like, they can sight-read some terrifically difficult piece and do a damn good job playing it all the way through. You see them do it, and you’re overwhelmed. You think, ‘I could never do that in a million years.’ But that’s as far as they go. They can’t take it any further. And why not? Because they won’t put in the effort. Because they haven’t had the discipline pounded into them. They’ve been spoiled. They have just enough talent so they’ve been able to play things well without any effort and they’ve had people telling them how great they are from the time they’re little, so hard work looks stupid to them. They’ll take some piece another kid has to work on for three weeks and polish it off in half the time, so the teacher figures they’ve put enough into it and lets them go to the next thing. And they do that in half the time and go on to the next piece. They never find out what it means to be hammered by the teacher; they lose out on a certain element required for character building. It’s a tragedy.

This sounds an awful lot like Carol Dweck:

In her influential research, (Carol) Dweck distinguishes between people with a fixed mindset — they tend to agree with statements such as “You have a certain amount of intelligence and cannot do much to change it” — and those with a growth mindset, who believe that we can get better at almost anything, provided we invest the necessary time and energy. While people with a fixed mindset see mistakes as a dismal failure — a sign that we aren’t talented enough for the task in question — those with a growth mindset see mistakes as an essential precursor of knowledge, the engine of education.

And this bit from The Art of Learning: An Inner Journey to Optimal Performance:

Children who are “entity theorists” ... are prone to use language like ‘I am smart at this.’ And to attribute their success or failure to an ingrained and unalterable level of ability. They see their overall intelligence or skill level at a certain discipline to be a fixed entity, a thing that cannot evolve. Incremental theorists, who have picked up a different modality of learning, are more prone to describe their results with sentences like ‘I got it because I worked very hard at it’ or ‘I should have tried harder.’ A child with a learning theory of intelligence tends to sense that with hard work, difficult material can be grasped- step-by-step, incrementally, the novice can become the master.

This is the path of amateurs:

By nature, we humans shrink from anything that seems possibly painful or overtly difficult. We bring this natural tendency to our practice of any skill. Once we grow adept at some aspect of this skill, generally one that comes more easily to us, we prefer to practice this element over and over. Our skill becomes lopsided as we avoid our weaknesses. Knowing that in our practice we can let down our guard, since we are not being watched or under pressure to perform, we bring to this a kind of dispersed attention. We tend to also be quite conventional in our practice routines. We generally follow what others have done, performing the accepted exercises for these skills.

This is the path of amateurs. To attain mastery, you must adopt what we shall call Resistance Practice. The principle is simple—you go in the opposite direction of all of your natural tendencies when it comes to practice.

If you want to get better at anything, you need to practice.

13. The 8 Causes of Plateaus

Have you ever found yourself trying really hard on something you care about?

Maybe you're learning how to play the piano. But the more effort you put in, the less you seem to get out of it. You've plateaued, according to Bob Sullivan and Hugh Thompson.

"Trying harder," they write in The Plateau Effect: Getting from Stuck to Success, "is a failed, frustrating strategy." ... "We're here to tell you that every day, the universe is conspiring against people who think that more is the answer."

If doubling down on hard work isn't the solution what is?

Thompson and Sullivan argue there are 8 reasons we plateau, and they, of course, offer tips to overcome them all.

Here is the cheat sheet.

When you were (supposed to be) reading the Classics in high school, Cliff Notes were bad. In fact, Bob recently met an employee of a company that makes animated version of CliffNotes – which apparently aren't Cliff-y enough for today's students.

But when you're trying to improve your life and move past those plateaus that hold you back, CliffNotes are great. They are efficient; they give you more results for less work – two of our main goals for teaching people about the Plateau Effect. So, here we give you our version of CliffNotes. If you're stuck, one of these devils is probably to blame.

Remember, what helps you break out of your plateau today will one day stop working – and you'll have to try another method. Breaking through plateaus, as you've seen, is a constant recalibration – it takes a little of this and a bit of that. In the list below, we show you what "this" and "that" really are for you, today, and into the future. These solvents produce solutions.

Element 1: Immunity

People, relationships, businesses and even physical processes become immune to the same techniques, the same approaches, the same solutions. Immunity is perhaps the most basic force of the Plateau Effect. Everybody has experienced what it's like to become immune to something: maybe it's the complements of your spouse, the smell of garlic at an Italian restaurant, or the effects of your second beer. Immunity can be frustrating – what worked so well yesterday just won't work today.

Solvent: Diversity

Immunity's Kryptonite is diversity. You've got to shake things up and be radical. Trying different approaches, techniques or procedures can shake you out of an immunity plateau.

Element 2: Greedy Algorithm

The greedy algorithm is a concept borrowed from the field of mathematics. Here's how it works: you always pick the best short-term solution and ignore the long-term outcome. As it is in mathematics – and in life – the best short-term solution hardly ever leads to the best long-term outcome. The greedy algorithm always finds the locally optimal solution but ignores the globally optimal solution.

Solution: Extend your gratification horizon

Short-term greed is bad but long-term greed is actually good. To get beyond the greedy algorithm, you need to think about solutions on a bigger timescale. Someone following the greedy algorithm (driven by short-term greed) would never go to medical school – the student is building debt with no income year after year. Someone who's thinking about a 10-year horizon instead of a 1-2 year horizon sees the six-figure checks that will eventually start coming in.

Element 3: Bad Timing

If you're working hard but you're stuck in a plateau, maybe it's as simple as taking a break. When you do something – and more precisely, when you don't do something – is critical.

The key is to take control of when you apply effort, not just how much effort you apply.

Solution: Wait

If bad timing has you stuck in a plateau, remember, the periods of rest and inactivity are just as important as the periods of great effort, just as silence between the notes is part of the music. If you use time as a tool, you can literally wait your way out of a plateau.

Element 4: Flow Issues

Whenever things seem to be sailing along, sometimes the engine just breaks down.

Specifically, you can run into one of four dysfunctions:

Erosion: Sometimes we deplete the resources that we need to be successful. Maybe we run out of capital, or time, or skilled workers. When you hit an erosion plateau, progress tends to degrade slowly as some critical resource is gobbled up over time.

Solvent: Find a counterbalance, something that replaces the resource you consume. If you can't find a counterbalance, you might not be in a plateau at all. You may have reached a terminal point.

Step Function: Sometimes you want to add just a little more of something, but that thing is only available in bundles. The result is a jump in cost, effort, or benefit. We call these things "step functions." If you aren't aware that something you need follows a step function, you can hit a plateau because incremental investment won't lead to incremental improvement.

Solvent: Try to smooth out your step function. Sometimes this can be done by identifying some other person or business that has complementary peaks to your own. If you can pool your resources, you can share the cost of the step and make it look more like a comfortable ramp.

Choke points: A choke point is the part of the system that breaks first and slows everything else down. Failing to identify a chokepoint can bring a gushing flow to an unexpected trickle.

Solvent: The trick is to find out where the choke point is and creatively route your way around it.

Mystery ingredients: The defining characteristic of a mystery ingredient is that even the chef doesn't know what it is. The mystery ingredient could be changing market conditions, interpersonal issues between co-workers, or just a team member with a can-do attitude. It's the elusive catalyst that makes things work.

Solvent: Mystery ingredients can often be hard to find, but seem obvious in retrospect. Often, it's just important to recognize that a mystery ingredient might exist; that what you see isn't the whole story.

Element 5: Distorted Data

We often react based on distorted data. It's like walking through a hall of mirrors, and basing a major decision on the crazy fat (or skinny) image you see. Sometimes we measure the wrong things or inappropriately assess risk. In other cases, we fall victim to common psychological errors with data, such as overweighing the most recent piece of information we've received, we get hung up on sunk costs, or we conform to what we think the data is telling us.

Solvent: Recalibrate

The Enlightenment brought us the scientific method because smart people realized that they couldn't trust their own eyes. The key is to boil out the impurities of data and recognize that you are looking through a lens that might be deceptive. Each type of distortion has its own remedy, but the tie that binds them is to look for a ground truth of data amidst the chaos.

Element 6: Distraction

It's easy to fall victim to the illusion of multitasking and become distracted. Distraction is the enemy of adaptation and can lead you straight towards a plateau. How do we know when and what we need to change to live in a world of unrelenting distraction?

Solvent: Radical Listening

If you take a page from improv comedy – where you look for the truth in what others are saying and build on it through the “yes....and” strategy – you get to a skill we call radical listening. It’s a mode of active engagement, where you are attuned to your surroundings, listening, and adapting.

Element 7: Failing Slowly

Failing slow is natural because it’s difficult to tell that a situation is incrementally getting worse. Often the incremental worsening of a situation happens slower than what psychophysicists call the just noticeable difference. The just noticeable difference helps explain why we continue forging ahead when we’re in the throes of a plateau – we just don’t realize how much less we’re getting for our efforts.

Solution: Fail fast

Once you understand the just noticeable difference you can counteract its effects. By setting clear markers, you can objectively see how you’re progressing, figure out what’s working and what’s failing, correct it and move on. It’s important to realize if your efforts will eventually fail by accelerating failure. This ability to fail fast is key, especially when the problems are changing quickly.

Element 8: Perfectionism

Perfect is the enemy of good. The desire for perfection kills beginnings – it’s never the right time to start, and even if you do, a task is never complete because it is held up to an impossible standard. A plateau of perfection is similar to a plateau of inaction.

Solution: First Steps, etc.

Accept that perfection isn’t achievable. Focus on taking the first step, and then the next step. There are some tricks that can help, such as structured procrastination and setting hard (but liberating) deadlines.

14. 66 Personal Development Habits For Smart People

Steve Pavlina's book, Personal Development for Smart People: The Conscious Pursuit of Personal Growth, offers an interesting look at self-improvement.

"Perception is the most basic aspect of truth," Pavlina writes, "If you want to improve some part of your life, you have to look at it first."

For example, if you want to know how your relationship is doing, you ask yourself "How do I feel about this relationship? What parts are working well? What parts need improvement?" Ask your partner the same questions and compare your answers. Figuring out where you stand will help you decide what changes you'd like to make. Perception is a key component of personal growth because we react to what we perceive to be true.

The first step "must be to recognize that your life as it stands right now isn't how you want it to be."

It's easy to say you should face the cold, hard, truth but in practice it can be very difficult.

However:

You can't get from point A to point B if you refuse to acknowledge that you're at point A!

There are two powerful ways you can apply your mind's predictive powers to accelerate your personal growth:

First, by embracing new experiences that are unlike anything you've previously encountered, you'll literally become more intelligent.

New situations shift your mind into learning mode, which enables you to discover new patterns. The more patterns your mind learns, the better it gets at prediction, and the smarter you become.

Read a book on a topic that's completely alien to you. Talk to people you'd normally avoid. Visit an unfamiliar city. Stretch beyond the patterns your mind has already learned. In order to grow, you must repeatedly tackle fresh challenges and consider new ideas to give your mind fresh input. If you merely repeat the same experiences, you'll stagnate, and your mental capacity will atrophy.

If you want to become smarter, you must keep stirring things up.

The second way to apply your mind's predictive powers is to make conscious, deliberate predictions and use those predictions to make better decisions. Think about where you're headed and ask yourself, "How do I honestly expect my life to turn out?"

Imagine that a very logical impartial observer examines your situation in detail, and predicts what your life will look like in 20 years, based on your current behavior. What kind of future will this person predict for you? If you're brave enough, ask several people who know you well to give you an honest assessment of where they see you in two decades. Their answers may surprise you.

A list of habits that can boost personal effectiveness (hacked and lightly edited):

1. Daily goals. Set targets for each day in advance. Decide what you'll do, then do it. Without a clear focus, it's too easy to succumb to distractions.
2. Worst first. To defeat procrastination, learn to tackle your most unpleasant task first thing in the morning, instead of delaying it until later. The small victory will set the tone for a very productive day.
3. Peak times. Identify your peak cycles of productivity, and schedule your most important tasks for those times. Work on minor tasks during your non-peak times.
4. No-comm zones. Allocate uninterruptible blocks of time for solo work where you must concentrate. Schedule light, interruptible tasks for your open-communication periods and more challenging projects for your blackout periods.

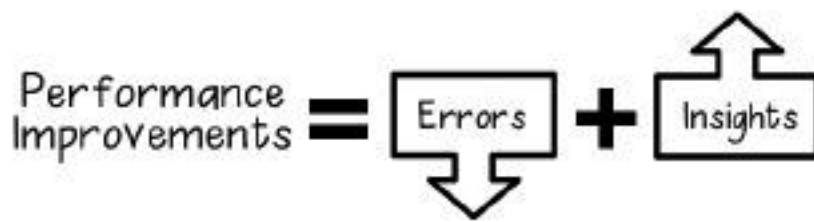
5. Mini-milestones. When you begin a task, identify the target you must reach before you can stop working. For example when writing a book, you could decide not to get up until you've written at least 1000 words. Hit your target no matter what.
6. Timeboxing. Give yourself a fixed time period – 30 minutes for example – to make a dent in a task. Don't worry about how far you get. Just put in the time.
7. Batching. Batch similar tasks such as phone calls or errands together, and knock them out in a single session.
8. Early bird. Get up at 5am and go straight to work on your most important task. You can get more done before 8am than most people do in a full day.
9. Pyramid. Spend 15-30 minutes doing easy tasks to warm up, then tackle your most difficult project for several hours. Finally end with another 15-30 minutes of easy tasks to transition out of work mode.
10. Tempo. Deliberately pick up the pace, and try to move a little faster than usual. Speak faster. Walk faster. Type faster. Read faster. Go home sooner.
11. Relaxify. Reduce stress by cultivating a relaxing, clutter-free workspace.
12. Agendas. Provide clear written agendas to meeting participants in advance. This greatly improves meeting focus and efficiency. You can use it for phone calls too.
13. Pareto. The Pareto principle is the 80-20 rule, which states that 80% of the value of a task comes from 20% of the effort. Focus your energy on that critical 20%, and don't overengineer the non-critical 80%.
14. Ready-fire-aim. Bust procrastination by taking action immediately after setting a goal, even if the action isn't perfectly planned. You can always adjust course along the way.
15. Minuteman. Once you have the information you need to make a decision, start a timer and give yourself just 60 seconds to make the actual decision. Take a whole minute to vacillate and second-guess yourself all you want, but come out the other end with a clear choice. Once your decision is made, take some kind of action to set it in motion.
16. Deadline. Set a deadline for task completion, and use it as a focal point to stay on track.
17. Promise. Tell others of your commitments, since they'll help hold you accountable.
18. Punctuality. Whatever it takes, show up on time. Arrive early.
19. Gap reading. Use reading to fill in those odd periods like waiting for an appointment, standing in line, or while the coffee is brewing. If you're a male, you can even read an article while shaving (preferably with an electric razor). That's 365 articles a year.
20. Resonance. Visualize your goal as already accomplished. Put yourself into a state of actually being there. Make it real in your mind, and you'll soon see it in your reality.
21. Glittering prizes. Give yourself frequent rewards for achievement. See a movie, book a professional massage, or spend a day at an amusement park.

22. **Priority.** Separate the truly important tasks from the merely urgent. Allocate blocks of time to work on the critical Quadrant 2 tasks, those which are important but rarely urgent, such as physical exercise, writing a book, and finding a relationship partner.
23. **Continuum.** At the end of your workday, identify the first task you'll work on the next day, and set out the materials in advance. The next day begin working on that task immediately.
24. **Slice and dice.** Break complex projects into smaller, well-defined tasks. Focus on completing just one of those tasks.
25. **Single-handling.** Once you begin a task, stick with it until it's 100% complete. Don't switch tasks in the middle. When distractions come up, jot them down to be dealt with later.
26. **Randomize.** Pick a totally random piece of a larger project, and complete it. Pay one random bill. Make one phone call. Write page 42 of your book.
27. **Insanely bad.** Defeat perfectionism by completing your task in an intentionally terrible fashion, knowing you need never share the results with anyone. Write a blog post about the taste of salt, design a hideously dysfunctional web site, or create a business plan that guarantees a first-year bankruptcy. With a truly horrendous first draft, there's nowhere to go but up.
28. **Delegate.** Convince someone else to do it for you.
29. **Cross-pollination.** Sign up for martial arts, start a blog, or join an improv group. You'll often encounter ideas in one field that can boost your performance in another.
30. **Intuition.** Go with your gut instinct. It's probably right.
31. **Optimization.** Identify the processes you use most often, and write them down step-by-step. Refactor them on paper for greater efficiency. Then implement and test your improved processes. Sometimes we just can't see what's right in front of us until we examine it under a microscope.
32. **Super Slow.** Commit yourself to working on a particularly hideous project for just one session a week, 15-30 minutes total. Declutter one small shelf. Purge 10 clothing items you don't need. Write a few paragraphs. Then stop.
33. **Dailies.** Schedule a specific time each day for working on a particular task or habit. One hour a day could leave you with a finished book, or a profitable Internet business a year later.
34. **Add-ons.** Tack a task you want to habitualize onto one of your existing habits. Water the plants after you eat lunch. Send thank-you notes after you check email.
35. **Plug-ins.** Inject one task into the middle of another. Read while eating lunch. Return phone calls while commuting. Listen to podcasts while grocery shopping.
36. **Gratitude.** When someone does you a good turn, send a thank-you card. That's a real card, not an e-card. This is rare and memorable, and the people you thank will be eager to bring you more opportunities.
37. **Training.** Train up your skill in various productivity habits. Get your typing speed to at least 60wpm, if not 90.

38. Denial. Just say no to non-critical requests for your time.
39. Recapture. Reclaim other people's poor time usage for yourself. Visualize your goals during dull speeches. Write out your grocery list during pointless meetings.
40. Mastermind. Run your problem past someone else, preferably a group of people. Invite all the advice, feedback, and constructive criticism you can handle.
41. Write down 20 creative ideas for improving your effectiveness.
42. Challenger. Deliberately make the task harder. Challenging tasks are more engaging than boring ones. Compose an original poem for your next blog post. Create a Power Point presentation that doesn't use words.
43. Asylum. Complete an otherwise tedious task in an unusual or crazy manner to keep it fun or interesting.
44. Music. Experiment with how music can boost your effectiveness.
45. Scotty. Estimate how long a task will take to complete. Then start a timer, and push yourself to complete it in half that time.
46. Pay it forward. When an undesirable task is delegated to you, re-delegate it to someone else.
47. Bouncer. When a seemingly pointless task is delegated to you, bounce it back to the person who assigned it to you, and challenge them to justify its operational necessity.
48. Opt-out. Quit clubs, projects, and subscriptions that consume more of your time than they're worth.
49. Decaffeinate. Say no to drugs, suffer through the withdrawal period, and let your natural creative self re-emerge.
50. Conscious procrastination. Delay non-critical tasks as long as you possibly can. Many of them will die on you and won't need to be done at all.
51. TV-free. Turn off the TV, especially the news, and recapture many usable hours.
52. Timer. Time all your tasks for an entire day, preferably a week. Even the act of measuring itself can boost your productivity, not to mention what you learn about your real time usage.
53. Valor. Pick the one item on your task list that scares you the most. Muster all the courage you can, and tackle it immediately.
54. Nonconformist. Run errands at unpopular times to avoid crowds. Shop just before stores close or shortly after they open. Take advantage of 24-hour outlets if you're a vampire.
55. Agoraphobia. Shop online whenever possible. Get the best selection, consult reviews, and purchase items within minutes.
56. Reminder. Add birthday and holiday reminders to your calendar a month or two ahead of their actual dates. Buy gifts then instead of at the last minute.

57. Do it now! Recite this phrase over and over until you're so sick of it that you cave in and get to work.
58. Coach. Hire a personal coach to keep yourself motivated, focused, and accountable. After several months of pep talks, you'll be qualified to start your own coaching practice.
59. Inspiration. Read inspiring books and articles, listen to audio programs, and attend seminars to keep absorbing inspiring new ideas (as well as to refresh yourself on the old ones).
60. Gym rat. Exercise daily. Boost metabolism, concentration, and mental clarity in 30 minutes a day.
61. Troll hunt. Banish the negative trolls from your life, and associate only with positive, happy, and successful people. Mindsets are contagious. Show loyalty to your potential, not to your pity posse.
62. Anakin. Would your problems be easier to solve if you turned evil? The dark side beckons...
63. Politician. Outsource your problems. How many can be solved more easily if you define them in financial terms? ...
64. Modeling. Find people who are already getting the results you want, interview them, and adopt their attitudes, beliefs, and behavior.
65. Proactivity. Even if others disagree with you, take action anyway, and deal with the consequences later. It's easier to request forgiveness than permission.
66. Real life. Give online life a rest, and reinvest that time into your real offline life, which, if you're a gamer, is probably suffocating beneath a pile of dead smelly orcas.

15. Improving Performance



Source: Seeing What Others Don't: The Remarkable Ways We Gain Insights

Via [Seeing What Others Don't: The Remarkable Ways We Gain Insights](#) (Kindle)

To improve performance, we need to do two things. The down arrow is what we have to reduce, errors. The up arrow is what we have to increase, insights. Performance improvement depends on doing both of these things.

We tend to look for ways to eliminate errors. That's the down arrow. But if we eliminate all errors we haven't created any insights. ...

Ideally, reducing mistakes would at least help us gain insights but I don't believe that's how it works. I suspect the relation between the arrows runs the other way. When we put too much energy into eliminating mistakes, we're less likely to gain insights. Having insights is a different matter from preventing mistakes.

When I showed this slide in my seminars, I got a lot of head nods. The participants agreed that their organizations were all about the down arrow. They felt frustrated by organizations that stifled their attempts to do a good job. Their organizations hammered home the message of reducing mistakes, perhaps because it is easier for managers to cut down on mistakes than to encourage insights. Mistakes are visible, costly, and embarrassing.

16. Three (Underrated) Reasons for Berkshire Hathaway's Success

Berkshire Hathaway is widely regarded as one of the most successful companies in the world. If you look at Warren Buffett's 49 year track record with Berkshire, it almost looks easy in hindsight. Make no mistake, however, it wasn't easy and he certainly didn't do it alone.

At this year's annual meeting Buffett and his longtime business partner, Charlie Munger, revealed "*the secret*" to their success. But it's not really a secret and, of course, extraordinary success is typically a combination of many things.

Underrated Factors that Enable Success

Here are three underrated factors that carried the bulk of the weight to creating Berkshire's success. Oddly, I don't think you'll find them on any business school curriculum.

1. Trust

Buffett is famous for his hands-off management style. He lets the CEOs of the companies run their show; he only asks that they send him the money they can't use.

Good people want to work with him and this is important because most of the people running Berkshire subsidiaries are already wealthy. They don't *have* to come to work; they *want* to come to work. And that is a huge difference. The only time you can get away with a crappy bureaucracy and a culture of distrust is when people *have* to come to work. *"By the standards of the rest of the world, we over-trust. And so far, our results have been far better, because we carefully selected people who should be over-trusted"*

— Charlie Munger

Every now and then something happens at a Berkshire company that calls into question his near abdication of responsibility to a subsidiary. "If only he had been paying attention," the critics chirp, "this wouldn't have happened." Those finger-waving critics are idiots. The alternative approaches are worse, not better.

There are many positives to the approach Buffett takes.

If Buffett closely managed each of his subsidiary CEOs to the point where most bosses manage their subordinates, they'd probably quit. If he sent out memos telling them all to use a new corporate HR system, they'd stop wanting to come to work. In fact Berkshire, a company with over 300,000 employees, has no HR department. If he peppered them with relentless emails from "headquarters" on some new policy, they'd ... well how do you feel about all of this stuff?

With Berkshire, Buffett wanted to do things his way. He wanted to paint his own canvas. He didn't want other people telling him to add a little more blue here and take away a little red there. Most people want to run their own show. And the best part? This system gets more out of people than micromanaging them.

Sure sometimes things go wrong, but for the most part the outcome is positively skewed. Things go wrong in other corporate cultures, they are not immune. When things go wrong in bureaucratic cultures, however, it's nearly impossible to hold anyone accountable because no one is really responsible for anything. And it's hard to hold people accountable when they are not responsible. It's a seductive illusion to think that we can create a system where people can't mess up. Buffett's hands-off approach makes it clear who is responsible for what. And this approach, not stock options, creates a *real* ownership culture.

This system also frees up Buffett's time. He doesn't have to chase management details, read power-points, etc. He can sit and read and think — that means he does what he does best. And judging by the results, this has worked out well.

Hiring the right people and trusting them is incredibly underrated and yet nearly impossible to find in large established bureaucratic organizations. Yet as Buffett shows, it's a much better approach. Trust is incredibly powerful.

2. (Quickly) Scramble Out of Your Mistakes

You know the old adage, when you find yourself in a hole the first thing to do is stop digging. That applies to business as well as life.

In the late 1960s Buffett acquired a department store, Hochschild-Kohn, through a company called Diversified Retailing, which later merged with Berkshire.

"It's a learning process, and mistakes made in one year often contribute to competence and success in succeeding years."

— Warren Buffett

The people running the company were, in Buffett's words, "first-class." Retailing, however, is a difficult industry, even with a first-class management team. They were, in Buffett's words, "running in quicksand." Realizing this quickly after the ink dried on the contract, Berkshire "scrambled" out of it, selling Hochschild-Kohn as quickly as they could — 3 years.

Business schools don't generally teach this either. What they teach and reinforce, in so many ways, is that you can be the hero. You can be the exception to the base rate.

But in life and business, you don't need to be the hero. There are no points for difficulty, so as Munger alluded to, smart people will play where competition is weak.

You can have the best management team that money can buy and still fail big in retailing — a recent example being JC Penney.

Buffett learned quickly that, in his words, "When a management with a reputation for brilliance tackles a business with a reputation for bad economics, it is the reputation of the business that remains intact."

3. Remove Ignorance

Diversified Retailing also owned shares in a better business: Blue Chip Stamps, which provided supermarkets and other retailing outlets trading stamps to give their customers that could be exchanged for merchandise.

"See's has provided us with lots of cash for acquisitions and opened my eyes to the power of brands. We made a lot in Coca-Cola partly because of See's. There's something about owning [a brand] to educate yourself about things you might do in the future. I wouldn't be at all surprised that if we hadn't owned See's, we wouldn't have bought Coca-Cola."

— Warren Buffett

The contrast between running a good business and a poor one stuck with Munger and Buffett and they decided to pay up for a real quality business. On January 3, 1972 Blue Chip Stamps bought See's Candies, a West Coast Manufacturer and retailer of boxed-chocolates. See's is an *extraordinary* business.

As a great business, most people think that See's main contribution to Berkshire was its overwhelming financial success. It wasn't. According to Munger, See's main contribution was "ignorance removal."

"We were barely smart enough to buy it," he said. See's taught them a powerful lesson, the value of strong brand names.

Without See's, they never would have purchased Coke shares in the 80s. And without Coke, Berkshire would be a lot less prosperous today as that investment has been one of their best.

"If there's any secret we have, it's ignorance removal. And the nice thing is we still have a lot of ignorance left to remove," Munger said at the 2014 Shareholders meeting.

Removing ignorance is about continuously getting smarter. Avoiding stupidity is easier than seeking brilliance.

I don't know why more people don't copy these three underrated factors to Berkshire's success.

To sum up:

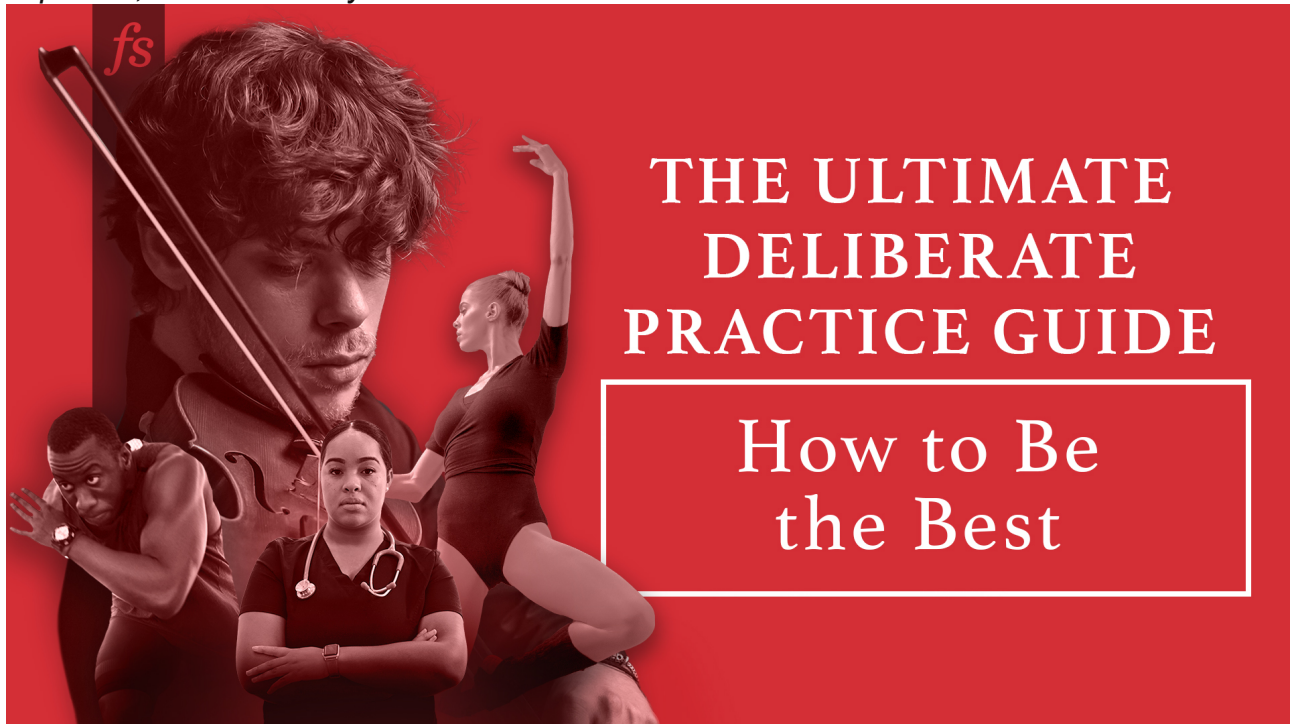
1. Hire good people and trust them.
2. Quickly admit mistakes and scramble out of them.
3. Remove your ignorance by always learning.

This formula is simple but not easy.

17. The Ultimate Deliberate Practice Guide: How to Be the Best

Everything You Need to Know to Improve Your Performance at Anything—For Beginners and Experts

Deliberate practice is the best technique for achieving expert performance in every field—including writing, teaching, sports, programming, music, medicine, therapy, chess, and business. But there's much more to deliberate practice than 10,000 hours. Read this to learn how to accelerate your learning, overcome the "OK" plateau, turn experience into expertise, and enhance your focus.



What is deliberate practice?

*“Engaged in the creative process we feel more alive than ever, because we are making something and not merely consuming, masters of the small reality we create. In doing this work, we are in fact creating ourselves.” —Robert Greene, *Mastery**

Deliberate practice is what turns amateurs into professionals. Across every field, deliberate practice is what creates top performers and what they use to stay at the top of their game. It's absolutely essential for expert performance.

As a general concept, “practice” means preparing. It's the act of repeatedly performing certain activities with the intention of improving a specific associated skill. We rehearse what to do in low-pressure situations so we'll be better when we use a skill in situations where something is actually at stake, such as in a competition or in the workplace.

Although this definition may seem obvious, it's crucial to distinguish between doing something and practicing it, because they're not always synonymous.

The key distinction between doing and practicing is that we're only practicing something when we do it in a way that makes us better at it—or at least with that intention.

Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them. Unlike regular practice, in which we work on a skill by repeating it again and again until it becomes almost mindless, deliberate practice is a laser-focused activity. It requires us to pay unwavering attention to what we're doing at any given moment and whether it's an improvement or not.

Geoff Colvin summarizes deliberate practice as such in *Talent Is Overrated*:

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding

mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

The extraordinary power of deliberate practice is that it aims at constant progress. Practitioners are not content with repeating a skill at the same level. They have metrics for measuring their performance. And they aspire to see those metrics get continuously better. While engaging in deliberate practice, we are always looking for errors or areas of weakness. Once we identify one, we establish a plan for improving it. If one approach doesn't work, we keep trying new ones until something does.

Using deliberate practice, we can overcome many limitations that we might view as fixed. We can go further than we might even think possible when we begin. Deliberate practice creates new physical and mental capabilities—it doesn't just leverage existing ones. The more we engage in deliberate practice, the greater our capabilities become. Our minds and bodies are far more malleable than we usually realize.

Deliberate practice is a universal technique, and you can employ it for whatever you're trying to be the best (or just get a little bit better) at. It's easiest to apply to competitive fields with clear measurements and standards, including music, dance, football/soccer, cricket, hockey, basketball, golf, horse riding, swimming, and chess.

But deliberate practice is also invaluable for improving performance in fields such as teaching, nursing, surgery, therapy, programming, trading, and investing. It can even accelerate your progress in widely applicable skills such as writing, decision-making, leadership, studying, and spoken communication.

The key in any area is to identify objective standards for performance, study top performers, and then design practice activities reflecting what they do. Recent decades have seen dramatic leaps in what people are capable of doing in many fields. The explanation for this is that we're getting better at understanding and applying the principles of deliberate practice. As a field advances, people can learn from the best of what those who came before them figured out. The result is that now average high-schoolers achieve athletic feats and children advance to levels of musical prowess that would have seemed unthinkable a century earlier. And there's little evidence to suggest we've reached the limits of our physical or mental abilities in any area whatsoever.

Many of us spend a lot of time each week practicing different skills in our lives and work. But we don't automatically get better just because we repeat the same actions and behaviors, even if we spend hours per day doing it. Research suggests that in areas such as medicine, people with many years of experience are often no better than novices—and may even be worse.

If we want to improve a skill, we need to know *what* exactly has to change and what might get us there. Otherwise, we plateau.

Some people will tell you it's only possible for anyone to improve at anything through deliberate practice, and any other sort of practice is a waste of time. This is an exaggeration. In reality, regular practice works for reinforcing and maintaining skills. It can also help us improve skills, particularly in the early stages of learning something. However, deliberate practice *is* the only way to:

1. Reach expert-level performance and enjoy competitive success
2. Overcome plateaus in our skill level
3. Improve at a skill much faster than through regular practice

If you're just doing something for fun and don't care about constantly improving at it, you don't need deliberate practice. For example, maybe you like to go for a walk around a local park in the afternoons to clear your head. Although you're practicing that walk each time you go, you probably don't care about increasing your walking speed day by day. It's

enough that the repetitions further ingrain the habit and help maintain a certain level of physical fitness. Not everything in life is a competition! But if you want to keep getting better at something as fast as possible or reach an expert level, deliberate practice is vital. Another important point to note is that deliberate practice isn't just a catchy name we came up with out of thin air. The term is largely attributed to Karl Anders Ericsson, one of the most influential figures of all time in the field of performance psychology. It's something many scientists have studied for decades. Everything we say here is supported by substantial academic research, particularly Ericsson's work. We'll also debunk the numerous myths swirling around deliberate practice as a concept and reveal some of its significant limitations. So if you're looking for quick hacks for overnight success, you might want to look elsewhere. If you want a realistic roadmap for improving your performance, read on.

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The elements of deliberate practice

“Life is not always a matter of holding good cards, but sometimes, playing a poor hand well.” —Jack London

In this section, we'll break down the fundamental elements of deliberate practice and exactly how to incorporate them into your practice sessions. As Ericsson wrote in *Peak*, *“No matter what the field, the most effective approach to improving performance is to follow a single set of principles.”* We'll explain why each component is crucial and how they apply to different fields, and we'll cover multiple ways to implement them depending on your goals.

Deliberate practice is structured and methodical

“Everyone has talent. What's rare is the courage to follow it to the dark places where it leads.” —Erica Jong

As humans, we're wired to want to do the easiest thing at all times in order to conserve energy. Put more simply, it's in our nature to be lazy. When we practice something a lot, we develop habits that become almost effortless to enact. While that's beneficial in many areas of our lives (and helps us survive), it's something we have to overcome in order to engage in deliberate practice. We can't expect constant improvement if we keep repeating the elements of a skill we already know how to do with ease. That's only enough if we're just having fun or want to reinforce our habits.

Deliberate practice is structured to improve specific elements of a skill through defined techniques. Practitioners focus above all on what they *can't* do. They seek out areas of weaknesses impacting their overall performance, then target those. At every stage, they set tailored, measurable goals in order to gauge whether their practice is effective at moving them forwards. Numbers are a deliberate practitioner's best friend.

If you want to reach an expert level of performance, you need to begin practice sessions with a plan in mind. You need to know what you're working on, why, and how you intend to improve it. You also need a way to tell if your improvement efforts aren't working and if you need to try a new tactic. Once you reach your goal for that particular component of the skill, it's time to identify a new area of weakness to work on next.

Having lots of little, realistic goals with a game plan for achieving them makes deliberate practice motivating. There's a sense of ongoing movement, yet the next step is always a realistic stretch. Day by day, the gains from deliberate practice may feel modest. But when we look back over a longer period of time, small bits of progress compound into gigantic leaps.

How to implement this: Take the skill you're aiming to improve and break it down into the smallest possible component parts. Make a plan for working through them in a logical order, beginning with the fundamentals, then building upon them. Decide which parts you'd like to master over the next month. Put your practice sessions in your calendar, then plan precisely which parts of the skill you're going to work on during each session.

Don't expect your plan to be perfect. You'll likely need to keep modifying it as you discover new elements or unexpected weaknesses. The most important thing is to always go into practice with a plan for what you're working on and how. Knowing what you're doing next is the best way to stay on track and avoid aimless time-wasting. That means seeking to keep figuring out what separates you from the next level of performance so you can concentrate on that.

Deliberate practice is challenging and uncomfortable

"One must develop an instinct for what one can just barely achieve through one's greatest efforts." —Albert Einstein (attributed)

Imagine the world from the perspective of a baby learning to walk for the first time. It's not usually an easy process. They need to develop a lot of new skills and capabilities. They need to build enough muscular strength to stand upright without support. And they need to learn how to coordinate their limbs well enough to move around. Along the way, a baby needs to develop numerous sub-skills, such as how to grip supports to pull themselves up. It likely takes thousands of attempts to master walking—as well as numerous, falls, collisions, and other mishaps. We might not remember the process as adults, but a baby learning to walk needs to spend many hours challenging themselves and moving incrementally out of their comfort zone.

If we want to use deliberate practice, we could do with learning a thing or two from babies. Deliberate practice isn't necessarily fun while we're doing it. In fact, most of the time it's a process of repeated frustration and failure. We have to fall down a dozen times for every step we take. That's the whole point.

Seeing as deliberate practice requires us to keep targeting our weakest areas, it means spending time doing stuff we're not good at. In the moment, that can feel pretty miserable. But the quickest route to improvement involves stepping outside of our comfort zones.

The reason why people who have spent decades doing something are not necessarily better than newbies is that they're liable to get complacent and stop pushing themselves. We need to keep attempting to do things that feel out of reach at the moment.

In his studies of elite violinists, Ericsson asked them to rate different practice activities by how enjoyable they were and how much they contributed to improving performance.

Invariably, there was an inverse correlation between the usefulness of an activity and its enjoyability. As Ericsson puts it in *Peak*:

The reason that most people don't possess these extraordinary physical capabilities isn't because they don't have the capacity for them, but rather because they're satisfied to live in the comfortable rut of homeostasis and never do the work that is required to get out of it. They live in the world of "good enough." The same thing is true for all the mental activities we engage in.

Elsewhere in the book, he writes *"This is a fundamental truth about any sort of practice: If you never push yourself beyond your comfort zone, you will never improve."* The interesting part is the more time you spend deliberately practicing, the more comfortable you'll become with being uncomfortable.

Daniel Coyle writes in *The Little Book of Talent*:

There is a place, right on the edge of your ability, where you learn best and fastest. It's called the sweet spot. . . . The underlying pattern is the same: Seek out ways to stretch yourself. Play on the edges of your competence. As Albert Einstein said, "One must develop an instinct for what one can just barely achieve through one's greatest efforts." The key word is 'barely.'

A quick way to assess if you're doing deliberate practice or just regular rote practice is to ask yourself if you ever feel bored or zone out during practice sessions. If the answer is yes, you're probably not practicing deliberately.

Deliberate practice isn't boring. Frustrating, yes. Maddening, yes. Annoying, even. But never boring. As soon as practicing a skill gets comfortable, it's time to up the stakes. Challenging yourself is about more than trying to work harder—it means doing new things. Pushing ourselves just beyond the limits of our abilities is uncomfortable, yet it's how we do our best—and indeed, it can be the source of some of our greatest moments of satisfaction. According to psychologist Mihaly Csikszentmihalyi, we often experience happiness as a result of entering a "flow" state, which occurs when we intensely focus on an activity that is challenging yet achievable. During moments of flow, we become so immersed in the activity that we lose any sense of time or of ourselves.

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time when we're practicing, we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed, as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of our reach.

Repetition inside the comfort zone does not equal deliberate practice. Deliberate practice requires that you operate in the learning zone and you repeat the activity a lot with feedback.

How to implement this: Each time you practice a component of a skill, aim to make it 10% harder than the level you find comfortable.

Once per month, have a practice session where you set yourself an incredibly ambitious stretch goal—not impossible, just well above your current level. Challenge yourself to see how close you can get to it. You might surprise yourself and find you perform far better than expected.

A common deliberate practice mistake is to plan a long practice session, then adjust the intensity of your practice to allow you to engage in a skill for the whole time. It's far more effective to engage in "sprints." Practice with the most intense focus you can manage for short periods of time, then take breaks. Seeing as you learn most when you stretch yourself beyond your current capabilities, shorter, more challenging practice periods are the way to go.

Deliberate practice requires rest and recovery time

“There is a time for many words, and there is also a time for sleep.” —Homer, The Odyssey

Seeing as deliberate practice is so challenging, it’s impossible to do it all day long. Across fields, top practitioners rarely spend more than around three to five hours per day on deliberate practice, at the high end. They may work for more hours than that per day, but few can sustain the mental energy to engage in deliberate practice for eight hours a day. Additional hours often result in diminishing negative returns, meaning more practice makes performance worse because it results in burnout. Geoff Colvin writes:

The work is so great that it seems no one can sustain it for very long. A finding that is remarkably consistent across disciplines is that four or five hours a day seems to be the upper limit of deliberate practice, and this is frequently accomplished in sessions lasting no more than an hour to ninety minutes.

Ericsson’s studies of elite violinists found they often took afternoon naps and slept an average of eight hours per night, considerably more than the average person. They were highly aware of the importance of sleep.

Even fitting in a single hour per day of deliberate practice is ample time to make substantial improvements, especially when we’re consistent with committing to it over the long haul. Continuous investments in success compound. In the long run, commitment pays off.

Not only do most deliberate practitioners not spend all day at it, they also devote a lot of time to recuperation and recovery. They sleep as much as their bodies need. They nap if necessary. They take frequent, refreshing breaks. Most of us understand that rest is necessary after physical activity. But we can underestimate its importance after mental activity, too. Deliberate practice needs to be sustainable for the long term. How long a person keeps at a skill is often far more important than how many hours a day they spend on it.

When you’re practicing deliberately, truly practice. When you’re recuperating, truly relax. No one can spend every waking hour on deliberate practice.

Sleep is a vital part of deliberate practice. Being asleep doesn’t mean you’re not still improving your skill. We consolidate memories at night, moving them from short-term to long-term memory. And we can’t exactly benefit from deliberate practice sessions if we don’t remember what we learn each time. Not only that, but sleep deprivation also results in a plethora of negative cognitive effects that impact performance. If we skimp on sleep, we’re likely to forget far more of what we learn during deliberate practice sessions, rendering them less useful.

When you’re not engaging in deliberate practice, your brain is still at work. During deliberate practice, we’re in focused mode. When we let our minds wander freely while at rest, we’re in diffuse mode. Although that time feels less productive, it’s when we form connections and mull over problems. Both modes of thinking are equally valuable, but it’s the harmony between them that matters. We can’t maintain the effort of the focused mode for long. At some point, we need to relax and slip into the diffuse mode. Learning a complex skill—a language, a musical instrument, chess, a mental model—requires both modes to work together. We master the details in focused mode, then comprehend how everything fits together in diffuse mode. It’s about combining creativity with execution. How to implement this: Make a list of activities you can engage in without too much conscious thought, letting yourself daydream while you do them. Common examples include going for a walk, washing the dishes, taking a shower, free-writing in a journal, playing with a toy like Lego, driving a familiar route, gardening, cooking, listening to music, or just gazing out the window. When you feel yourself getting tired or hitting a roadblock during deliberate practice, don’t keep pushing for too long. You want to be stretching yourself, not exhausting yourself. Instead, switch to one of those more relaxing activities

for at least five minutes. You'll likely come back to practice with new connections or at last feeling refreshed.

When you're practicing deliberately, truly practice. When you're recuperating, truly relax. No one can spend every waking hour on deliberate practice.



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Deliberate practice involves constant feedback and measurement

"Deliberate practice is hard. It hurts. But it works. More of it equals better performance and tons of it equals great performance." —Geoff Colvin, *Talent Is Overrated*

Practicing something without knowing whether you are getting better is pointless. Yet that is what most of us do every day without thinking.

As we saw before, deliberate practice involves continuously stretching yourself to improve on weak areas of a skill. For that to work, practitioners require constant feedback about their current level of performance so they can identify what works for making it better. What gets measured gets managed. To engage in deliberate practice, you need a way of measuring the most instructive metrics related to your performance. Seeing how those metrics change is the sole way to know if practice is working or not. Top performers across fields tend to spend time examining their past performance with care to identify areas for improvement. For example, a tennis player might film themselves playing a match so they can go through the footage frame by frame afterward. This provides valuable feedback, because they can figure out what might have held them back during weaker moments. In fields such as sports and chess, measuring performance tends to be straightforward. In other areas such as business, measurements are harder to take, and there may be no established markers of success. The influence of random factors may also be stronger, making it less clear whether technique changes are actually having an influence or not. When you engage in deliberate practice, it's always important to be aware of how strongly correlated your practice and your performance are likely to be.

When measuring your performance, beware of vanity metrics. These are numbers that are easy to calculate and feel good to boost. But they don't actually move the needle towards the real improvements in performance that help you reach your goals. For example, let's say you're using deliberate practice to improve the skill of email marketing, as part of the wider goal of getting more customers for your business. The number of email subscribers is a vanity metric; the number of paying customers is a useful metric. It's completely possible to increase the former without a corresponding increase in the latter.

How to implement this: Identify the most significant metrics related to performance in your chosen skill and keep a record of them each time you practice. It's easy to fool yourself

without a clear record of how you're doing. You might want to break the skill down into a few different parts to measure it, but make sure you're not fixating on vanity metrics. Deliberate practice is most effective with the help of a coach or some kind of teacher *"The best teacher is not the one who knows most but the one who is most capable of reducing knowledge to that simple compound of the obvious and wonderful."* —H.L. Mencken (attributed)

Deliberate practice is most effective when conducted with some kind of coach who can give feedback, point out errors, suggest techniques for improvement, and provide vital motivation. Although mastering any skill requires a lot of time engaging in solitary practice, working with a coach at least some of the time is incredibly valuable. In some fields such as sports and music, it's common for a coach to be present all of the time. But most top performers benefit from a combination of coaching and solitary practice.

When we look at the lives of people who achieved great things, we often find that those who did so at a young age or in a shorter time than expected benefited from having fantastic teachers. For example, physicist Werner Heisenberg had the epiphany that led to the formulation of matrix mechanics a mere five years after commencing serious study of physics. But he no doubt benefited from the mentorship of Niels Bohr and Max Born, two of the foremost physicists at the time.

Even people at the most elite levels of performance across fields can benefit from specialist coaching. Engaging in something and teaching that thing are separate skills in themselves. The best practitioners are not always the best teachers because teaching is a skill in itself.

Ericsson explained that *"the best way to get past any barrier is to come at it from a different direction, which is one reason it is useful to work with a teacher or coach."* We often make the same mistakes again and again because we simply don't realize what we're doing. Our performance falls into ruts and we can't figure out why we're running into the same problem yet again.

A coach can see your performance from the outside, without the influence of overconfidence and other biases. They can identify your blind spots. They can help you interpret key metrics and feedback.

Ericsson went on to say that *"even the most motivated and intelligent student will advance more quickly under the tutelage of someone who knows the best order in which to learn things, who understands and can demonstrate the proper way to perform various skills, who can provide useful feedback, and who can devise practice activities designed to overcome particular weaknesses."* An experienced coach will have worked with many people on the same skill so they'll be able to advise on the best ways to structure practice. They'll know when you're just repeating what you find easy, and they'll be able to push you to the next level.

Teachers or coaches see what you miss and make you aware of where you're falling short. Geoff Colvin writes:

In some fields, especially intellectual ones such as the arts, sciences, and business, people may eventually become skilled enough to design their own practice. But anyone who thinks they've outgrown the benefits of a teacher's help should at least question that view. There's a reason why the world's best golfers still go to teachers.

But what if you don't have access to a coach? What if you don't have the means to hire one or one isn't available for your particular skill? In that case, it's still possible to apply the same principles that make a coach useful by yourself. Top performers across fields build the skill of metacognition, essentially making it possible for them to coach themselves.

Colvin explains:

The best performers observe themselves closely. They are in effect able to step outside themselves, monitor what is happening in their own minds, and ask how it's going.

Researchers call this metacognition—knowledge about your own knowledge, thinking

about your own thinking. Top performers do this much more systematically than others do; it's an established part of their routine.

...A critical part of self-evaluation is deciding what caused those errors. Average performers believe their errors were caused by factors outside their control: my opponent got lucky; the task was too hard; I just don't have the natural ability for this. Top performers, by contrast, believe they are responsible for their errors. Note that this is not just a difference of personality or attitude. Recall that the best performers have set highly specific, technique-based goals and strategies for themselves; they have thought through exactly how they intend to achieve what they want. So when something doesn't work, they can relate the failure to specific elements of their performance that may have misfired.

How to implement this: Don't expect the same teacher to suit you forever. We usually need different teachers as our skill level progresses because we outgrow them. One attribute of a good teacher is that they know when to tell a student to move on. As we reach expert levels of performance, we need teachers who are themselves experts. If they're always a step ahead, we can learn from their mistakes instead of making our own.

You get the best results from working with a coach if you show yourself to be receptive to constructive criticism, even if it's uncomfortable to hear. If you respond badly, you disincentivize them from telling you what's most useful to know. Top performers know the goal is to get better, not just to hear you're already great.

Deliberate practice requires intrinsic motivation

Persisting with deliberate practice despite its innate difficulty and discomfort requires a lot of motivation. But that motivation needs to be intrinsic, meaning that it comes from inside us because we find an activity enjoyable for its own sake. This is in contrast to extrinsic motivation, where we participate in an activity to gain an external reward or avoid a negative consequence. Yet another reason why rest is important for deliberate practice is because it helps sustain motivation.

Although deliberate practice can lead to external rewards for using a skill (such as winning a competition or getting a promotion), this should not be the sole reason for practicing it. Extrinsic motivation is unlikely to be enough to get us through the long period of struggle necessary to master a skill. Becoming proficient at anything means spending time failing repeatedly at it, during which there are few external rewards. But if we enjoy getting better for its own sake, we have more of a chance of persevering until our practice starts paying off. We can navigate obstacles because we want to see where the road might take us—the obstacles aren't roadblocks.

If you want to use deliberate practice to master a skill, you need to be willing to keep practicing it no matter what. Although brute force and rewarding yourself can be effective in the short run, it won't work forever. If you're planning to engage in deliberate practice to reach expert-level performance, make sure it's a prospect you feel excited about even if it won't always be fun.

Extrinsic motivation isn't always ineffective, however. People who engage in consistent, sustainable deliberate practice tend to be adept at knowing when and how they need to employ external incentives. It's important to reward yourself when you make progress in your practice and reflect on how far you've come, not just how far is left to go.

The need for intrinsic motivation is one reason why children who are pushed to develop a skill from a young age by their parents don't always end up reaching a high level of performance and often quit as soon as they can.

How to implement this: Make a list of the reasons you want to work on a skill and the benefits getting better at it might bring. Before you begin a deep practice session, reread the list to remind you of why you're bringing your full focus to something difficult. You could also list some of the benefits you've experienced from it in the past or include quotes from top performers in your field you find inspiring. It might feel cheesy, but it can provide a

powerful boost during particularly difficult practice moments. Try to focus on intrinsic reasons and benefits, such as feeling fulfilled.

Keep a “motivation diary” for one week (or longer if possible.) Try setting an alarm to go off every fifteen minutes during each practice session. When the alarm sounds, score your motivation level out of ten (or whichever scale you prefer.) At the end of the week, review your notes to look for any patterns. For example, you might find that you begin to feel demotivated once you’ve been practicing for more than an hour, or that you feel more motivated in the morning, or some other pattern. This information could be enlightening for planning future deliberate practice sessions, even if it may disrupt your focus at the time. Another method is to simply take notes each day, documenting your current level of motivation to work on your chosen skill. Pay attention to any recurring influences. For example, you might feel more motivated to improve your skill after speaking with a more proficient friend, but less motivated after a bad night’s sleep.

One potent option for sustaining motivation is to find someone who can be a reliable cheerleader for you. In an Ask Me Anything session for Farnam Street members, Tesla co-founder Marc Tarpenning explained that having a cofounder is vital for entrepreneurs because partnering with someone else helps sustain motivation. It’s rare that both founders feel demotivated on the same day. So if one is struggling, the other can provide the encouragement needed to stay resilient. Having someone to provide extrinsic motivation when you need it can help you persevere at deliberate practice. Your cheerleader doesn’t necessarily need to be working on the same skill themselves. They just need to understand your reasons and be willing to remind you of them when you start to doubt whether the hard work is worthwhile.

Deliberate practice takes time and can be a lifelong process

Although deliberate practice tends to result in much faster progress than normal practice, truly mastering a skill is a lifelong process. Reaching the top of a field can take years or even decades, depending on its competitiveness. As the bar for success in many areas keeps rising, more deliberate practice is required to stand out.

When we applaud the top people in any field, we often fail to appreciate that their success almost always came after many years of deliberate practice, which Robert Greene refers to in *Mastery* as “a largely self-directed apprenticeship that lasts some five to ten years [and] receives little attention because it does not contain stories of great achievement or discovery.” They may have ultimately benefited from a lucky break, but their extensive preparation meant they were ready for it. Great achievements tend to come later in life or even near the ends of careers. Those who succeeded young started very young.

Throughout Ericsson’s decades of research, he searched high and low for an example of a true prodigy: someone born with an innate, remarkable talent. He never found a single proven example. Instead, he discovered that people labeled as prodigies invariably put in enormous amounts of deliberate practice—they just often obscured it on purpose or started at a young age.

Although innate differences count when beginning to learn something (and people who begin with advantages may be more likely to persist), in the long run, deliberate practice always wins out.

David Shenk writes in *The Genius in All of Us*: “Short-term intensity cannot replace long-term commitment. Many crucial changes take place over long periods of time.

Physiologically, it’s impossible to become great overnight.”

According to psychologist John Hayes, creative genius tends to come after ten years of studying relevant knowledge and developing skills. Hayes referred to this as the “ten years of silence.” In a study of seventy-six composers with sufficient biographical data available listed in *The Lives of the Great Composers*, Hayes found they almost always created their first notable works (defined as being those for which at least five different recordings were available at the time) at least ten years after commencing a serious study of music. Just

three of the five hundred works Hayes included in his sample were composed after less than a decade of preparation—and those were produced in years eight or nine. In additional studies, Hayes found similar patterns for painters and poets.

Later research reinforces Hayes' findings, and any casual survey of the lives of people widely considered to be geniuses tends to show a similar pattern. Making a breakthrough takes time. When it seems like someone was an overnight success, there's almost always a long period of silent deliberate practice preceding it. Innate talents are just a starting point. If we want to master a skill, we need to commit to working on it for a lengthy period of time, likely with few rewards. While there are no assurances that with struggle comes reward, without it the odds are lower.

Not only do world-class performers spend a long time getting good at their core skill, those in creative fields tend to produce an enormous quantity of work before gaining recognition. For every piece of work we're familiar with, there are likely dozens or even hundreds of others few people remember or ever saw.

For example, British prime minister Winston Churchill was known for his masterful public speaking. One of his best-known speeches "We Shall Fight on the Beaches," given in June 1940, displayed the extent of his command of oration and helped build morale at the time. But it's hard to overstate how prolific Churchill was as a speaker, giving an estimated 3,000 speeches during his political career. For every speech—an average of one per week between 1900 and 1955—he used deliberate practice to prepare. He engaged in focused rehearsals in front of a mirror, taking notes as he went to inform modifications. Churchill also left nothing to chance, planning his pauses and movements in advance. As well as devising his own techniques for added impact, he memorized the works of some of history's most inspiring orators.

Although he doubtless began with a degree of innate talent (his father, Randolph Churchill, was also an admired orator), Churchill clearly used extensive deliberate practice to build upon it. While this impressive resume and history solidified his place on the throne of oratorical excellence, it's important to note that he wasn't a "born speaker"—in fact, he made many mistakes. And he learned from them. If you want to produce a masterpiece, you need to accept that you'll make a lot of less remarkable work first.

Deliberate practice requires intense focus

"You seldom improve much without giving the task your full attention." —Karl Anders Ericsson

The deeper we focus during deliberate practice sessions, the more we get out of them. Intense focus allows us to increase skills and break through plateaus. Developing your attention span can have a huge impact on your life. When asked about his success, Charlie Munger once said, *"I succeeded because I have a long attention span."*

The authors of *The Game Before the Game* write, *"If you can pay attention for only five minutes in practice, then take a break every five minutes. If you can pay attention for only twenty balls, don't hit fifty. To be able to practice longer and maintain the quality of the practice, train yourself to pay attention for longer periods of time....Productive practice is about how present you can stay with your intention and is measured in the quality of the experience as opposed to the quantity of time used."*

A benefit of getting constant feedback is that it shows you what moves the needle towards improved performance and what is just running in place. Certain practice activities can feel good without having any impact. Top performers prioritize knowing what to prioritize. They always start with the most important thing because anything else is a distraction.

Intense focus is a multiplier of everything else. Keeping an eye on key metrics enables top performers to identify and systematically remove distractions from their lives. To be the best, you need to focus on both the micro and macro level. You need to pay full attention to what you're doing in the current practice sessions, and you need to know how it fits into

the bigger picture of your desired trajectory. Deliberate practice is part of the exploit phase of selecting opportunities.

As the authors of the *International Handbook of Research in Professional and Practice-Based Learning* write, “*Practicing the right things is at the core of the theory of deliberate practice.*”

How to implement this: Put the big rocks in first. You can do anything, but you can’t do everything. Figure out which practice activities have the biggest influence on your performance and plan to engage in those first before you even consider activities that offer marginal gains.

Deliberate practice leverages the spacing effect

One reason why consistent deliberate practice sessions over the course of years are more effective than longer sessions for a shorter period of time relates to the spacing effect. We can’t approach learning a skill through deliberate practice in the same way we quite likely approached studying for tests in school. If we better understand how our minds work, we can use them in the optimal way for learning. By leveraging the spacing effect, we can encode valuable knowledge related to our particular skill for life during practice sessions. Memory mastery comes from repeated exposure to the same material. The spacing effect refers to how we are better able to recall information and concepts if we learn them in multiple sessions with increasingly large intervals between them. The most effective way to learn new information is through spaced repetition. It works for learning almost anything, and research has provided robust evidence of its efficacy for people of all ages—and even for animals.

Spaced repetition is also satisfying because it keeps us on the edge of our abilities (which, as we saw earlier, is a core element of deliberate practice.) Spaced sessions allow us to invest less total time to memorize than one single session, whereas we might get bored while going over the same material again and again in a single session. Of course, when we’re bored we pay less and less attention. The authors of *Focused Determination* put it this way:

There is also minimal variation in the way the material is presented to the brain when it is repeatedly visited over a short time. This tends to decrease our learning. In contrast, when repetition learning takes place over a longer period, it is more likely that the materials are presented differently. We have to retrieve the previously learned information from memory and hence reinforce it. All of this leads us to become more interested in the content and therefore more receptive to learning it.

We simply cannot practice something once and expect it to stick.

By engaging in deliberate practice on a regular basis, even if each practice session is short, we leverage the power of the spacing effect. Once we learn something through spaced repetition, it actually sticks with us. After a certain point, we may only need to revisit it every few years to keep our knowledge fresh. Even if we seem to forget something between repetitions, it later proves easier to relearn.

How to implement this: Forget about cramming. Each time you’re learning a new component of a skill, make a schedule for when you’ll review it. Typical systems involve going over information after an hour, then a day, then every other day, then weekly, then fortnightly, then monthly, then every six months, then yearly. Guess correctly and the information moves to the next level and is reviewed less often. Guess incorrectly and it moves down a level and is reviewed more often.

The history of deliberate practice

Karl Anders Ericsson: The expert on expertise

"Learning isn't a way of reaching one's potential but rather a way of developing it." —Karl Anders Ericsson, *Peak*

The concept of deliberate practice is attributed to Florida State University psychologist Karl Anders Ericsson, who along with his collaborators performed pioneering research in the field of expert performance. Ericsson spent decades seeking to answer the question of what it takes to become really good at something difficult. His research often focused on medicine, music, and sports.

Ericsson's interest in expert performance kicked off in the late 1970s, when he began working with psychologist Bill Chase at Carnegie Mellon University to study short-term memory. Together, they began a series of experiments to see how many random digits it's possible to memorize after hearing them once. Ericsson and Chase used an undergrad named Steve Faloan as their guinea pig. For a few hours each week, they read out numbers and Faloan repeated as many as he could recall.

Although the experiment might sound dull, they uncovered something intriguing. In a 1982 paper entitled "Exceptional Memory," Ericsson and Chase summarized their findings. Previously, researchers believed the average person could hold just seven random digits in their short-term memory. Yet with careful practice, Faloan began to remember more and more numbers. At his peak and after 200 hours of practice, he could recall 82 digits. To assess if this was a fluke, Ericsson tried the same with a friend, Dario Donatelli. Five years later, Donatelli could recall 113 digits. Both he and Faloan went far beyond what seemed to be an immovable ceiling on human performance and blew past existing world records. The experience of seeing two people who started off with ordinary memories enhance their capabilities in such a drastic way inspired Ericsson to further study the effects of practice on skills. Could it be that extraordinary abilities came from extraordinary practice, not just innate ability?

Through his studies of expert performers in a range of fields, Ericsson concluded they practiced their skills in a fundamentally different way than amateur practitioners. Ericsson described this kind of practice as "deliberate" due to its methodical, hyper-conscious nature. He argued that experts become experts largely as a result of the way they practice. They may benefit from innate advantages, but their talents themselves are not innate. Ericsson also believed that the standards in many additional fields could be improved far beyond their current level if practitioners employed the principles of deliberate practice. Indeed, many fields have seen remarkable increases in their standards for high performance over time. Today, high-schoolers manage athletic feats that were once Olympic level and children play music once considered world-class. This is possible because of better training and knowledge of what it takes to be the best. The more we improve how we train, the more we expand our range of possible performance.

In 2016, Ericsson published *Peak: Secrets from the New Science of Expertise*, a popular science book condensing his learnings from thirty years of research. He also co-edited the 2006 *Cambridge Handbook of Expertise and Expert Performance*.

Malcolm Gladwell: The 10,000 hour rule

The widespread awareness of Ericsson's work outside the scientific community is in part a result of Malcolm Gladwell's 2008 book, *Outliers: The Story of Success*. In the book, Gladwell attributed unusual success in different fields to a mixture of lucky factors (such as when or where a person was born) and around 10,000 hours of practice. He based this figure on research, including Ericsson's, that suggested top performers tended to have put in about that amount of time before reaching peak performance.

Gladwell showed how the success of Bill Gates, the Beatles, and other outstanding performers is not so much to do with what they are like but rather where they come from.

"The people who stand before kings may look like they did it all by themselves," Gladwell

writes. *“But in fact they are invariably the beneficiaries of hidden advantages and extraordinary opportunities and cultural legacies that allow them to learn and work hard and make sense of the world in ways others cannot.”*

The so-called “10,000 hours rule” caught on. It’s a catchy idea, and many people took it to mean that anyone can master anything if they just put the time in. Ericsson himself disputed Gladwell’s representations of his research, which led to the widespread belief that the time someone spends practicing predicts their success, without emphasizing the quality of their practice.

Although the backlash against Gladwell’s calculation has arguably been exaggerated, it’s important to stress that research into deliberate practice emphasizes quality of practice, not quantity. It’s all too possible to spend 10,000 hours engaging in a skill without serious improvements. For example, most of us spend hours per day typing, yet we don’t see continuous improvements in speed and quality because we’re not using deliberate practice.

The useful takeaway from the “10,000 hours rule” is simply that it takes a lot of work to become the best. There’s no magic number of practice sessions, and everyone’s path will look different. Just because successful people in a given field have spent around 10,000 hours practicing their key skill, that doesn’t mean every person who practices that skill for 10,000 hours will become successful.

The limitations and downsides of deliberate practice

Part of us wants to believe expert performance is something innate and magical so we can excuse ourselves from hard work. The other part of us wants to believe that it’s something earned through blood, sweat, and tears—that we too could achieve amazing performance, if only we could devote ourselves to something.

Deliberate practice, in reality, is far more complex and nuanced than many people would have you believe. It’s not a panacea, and it won’t solve all of your work- and art-related problems. Let’s take a look at some of the limitations of deliberate practice.

First of all, deliberate practice is a necessary but insufficient part of becoming a world-class performer. You can’t rise to the top without it. But it’s not enough on its own to be the absolute best in any field. Once you reach higher echelons for any skill, everyone is engaging in a lot of deliberate practice.

If you’re aiming at expertise or just really good performance, deliberate practice will most likely get you there. But the higher you rise, the more luck and randomness end up mattering. However much you engage in deliberate practice, you can’t control the chance events (good or bad) that dictate a great deal of life.

When we look at the lives of top performers, they often benefited from specific backgrounds or opportunities, in addition to engaging in deliberate practice. For example, if you’re trying to become a champion chess player, it’s a big boost if your mother was a champion chess player. Not only will you have potential genetic advantages, you’ll have also likely grown up hearing about chess, been encouraged to practice it from a young age, and have someone to turn to for advice.

Seeing as it takes years of consistent deliberate practice to master a skill, people who begin early in life have an advantage over those who start later on. That doesn’t mean you can’t become exceptional at something you discover well into adulthood (just look at [Julia Child](#) or check out the book *Guitar Zero*). But it does mean that people who begin deliberate practice as kids are more likely to enjoy the success that makes it possible to keep committing to it. If you’re trying to master a skill while also having to work an unrelated job, care for your family, and deal with the other myriad responsibilities of adult life, you likely will have less room for it than a ten-year-old.

People who discover they want to master a skill or are encouraged to do so by others early in life have an advantage. Once the opportunity for practice is in place, the prospects of

high achievement take off. And if practice is denied or diminished, no amount of talent is going to get you there.

In addition to lucky circumstances, high performers benefit from a combination of deliberate practice and innate talents or physical advantages. However much you practice, certain physical limitations are insurmountable. For example, if you're 165 centimeters tall, you're unlikely to become a professional basketball player. There are some physical abilities, such as particular kinds of flexibility, that can only be developed at a young age when a person's skeletal structure is still forming. It's important to be realistic about your starting point and be aware of any limitations. But that doesn't mean you can't develop workarounds or even use them to your advantage.

Another downside of deliberate practice is that the level of focus it requires can mean practitioners miss out on other parts of life. Top performers often devote almost every waking hour to practice, recuperation from practice, and support activities. For example, a professional dancer might spend several hours a day on deliberate practice with all of the remaining hours going toward sleep, low-impact exercise, stretching, preparing nutritious food, icing his feet, and so on. There is enormous satisfaction in the flow states produced by deliberate practice, but practitioners can absolutely miss out on other sources of happiness, such as spending time with friends.

Deliberate practice is part of the exploit phase of new opportunities. Yet sometimes we can end up having too much grit. We can keep persevering with the skill we're practicing right now, remaining overly passionate, past the point where it serves us. We can wear ourselves out or get hurt or fail to realize when it's no longer worth practicing a skill. For example, a new technology might mean our skill is no longer valuable. If we keep on deliberate practicing due to sunk costs, we'll be unlikely to see many long-term benefits from it. A crucial skill in life is knowing when to pivot. Focusing too much on our goals can blind us to risks.

In some fields, expertise is hard to quantify or measure, which makes it less clear how to structure practice. There may be no single target to hit or universal rule for what improves performance.

A final limitation to keep in mind is that, as Ericsson explained, "*the cognitive and physical changes caused by training require upkeep. Stop training and they go away.*" If someone can't practice for a period of time, such as due to an injury or having a child, they're likely to see the skills they developed through deliberate practice deteriorate.

Summary

Deliberate practice isn't everything, but if you want to keep improving at a skill or overcome a plateau, you'll benefit from incorporating the principles mentioned in this article. To recap:

- Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them.
- The more we engage in deliberate practice, the greater our capabilities become.
- Our minds and bodies are far more malleable than we usually realize.
- Deliberate practice is structured and methodical.
- Deliberate practice is challenging because it involves constantly pushing yourself out of your comfort zone.
- Deliberate practice requires constant feedback and measurement of informative metrics—not vanity metrics.

- Deliberate practice works best with the help of a teacher or coach.
- Continuing deliberate practice requires a great deal of intrinsic motivation.
- Deliberate practice requires constant, intense focus.
- Deliberate practice leverages the spacing effect—meaning a consistent commitment over time is crucial.
- If you're content with your current level of skill or just doing something for fun, you don't necessarily need to engage in deliberate practice
- Deliberate practice is best suited to pursuits where you're actively aiming for a high level of performance or to break beyond some kind of supposed limit.

Step 151-Review, Reflection, Review And Accountability

A. Listen and Follow The Following Book:

1. **How We Think By John Dewey**

B. Analyse: If I win or Lose, I should be excited. If I win or loss, the process should be exactly the same. You have to go back and look:

1. **Good Habits, Virtues, Skills and improvement by 1%.**
2. **Bad Habits, Virtues, Skills and decline by 1%.**
3. **Find the finds I done well and worked.**
4. **Figured out how and why did they work well.**
5. **How can I make them again.**
6. **Find the things I failed. How and why it did not work well.**
7. **Find the things I could do better.**
8. **Find, Study and Analyse my weakness and Strengths. Work hard on my weaknesses. Perfect my strengths and work hard on my strengths.**
9. **Study and Analyse the strength and weakness of the opponent or competitors and work with your weakness to their strengths.**
10. **What are unfinished tasks and what action.**

C. Did I Take Responsibility?

1. **Pay Attention to Details.**
2. **Acknowledge and fix your mistakes.**
3. **Develop proactive approach.**
4. **Offer solution instead of complaints.**
5. **Accept Criticism.**
6. **Show Focus.**

D. Did I take Accountability?

- 1. Take Responsibility for the loss and analyse the mistakes I made. Analyse what to change to overcome those mistakes and be better at your craft or any area in life.**
- 2. They're completely focused on taking responsibility and taking charge, whether they're competing in sports or managing a family or running a business or driving a bus; they decide how to get the job done, and then they do whatever is necessary to make it happen.'".**
- 3. Want to know a true sign of a Cleaner? He feels no pressure when he screws up and has no problem admitting when he's wrong and shouldering the blame: When a Cooler makes a mistake, he'll give you a lot of excuses but no solutions. When a Closer makes a mistake, he finds someone else to blame. When a Cleaner makes a mistake, he can look you in the eye and say, 'I Screw up.'".**
- 4. Made a mistake? Don't sugar-coat it. Don't look for excuses. Don't blame other people. Own it.**
- 5. Develop the confidence to say when you've screwed up – people will respect you for it.**
- 6. Next time you're making an excuse, catch yourself. Admit it to yourself that it was your fault. Take responsibility for it. Own it.**

E. Track The Hours Spent For That Week For Different Task.

F. Use Weekly Review To Celebrate Good and Bad Weeks.

G. Do it Correctly, Slowly, Patiently, Methodically, Logically, Take It Time and Do Not Rush Process..

Step 152 - Improvement

Improvement

- A. What First to Improve in Steps of Performance.
- B. What to Change for better Performance.
- C. What First to Improve in Steps of Performance.
- D. What to Change for better Performance.
- E. Ask yourself: Where are you now?
- F. Ask yourself: Where do you want to be instead?
- G. Ask yourself: What are you willing to do to get there?
- H. Make a plan to get there.
- I. Act on it.
- J. Look at the improvement over the long period of time, and decide the steps I will take to improve. Look at the improvement as marathon, where you step by step improving.
- K. Take One Step at the time to move forward.
- L. Write Down the Notes on Improvement.
- M. No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better
- N. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.

Step 153 - Feedback System In Place

1. Feedback System In Place.

- I. Arrange a feedback, that you will get consistently and reliably.
- II. This could be hired a coach or friends who are honest.
- III. Iteration (repetition process) is fundamental basis of all improvement.

Step 154-Repeat

1. Repeat.

- I. Next Step is to Repeat (steps 1-126) for every single module in learning plan until completed every single one.**

- A. Record Strategy, Tactics and Plan.**
- B. Preparation.**
- C. Examine.**
- D. Listen Strategy, Tactics and Plan.**
- E. Performance.**
- F. Improvement.**
- G. Record Reflection and Review.**
- H. Listen Recorded Reflection, Review.**
- I. Record Improvement.**
- J. Listen Improvement.**
- K. Performance.**
- L. Record Reflection and Review.**
- M. Listen Recorded Reflection, Review.**
- N. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.**

Step 155-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. The world never tells you that you're wrong; it only gives you outcomes.
3. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
4. **Reality will do a lot of the work for us if we simply align with it.** Most of the time we're simply adding friction because we want the world to work in the way we think it should.
5. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care

about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.
- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything

outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models

allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's

got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do

put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

Step 156- Spend 5k-10k Hours

1. Spend 5k-10k Hours.

- I. Iterate (repetition process) for 5k-10k hours.
- II. There are not shortcuts.
- III. If you want to be good at anything you need to spend 10k hours trial and error, until you master.
- IV. Do It Correctly, Slowly, Patiently, Methodically, Logically Take It Time and Do Not Rush Process.

PART 21: Deep Work and Prediction

Step 157 - Prediction Books

1. **Listen, Follow And Apply Rules of Reading Part 1 to 18, before looking Prediction.**
2. **Listen, Follow and Apply the following Books.**
 - **Financial Analysis, Modelling, and Forecasting Technique**
 - **Financial Planning & Analysis and Performance Management.**
 - **Predictably, The hidden Forces That Shape Our Decision.**
 - **Predictive Analytics For Dummies**
 - **Predictive Analytics.**
 - **Reading People_ How to Understand People and Predict Their Behavior- -Anytime, Anyplace.**
 - **Sports Performance Measurement and Analytics_ The Science of Assessing Performance, Predicting Future Outcomes, Interpreting Statistical Models.**
 - **Thinking_ The New Science of Decision-Making, Problem-Solving, and Prediction.**

Step 158-Steps In Predicting

So How Can You Improve Your Own Prediction Skills?

1. Watch Videos of the Person who I rolling, Sparing, and see the movements and the steps they are taking in order to take one position or the other.

I. See the opponent favorite attack Tactics:

- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their in the attack?
- How can I explore their weakness in my defence?

II. See the opponent favorite defence tactics

- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their defence?
- How can I explore their weakness in my Defence?

2. Watch Live rolling of the person who I rolling, Sparing, and see the movements and the steps they are taking in order to take one position or the other.

I. See the opponent favorite attack Tactics:

- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their in the attack?
- How can I explore their weakness in my defence?

II. See the opponent favorite defence tactics

- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their defence?
- How can I explore their weakness in my Defence?

3. Recognise Patterns- Pay attention the following:

I. Where are the hands?

II. Where are the feet?

III. How the weight is distributed?

IV. Where the back?

V. Where is the whole body moves toward?

4. **Know All The Facts.** Analysis starts with data. It's more than data, but it starts with data. You need to be rooted in the real world, and you need to be rigorous. Before you start anything, you need to gather as much data as possible, and then crunch it, which can mean combining data points, but often means discarding data points as well.
5. **Live And Breathe Your Space.** The other key tool in analysis is the understanding of your market, and just as important, your primary research, which by and large means talking to people. You need to be embedded in your space's social and intellectual networks, and you need to talk to the people who are smarter than you, embedded in the space, and learn from them. This creates a virtuous circle: talking to smart people makes you smarter, which makes smart people want to talk with you.
6. **Forget Everything I've Just Said.** Data is fine, even necessary. Primary research is fine, even necessary. But there's another element which is just as necessary (and most often lacking). It's that special something. It's often dubbed insight. It's seeing the trend that nobody else is seeing. This is a question that has obsessed me. I don't know that I've cracked it, but I think I've found a method that works for me, and that is: every once in a while, forget everything you know. Every once in a while, you have to look at what you're obsessed about like you don't know anything about it. Clear your mind. Think about other stuff. It sounds silly, but what matters is putting yourself in a frame of mind where you're looking at the situation from a new angle, and realizing that by only focusing yourself on your area of expertise you will miss things.
7. **Establish a Base Rate.** Compare. Establish the "base rate," the typical historical frequency or severity of the outcome you are trying to forecast, by picking a reference class of similar past events. Very few situations are unique; think deeply enough about the instance at hand, and you will likely discover a set of historical precedents for it. Instead of guessing how stocks will do if interest rates rise by one percentage point, for instance, look at the full sample of all such past interest-rate increases, take the average of subsequent stock performance and use that as your base-rate assumption.
8. **Be Specific.** Try to flush your ignorance out into the open: Don't just say, "I think emerging-markets stocks are cheap right now." Instead, say "There is an 80% probability that emerging-markets stocks will go up at least 25% in the next 12

months.” When significant new information comes in, adjust your forecast incrementally.

9. Consider the Opposite. Invert. Consider the opposite and ask what information you would need if you were trying to make a case that emerging-markets stocks will go down at least 25% in the next 12 months. Then seek it out, absorb it and test whether you need to revise your original forecast.
10. Cast a Wide Net. Find a variety of sources for news and analysis, varying widely in their viewpoints, vested interests and geographic origin. Discount the sources that use the self-reinforcing language of overconfidence: Words like “furthermore,” “clearly” and “certain” or “impossible.” Heed most closely those sources that admit uncertainty with words like “however,” “but,” and “on the other hand.”
11. Measure Everything. Record in detail the reasoning behind your forecasts. When you turn out to be right, don’t just celebrate; check your records to see whether you were right for the reasons you predicted or whether you just got lucky. When you turn out to be wrong, compare this error to the other times you were mistaken, looking for patterns to correct. If you don’t measure every meaningful aspect of your forecasts, you will never improve.

Step 159 - Have I done The Work

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - C. Will you care about what you're reading in a month? In a year? In five years?
 - D. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - E. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - F. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 160-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. The world never tells you that you're wrong; it only gives you outcomes.
3. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
4. **Reality will do a lot of the work for us if we simply align with it.** Most of the time we're simply adding friction because we want the world to work in the way we think it should.
5. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care

about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.
- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything

outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models

allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's

got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do

put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

PART 22: Deep Work and Feynman Technique

Step 161-Feynman Technique

Feynman Technique

I. Choose a Concept, Idea, topic to Learn. Select a Topic You are interested in learning about and write it at the top of the blank page in the Notebook or Paper.

- A. Choose your topics carefully: Not everything that you study suits this technique. Usually abstract complex ideas are best understood by Feynman technique but ideas that are evidence-based/observational might not really be suited for this.
- B. Selecting a concept to study compels you to be intentional about what you don't know. It also forces you to choose a topic that's small enough that it could reasonably fit onto one or several pages.
- C. **You face what you don't know.** By writing a topic down on a blank page, you acknowledge you're starting from scratch or at least filling in some blanks. In doing so, take the initial step in the process.
- D. **You need to be specific.** Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.

II. Use It For Real.

- A. Use it for real: perfectly suitable for weekly tech-talks, lectures, paper-reading, Study, Bible Study, Sermon or any type of study, deep work and deep study sessions.

III. Study The Topic By Reading, Listening, Watching and Communicating.

- A. You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.
- B. Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.
- C. Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.
- D. Make it your own.
 - Start with not knowing.
 - Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
 - Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.
- E. Take Notes On the Topic From Study.
- F. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.
- G. Don't write notes on notes: Life is short.
- H. Cornell Notes.
 - How Will I Take Notes and Cornell Note Take Method Pages 79-82.

IV. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

V. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

VI. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

A. Step 1- Use The Chosen Rules of Reading Method For Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method and Follow Each Steps Of The Method Until Finish All Steps, While Re-listen Lectures, Read Books or Lecture Notes 1-100 Times For Each Step.

B. Step 2- Following Rules of Reading Methods:

C. VERY VERY FAST Reading- Skimming. Pages 47-51.

D. VERY FAST READING- Entertainment.

I. Method 1-Speed Reading. FAST Reading. Pages 59-64.

E. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

F. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

G. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

- A. Learning should be iterative. More often than not, learning something challenging takes several attempts. With the Feynman Technique, returning to the source material is an explicit part of the learning process. When gaps in our knowledge arise and our explanations aren't quite right, revisiting our primary and secondary sources can help solidify what we're learning.
- B. Getting it right will likely take several iterations. That's a good thing; the more you refine your explanations, the more your understanding will deepen. Learning becomes an iterative process. Rather than viewing learning as one-and-done, this step gives you permission to continuously refresh your knowledge.
- C. You're actively engaged. Using sources to polish our own explanations and models is an active process. When we learn passively, committing details to memory is more challenging. When we're actively part of creating our own summaries and reasoning, drawing intentionally from original information to fill our blind spots, we can more readily commit knowledge to our long-term memory.
- D. You expand your knowledge base. Paradoxically, the more we learn, the more *our capacity* to learn increases. Looking through a chapter of a textbook might feel like a different language the first time around. The second time it becomes more clear. The third time, with a strong base already, we pick up nuances we couldn't have possibly seen before.

VIII.Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
- B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

IX. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.

- A. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.
- B. Remove any jargon or complexity.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.
- G. **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught them in their own words. If they can't do this, your explanation is too complex — simplify it and use plain language.
- H. **You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes

you to tackle even more challenging subjects knowing you have a solid framework for learning.

X. Reflect, Refine, and Simplify.

- A. Only when you can explain the subject in simple terms do you understand it.**
- B. Simple is beautiful.**
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.**
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.**
- E. Go back to the source material, reviewing the parts you don't quite understand yet.**
- F. Repeat until you have a simple explanation.**

XI. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

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- C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

IX. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

*PART 23: Sport and Jiu-jitsu,
Judo Or Wrestling*

Step 162-What Trainings Do I Do On Daily Basis Schedule.

Decide The Training I Will Do It Today

A. Monday:

- I. Gym Jiujitsu.**
- II. Home Wrestling, Jiujitsu, Judo And Luta Livre.**
- III. Home Boxing.**
- IV. Home Muay Thai and Lethwei.**
- V. Home Sambo and MMA.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. De-escalation.**
- IX. Situational Awareness.**

B. Tuesday:

- I. Home Wrestling, Jiujitsu, Judo And Luta Livre**
- II. Home Boxing.**
- III. Home Sambo and MMA.**
- IV. Home Muay Thai and Lethwei.**
- V. Breath.**
- VI. Strength.**

C. Wednesday:

- I. Gym JiuJitsu.**
- II. Home Wrestling, Judo, JiuJitsu And Luta Livre**
- III. Home Sambo and MMA.**
- IV. Home Boxing.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. De-escalation.**
- IX. Situational Awareness.**

D. Thursday:

- I. Home Wrestling, JiuJitsu, Judo And Luta Livre**
- II. Home Sambo and MMA**
- III. Home Boxing.**
- IV. Home Muay Thai and Lethwei.**
- V. Stretch and Flexibility.**
- VI. Strength.**
- VII. Conditioning.**

E. Friday:

- I. Gym JiuJitsu.**
- II. Home Wrestling, JiuJitsu, Judo and Luta Livre.**
- III. Home Boxing.**
- IV. Home Sambo and MMA.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Stretch and Flexibility.**

F. Saturday:

- I. Home Wrestling, JiuJitsu, Judo And Luta Livre.**
- II. Home Boxing.**
- III. Home Sambo and MMA.**
- IV. Home Muay Thai and Lethwei.**
- V. Breath.**
- VI. Conditioning.**
- VII. Strength.**
- VIII. De-escalation.**
- IX. Situational Awareness.**

G. Sunday:

- I. Gym JiuJitsu**
- II. Home Wrestling, JiuJitsu, Judo And Luta Livre.**
- III. Home Boxing.**
- IV. Home Sambo and MMA.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Strength.**
- IX. Mental Tough.**
- X. De-escalation.**
- XI. Situational Awareness.**

Step 163-What Specific Training Do I Want To Practice Today

Step 1- Out of the Weekly And Daily Goals and Tasks, Decide One Technique, Practices and Exercise I will Drills Today For JiuJitsu, Judo or Wrestling. Check BJJ Template For The Different Practices in Excel.

- 1. Current Focus on Fundamental Skills At Home.**
- 2. Current Focus on 80/20 Principles of Attack and Defence of BJJ at Home.**
- 3. Sparring Focus on Defence.**
- 4. Sparring Focus on Attack.**
- 5. What To Do When Opponent Does, is or has.**
- 6. Instructional Video Of BJJ To Train.**
- 7. Video Link To The Technique and Good Resources.**
- 8. Mistakes and Solutions To Those Mistakes.**
- 9. Current Focus on What Practices at the BJJ Gym.**
- 10. Current Focus on Principles of Attack and Defence OF BJJ At Home.**

Step 2-Apply Step By step The technique as it was written in BJJ Template. Drill The Technique and Exercises At Home 1-1000 Times, Until I can do It Perfectly without any Problems.

Step 3- Prior The Gym, Prepare, My BJJ Game Plan For Rolling From BJJ Template The Following:

- 1. Current Focus on 80/20 Principles of Attack and Defence of BJJ at Home.**
- 2. Sparring Focus on Defence.**
- 3. Sparring Focus on Attack.**
- 4. Mistakes and Solutions To Those Mistakes.**

Step 4-Always Think About Every Steps in my attack or defence and see the following:

- **Use SWOT analysis of My Attack and Defence?**
- **USE SWOT Analysis of Opponent Attack and Defence?**
- **USE 80/20 Principle for My Attack, Defence, Sweep, Submission, Movement and Go To Move?**
- **USE 80/20 Principle for Opponent Attack, Defence, Sweep, Submission, Movement and Go To Move?**
- **What makes you uncomfortable in any area and work on the weaknesses of mine.**
- **In jiujitsu I have to prepare in things that makes me uncomfortable. Look for the techniques based on 80/20 principle. Look for the techniques that are simple but have the highest success rate.**
- **What mistakes I did In my attack and defence?**
- **What mistakes My opponent did in attack and defence?**
- **How Can I explore the mistakes and weaknesses of my opponent the attack and defence?**
- **How Can opponent explore mistakes and weaknesses of my attack and defence?**
- **Use 5W and 1 H**

Step 5-Use The Following Technique to Study, Watch and Predict Opponent Defence, Offence, Submission, Counterattack and Counter Defence:

- 1. Study and Watch Videos of the Person who I rolling, Sparing, and see the movements and the steps they are taking in order to take one position or the other. Use 80/20 Principle.**
 - I. See the opponent favourite attack Tactics:**
 - **USE SWOT analysis**
 - **Use 5W and 1 H.**

- Use 80/20 Principle
- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their in the attack?
- How can I explore their weakness in my defence?

II. See the opponent favourite defence tactics.

- Use SWOT Analysis
- Use 5W and 1 H.
- Use 80/20 Principle
- Check The steps they are taking?
- What angles do they take?
- What are weaknesses of their defence?
- How can I explore their weakness in my Defence?

2. Watch Live rolling of the person who I rolling, Sparring, and see the movements and the steps they are taking in order to take one position or the other. USE 80/20 Principle.

I. See the opponent favorite attack Tactics:

- Use SWOT Analysis
- Use 5W and 1 H.
- Use 80/20 Principle.
- Check The steps they are taking?
- What angles do they take?
- What are the Strengths and Weakness In Their Attack
- How can I explore their weakness in my defence?
- What Opportunities and Threats In their attack
- What opportunities and Threats I have in their attack?

II. See the opponent favourite defence tactics. Use 80/20 Principle.

- **USE SWOT ANALYSIS.**
- **Use 5W and 1 H.**
- **Use 80/20 Principle.**
- **Check The steps they are taking?**
- **What angles do they take?**
- **What are weaknesses of their defence?**
- **How can I explore their weakness in my Defence?**
- **What are the Strengths and Weakness In Their Defence?**
- **How can I explore their weakness in my Attack?**
- **What Opportunities and Threats In their DEFENCE?**
- **What opportunities and Threats I have in their DEFENCE?**

3. Use 80/20 Principle, Recognise Patterns- Pay attention the following:

- I. Where are the hands?**
- II. Where are the feet?**
- III. How the weight is distributed?**
- IV. Where the back?**
- V. Where is the whole body moves toward?**
- VI. Use 5W and 1 H**

4. Use 80/20 Principle In Prediction.

Step 6- Try to predict what opponent Step Would Be, if I take this or that route in the attack, defence, Submission, Counter Attack and Counter Submission. Based on The Step 5. Use 80/20 Principle AND SWOT.

Step 7- Try to predict opponent move in attacking, defence, Submission, Counter Attack, and Counter Defence and how can I counter? This is Based on the Step 5. Use 80/20 Principle AND SWOT.

Step 8- Try to predict the opponent defence, Submission and attack plan, when Roll. This is based on the Step 5. Use 80/20 Principle AND SWOT.

Step 9- Let The World Do The Work For You.

- 1. The world never tells you that you're wrong; it only gives you outcomes.**
- 2. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
- 3. Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
- 4. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
- 5. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world**

continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.

6. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.
7. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
8. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
9. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately.

Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.

10. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

11. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet

of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

Step 10- In the Gym Practice:

- 1. Warm Up**
- 2. Listen What Are Instruction in Practice.**
- 3. Use Normal, Diaphragmatic or Gracie Breathing.**
- 4. Practice The Drill and Think, How Can I execute this drill perfectly.**
- 5. Be Proactive.**
- 6. Take One Task At the Time.**
- 7. Develop Mental Toughness and Have Jordan and Kobe Mindset In JiuJitsu.**
- 8. Ask Questions.**
- 9. Respect The Instructor, Mat and Opponent.**
- 10. Practice And Fail, Practice and Fail, Practice until Success.**

Step 11- In the Gym Rolling or Competition.

- 1. Before The Roll Think The Defence, Attack, Submission or Sweep From BJJ Template I WILL Apply, and How Will I apply.**
- 2. Think While Rolling the Following:**
 - I. Think, How Can I execute The Game Plan From Start to the End by Being In any Position at the time.**
 - II. What Is the next Step Do I need To take, in order to fully execute the BJJ Template Game Plan.**
 - III. What Do I need to Do To Prevent Me to be in the position, where the opponent wants me to be.**
 - IV. Think also while rolling**
 - USE AND APPLY SWOT Analysis for Myself and Opponent**
 - USE and Apply 80/20 Principle For Myself and Analysing Opponent While Rolling.**
 - What mistakes I did In my attack and defence?**
 - What mistakes My opponent did in attack and defence?**
 - How Can I explore the mistakes and weaknesses of my opponent the attack and defence?**
 - How Can opponent explore mistakes and weaknesses of my attack and defence?**
 - Use 5W and 1H.**

Step 12- After The Roll, Analyse and Evaluate:

- 1. Success: Find what I have done well and worked**
 - Figured out how and why did they work well.**
 - How Can I make them work again.**
- 2. Failure: Find things I failed. How and why it did not Worked well?.**
- 3. Improvement: Find the things I could do better.**
- 4. Use 80/20 Principle.**

Step 13-After The Gym:

- 1. Show Respect By Bow.**
- 2. Thanking.**

Step 14-Progression of BJJ:

- 1. Without basics and foundations and fundamentals, you cannot progress.**
- 2. Repetition:**
 - I. Practice, Practice, Practice every day.**
 - II. Repeat 1000 times.**
 - III. Drill the moves 1000 times until I can do automatically.**
- 3. Use and Apply 80/20 Principle At all Time.**
- 4. USE SWOT ANALYSIS For Myself and Opponent.**
- 5. What makes you uncomfortable in any area and work on the weaknesses of mine.**
- 6. In jiu-jitsu I have to prepare in things that makes me uncomfortable. Look for the techniques based on 80/20 principle. Look for the techniques that are simple but have the highest success rate.**
- 7. A Cleaner: Means never being satisfied. It means creating new goals every time you reach your personal best. If you're good, it means you don't stop until you're great. If you're great, it means you fight until you're unstoppable.**
- 8. Steps to winning has infinite steps and constantly changing. Do not look for steps in success and winning. Work Hard, and try push to my limits.**
- 9. Perfect Your craft by doing over and over again.**
- 10. Fail over, and over again, as this leads to success.**
- 11. Never fear about the skills, if you put work. Work ethic eliminates fear. If you put work you know what you are capable of doing, what you are not**

- 12. Master your weakness, so they become strengths.**
- 13. Every day, challenge yourself to be uncomfortable.**
- 14. Every day, push yourself past your own mind-created limits and soon your old limits become your new normal.**
- 15. That's how you grow. By pushing your boundaries and expanding them.**
- 16. Relentless-Relentless is Attack, Attack the problem or the task and never give an inch to anybody and always go after, and if there is a challenge with this, be excited and see how you stack up and measure against this problem, if I am good enough. If I am not good enough I will prepare next time, I will be good enough.**
- 17. Stop looking for the shortcut. Do the work and Grind Constantly.**
- 18. Sorry, there's no off-season when you're serious about being a winner."**
- 19. Just show up, work hard, and listen. That's your part of the deal. Do the work.**
- 20. Take one challenge at the time, Once overcome the challenge, then move to another challenge and hardship.**
- 21. Be Resilience-Strength of character and toughness in any area of Life.**
- 22. Use 5W and 1 H.**

Step 164- Letting The World Do The Work For You

Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.

7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your

outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve.

Optically, they “reorganize their incentive programs,” but practically, they’ve simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He’s got all these beautiful charts on how much more competitive you’ll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You’re sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you’re in. However, you can be damn sure the salesman is now knocking on your competitor’s door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn’t always a comfortable reality. Understanding how the world works isn’t easy and it shouldn’t be. It’s hard work. If it were easy, everyone would do it. And it’s not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it’s extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don’t line up with reality as we think something that isn’t true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we’ve got all the information, if we’re on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world’s feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall

over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding

Step 165- Reflection, Review and Improvement

Record Reflection, Review and Improvement

A. Record the Reflection and Review.

B. Analyse: If I win or Lose, I should be excited. If I win or loss, the process should be exactly the same. You have to go back and look:

1. JiuJitsu, Wrestling, Judo.

- **Was There an improvement by 1%, where was the improvement.**
- **Success: Find what I have done well and worked well.**
 - **Figured out how and why did they work well.**
 - **How Can I make them work work again.**
- **Use 5W and 1 H**

- **Failure: Was there a declined by 1%, where was the decline?**
- **Find things I failed: Figured out how and why they did not work.**
- **Use 5W and 1 H**

Improvement

- **Find the things I could do better.**
- **What First to Improve in Steps of Performance.**
- **What to Change for better Performance.**
- **Decide and Prioritise 1-3 Challenges and Problems to improve**
- **Steps I will Take To Improve.**
- **Look at the improvement over the long period of time, and decide the steps I will take to improve. Look at the improvement as marathon, where you step by step improving.**
- **Take One Step at the time to move forward.**
- **Use 80/20 Principle.**
- **Use 5W and 1H.**

- **No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better**

Analyse

- **Use 80/20 Principle.**
- **Use 5W and 1H.**
- **Find, Study and Analyse my weakness and Strengths. Work hard on my weaknesses. Perfect my strengths and work hard on my strengths.**
- **Study and Analyse the strength and weakness of the opponent or competitors and work with your weakness to their strengths.**
- **Analyse My Mistakes in Rolling.**
- **Analyse Opponent Mistakes in Rolling.**
- **Find and Analyse The Opportunity and Threat.**

*Part 24: Sport and Fighting Sport,
Conditioning, Stretching and
Flexibility, Strength, Breathing,
Mental Tough And Develop
Mindset.*

Step 166-Books On Muscle Training

Books On Sport

1. Home workout circuit training 6 week exercise band workout & bodyweight training.
2. Men's Health Home Workout Bible.
3. Men's Health Natural Bodybuilding Bible_ A Complete 24-Week Program For Sculpting Muscles That Show.
4. Men's Health Your Body is Your Barbell_ No Gym. Just Gravity. Build a Leaner, Stronger, More Muscular You in 28 Days!.
5. Predictive analytics for dummies.
6. The Men's Health and Women's Health Big Book of Sex_ Your Authoritative, Red-Hot Guide to the Sex of Your Dreams.
7. The Men's Health Big Book of Exercises_ Four Weeks to a Leaner, Stronger, More Muscular YOU!
8. The Men's Health Big Book_ Getting Abs_ Get a Flat, Ripped Stomach and Your Strongest Body Ever--in Four Weeks.
9. The Women's Health Big Book of Exercises_ Four Weeks to a Leaner, Sexier, Healthier YOU!.
10. The Women's Health big book of yoga_ the essential guide to complete mind_body fitness.

Step 167-What Trainings Do I Do On Daily Basis Schedule.

Decide The Training I Will Do It Today

A. Monday:

- I. Gym JiuJitsu.**
- II. Home Wrestling, JiuJitsu, Judo And Luta Livre.**
- III. Home Boxing.**
- IV. Home Muay Thai and Lethwei.**
- V. Home Sambo and MMA.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Deescalation.**
- IX. Situational Awareness.**

B. Tuesday:

- I. Home Wrestling, JiuJitsu, Judo And Luta Livre**
- II. Home Boxing.**
- III. Home Sambo and MMA.**
- IV. Home Muay Thai and Lethwei.**
- V. Breath.**
- VI. Strength.**

C. Wednesday:

- I. Gym JiuJitsu.**
- II. Home Wrestling, Judo, JiuJitsu And Luta Livre**
- III. Home Sambo and MMA.**
- IV. Home Boxing.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Deescalation.**
- IX. Situational Awareness.**

D. Thursday:

- I. Home Wrestling, JiuJitsu, Judo And Luta Livre**
- II. Home Sambo and MMA**
- III. Home Boxing.**
- IV. Home Muay Thai and Lethwei.**
- V. Stretch and Flexibility.**
- VI. Strength.**
- VII. Conditioning.**

E. Friday:

- I. Gym JiuJitsu.**
- II. Home Wrestling, JiuJitsu, Judo and Luta Livre.**
- III. Home Boxing.**
- IV. Home Sambo and MMA.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Stretch and Flexibility.**

F. Saturday:

- I. Home Wrestling, JiuJitsu, Judo And Luta Livre.**
- II. Home Boxing.**
- III. Home Sambo and MMA.**
- IV. Home Muay Thai and Lethwei.**
- V. Breath.**
- VI. Conditioning.**
- VII. Strength.**
- VIII. Deescalation.**
- IX. Situational Awareness.**

G. Sunday:

- I. Gym Jiujitsu**
- II. Home Wrestling, Jiujitsu, Judo And Luta Livre.**
- III. Home Boxing.**
- IV. Home Sambo and MMA.**
- V. Home Muay Thai and Lethwei.**
- VI. Breath.**
- VII. Conditioning.**
- VIII. Strength.**
- IX. Mental Tough.**
- X. Deescalation.**
- XI. Situational Awareness.**

Step 168-What Specific Training Do I Want To Practice Today

Step 1- Out of the Weekly And Daily Goals and Tasks, Decide 1-4 Techniques, Practices and Exercise I will Drills Today For Boxing, Sambo, MMA, Muay Thai, Lethwei, Conditioning, Stretching and Flexibility, Strength, Breathing, Mental Tough And Develop Mindset. Check BJJ Template For The Different Practices in Excel.:

1. Muay Thai and Lethwei

- A. Nutrition.**
- B. Warm up.**
- C. Clinch.**
- D. Low Kicks.**
- E. High Kicks.**
- F. Knees.**
- G. Elbows.**
- H. Hooks.**
- I. Uppercuts.**
- J. Defence.**
- K. Headbutt**
- L. Offence.**
- M. Leg workouts.**
- N. Drills.**

2. Boxing.

- A. Nutrition.**
- B. Warm Up.**
- C. Hooks.**
- D. Straights.**
- E. Uppercuts.**
- F. Jabs.**
- G. Leg Works.**
- H. Drills**

3. Conditioning.

- A. Nutrition.**
- B. Cycling.**
- C. Jogging or Run.**

4. Stretching and Flexibility.

- A. Nutrition**
- B. Head.**
- C. Shoulders.**
- D. Hands.**
- E. Hips.**
- F. Legs.**
- G. Feet.**

5. Strength.

- A. Listen and Watch Men's Health Big Book Exercise Pages 1-1100.**
- B. Nutrition.**
- C. Warm Up.**
- D. Hands.**
- E. Chest.**
- F. Back.**
- G. Shoulders.**
- H. Arms.**
- I. Quadriceps and Calves.**
- J. Glutes and Hamstring.**
- K. Core.**
- L. Total Body.**

6. Breathing.

- A. Nutrition.**
- B. Normal Breathing.**
 - Inhale through nose.
 - Exhale through mouth.
 - Do 5-10 minutes a day.
- C. Diaphragmatic Breathing.**
 - One Hand on Chest, Other on Stomach.
 - Inhale Slowly through Nose, and air push stomach upward against the hand, while chest remain still.
 - Exhale through Pursed lips, push stomach downward and chest remains still.
 - Do 5-10 Min times a day.

D. Gracie Breath.

- Lay or Sit on Flat Surface.
- One Hand on Chest, Other on Stomach.
- Inhale air through Nose Gradually increasing air in the body.
- Hand on the chest should be immobile, and the hand on the belly is moving upward.
- Back Should not be inflated
- Exhale through pursed lips do percussive- 5 beats saying (Shh, Shh, Shh, Shh, Shh).
- Hand on the belly goes downward.
- Do 5-10 Min times a day.

7. Mental Tough And Develop Mindset.

A. Mental Toughness.

- Be the best in each class, Drill, Roll and Competition.
- Do not let defeat, Negative thinking ruin self image.
- Give my best in each Drill, Roll and Competition.
- Never Give up.
- Let the EGO be in check in each Drill, Class, Roll and Competition.
- Be the hardest working person in each Class, Drill, Roll and Competition.
- Always Find Motivation to be better, this could be personal or something inside pushing to be better.
- Give 100% in Each Class, Training at home, Drill, Roll, Competition.
- When something goes wrong, get it over and move on.
- After each class, training at home, drill, roll and competition, think what Good did I do, and the failures.
- Be Proactive in my class, drill, home training, roll, and competition and respond positively, and focus and act on what I can control and influence, instead the things I cannot influence and control from outside.
- Take One task at the time to learn, and proficient the technique.
- Mentally tough people, never blame others, in what life throws at them, instead take full responsibility for what happens in their life.

- Get out of the comfort Zone to challenge myself, and by doing this build mental toughness.
- Be Relentless.
- Stop Make Excuses and Practice Practice Practice.
- Be aware of weakness of my BJJ and work hard on to overcome, and that this weakness become my strength.
- Fail to go forward fast.
- Evaluate my experiences and come up with a strategy to not fail again and execute new strategy.
- Hard work conquers all.
- Have a good work habits.
- Reevaluate my BJJ and reflect on daily, weekly, monthly and yearly basis.

B. Mindset

- Accept the failure, but never accept not trying.
- Train hard in class, at home, drill so that it would be easier in competition.
- Bleed more in training, at home, drills, so that you less bleed in the battle.
- Be Hardest Working Everywhere I go.
- Look For Challenge and overcome those Challenges.
- Look For Failures as Path for Success.
- Discipline myself wake up early and train and work hardest day in and day out.
- Word Hard like nobody will ever work.
- Constantly practice and upgrade myself.
- Earn successfully through determination consistent practice and put lots of effort.
- If I want to be best, there is no shortcuts, therefore work hardest.
- Do not afraid struggles, but embrace and work harder on daily basis.
- Stay in the moment and be in the present, and not somewhere else.
- Give my best all the time.
- Be intense I my training, drill, train at home, roll and competition.

Step 2-Apply Step By step The technique as it was written in BJJ Template. Drill The Technique and Exercises At Home 1-1000 Times, Until I can do It Perfectly without any Problems.

Step 3-Always Think About Every Steps in my attack or defence and see the following:

- **80/20 of My Attack and Defence?**
- **80/20 of Opponent Attack and Defence?**
- **USE SWOT Analysis for My Attack and Defence?**
- **Use SWOT ANALYSIS For Opponent Attack and Defence?**
- **What mistakes I did In my attack and defence?**
- **What mistakes My opponent did in attack and defence?**
- **How Can I explore the mistakes and weaknesses of my opponent the attack and defence?**
- **How Can opponent explore mistakes and weaknesses of my attack and defence?**

Step 4-Use The Following Technique to Study, Watch and Predict Opponent Defence, Offence, Submission, Counterattack and Counter Defence:

- 1. Study and Watch Videos of the Person who I rolling, Sparring, and see the movements and the steps they are taking in order to take one position or the other.**
 - I. See the opponent favourite attack Tactics:**
 - **Check The steps they are taking?**
 - **What angles do they take?**
 - **What are weaknesses of the attack?**
 - **How can I explore their weakness in my defence?**
 - II. See the opponent favourite defence tactics.**
 - **Check The steps they are taking?**

- What angles do they take?
- What are weaknesses of their defence?
- How can I explore their weakness in my Defence?

Step 5- Try to predict what opponent Step Would Be, if I take this or that route in the attack, defence, Submission, Counter Attack and Counter Submission. Based on The Step 5.

Step 6- Try to predict opponent move in attacking, defence, Submission, Counter Attack, and Counter Defence and how can I counter? This is Based on the Step 5.

Step 7- Try to predict the opponent defence, Submission and attack plan, when Roll. This is based on the Step 5.

Step 8- Let The World Do The Work For You.

1. The world never tells you that you're wrong; it only gives you outcomes.
2. Don't force. Don't resist. Have a beginner's mind. Let the world teach you.
3. Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.
4. If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of

the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman

5. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
6. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.
7. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World

Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.

8. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
9. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
10. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

11. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

Step 9- After The Roll, Analyse and Evaluate:

1. **Success: Find what I have done well and worked**
 - Figured out how and why did they work well.
 - How Can I make them work again.
2. **Failure: Find things I failed. How and why it did not Worked well?.**
3. **Improvement: Find the things I could do better.No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better**

Step 169- Letting The World Do The Work For You

Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.

7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your

outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.

VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve.

Optically, they “reorganize their incentive programs,” but practically, they’ve simply expended energy to stay in place. Another, perhaps more complicated, example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He’s got all these beautiful charts on how much more competitive you’ll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You’re sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you’re in. However, you can be damn sure the salesman is now knocking on your competitor’s door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn’t always a comfortable reality. Understanding how the world works isn’t easy and it shouldn’t be. It’s hard work. If it were easy, everyone would do it. And it’s not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it’s extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don’t line up with reality as we think something that isn’t true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we’ve got all the information, if we’re on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world’s feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall

over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding

Step 170 - Reflection, Review and Improvement

Record Reflection, Review and Improvement

A. Record the Reflection and Review.

B. Analyse: If I win or Lose, I should be excited. If I win or loss, the process should be exactly the same. You have to go back and look:

1. Muay Thai, Lethwei Boxing, Strength, Conditioning, Breath, Stretching, Flexibility, Mental Tough and Mindset.

- **Was There an improvement by 1%, where was the improvement.**
- **Success: Find what I have done well and worked in the following area:**
- **Figured out how and why did they work well.**
- **How Can I make them work again.**

- **Failure: Was there a declined by 1%, where was the decline?**
- **Find things I failed. How and why they did not work.**

Improvement

- **Find the things I could do better.**
- **What First to Improve in Steps of Performance.**
- **What to Change for better Performance.**
- **Decide and Prioritise 1-3 Challenges and Problems to improve**
- **Steps I will Take To Improve.**
- **Look at the improvement over the long period of time, and decide the steps I will take to improve. Look at the improvement as marathon, where you step by step improving.**
- **Take One Step at the time to move forward.**
- **No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better.**

Analyse

- **Find, Study and Analyse my weakness and Strengths. Work hard on my weaknesses. Perfect my strengths and work hard on my strengths.**
- **Study and Analyse the strength and weakness of the opponent or competitors and work with your weakness to their strengths.**
- **Analyse My Mistakes in Rolling.**
- **Analyse Opponent Mistakes in Rolling.**
- **Find and Analyse The Opportunity and Threat.**

Part 25: Monthly Journaling

Step 171-Materials Needed and Listen And Follow Rules of Reading For Monthly Journaling

1. Organise Materials for Journaling
 - Phone
 - Headphone
 - Pen
 - CopyBook
 - AudioRecorder on The Phone
2. Listen, Follow and Apply Rules of Reading For Journaling and Review of The Day, When Doing Journaling and Review of A Month.
3. Listen, Follow and Apply Books Throughout the Journaling, Reflection, Review, Analyse : How we Think By John Dewey,
4. Write Down Questions and Think Over the Day and Answer Those Questions, If I am Using Pen and Copybook
5. AudioRecord the Questions and Think over those questions and Answer Them.

Step 172 Record, Reflect

1. Reflection and Review.

A. Success.

- I. What I have Done Well During Month?**
- II. What Have Worked During Month?**
- III. Was There an Improvement by 1%, Where was the improvement?**

B. Failure.

- I. What I have Failed During Month?**
- II. What have not worked well During Month?**
- III. Was there a declined by 1%, where was the decline?**

C. Accountability

- I. Take Accountability for Success and Failure**

D. Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.

- First, he would learn everything he could about it and prepare physically as best as possible.
- Once the physical prep was done, he'd take care of the mental prep with visualization.
- Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.
- Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.
- Side note: visualization is great, but it's no substitute for preparation.

Step 173-Analyse Strength and Weaknesses

1. Analyse.

- I. Find, Study and Analyse My Weakness.**
- II. Find, Study and Analyse The Opponent Weakness.**
- III. Find, Study and Analyse My Strengths.**
- IV. Find, Study and Analyse Opponent Strengths.**
- V. Work hard on my weaknesses.**
- VI. Perfect my strengths and work hard on my strengths.**

Step 174-Analyse Opportunities and Threats

1. Analyse.

- I. Find, Study and Analyse My Opportunities.**
- II. Find, Study and Analyse Opponent Opportunities I gave**
- III. Find, Study and Analyse The Threats I gave to Opponent**
- IV. Find, Study and Analyse The Threats the Opponent gave me.**

Step 175-Improvement

1. Improvement.

- I. Find the things I could do better.**
- II. What First to Improve in Steps of Performance.**
- III. What to Change for better Performance.**
- IV. No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better**

Step 176-Steps to Take To Do Better and Improve

1. Steps to Improve.

- I. Decide and Prioritise 1-3 Challenges and Problems to improve**
- II. Steps I will Take To Improve.**
- III. Look at the improvement over the long period of time, and decide the steps I will take to improve. Look at the improvement as marathon, where you step by step improving.**
- IV. Take One Step at the time to move forward.**

Step 177-Ideas and Gratitude

1. Ideas

- I. Investigate each Ideas I have.**
- II. Decide The Ideas To Proceed.**

2. Gratitude.

- I. What I am Thankful for?**
- II. What is my Gratitude For?**

*Part 26: Weekly and Daily
Journaling*

Step 178-Materials Needed and Listen And Follow Rules of Reading For Weekly and Daily Journaling

1. Organise Materials for Journaling
 - Phone
 - Headphone
 - Pen
 - CopyBook
 - AudioRecorder on The Phone
2. Listen, Follow and Apply Rules of Reading For Journaling and Review of The Day, When Doing Journaling and Review of The Day.
3. Listen, Follow and Apply Books Throughout the Journaling, Reflection, Review, Analyse : How we Think By John Dewey,
4. Write Down Questions and Think Over the Day and Answer Those Questions, If I am Using Pen and Copybook
5. AudioRecord the Questions and Think over those questions and Answer Them.

Step 179- Record, Reflect

1. Reflection and Review.

A. Success.

- I. What I have Done Well For A Week, Today?**
- II. What Have Worked Within A week, today?**
- III. Was There an Improvement by 1%, Where was the improvement?**

B. Failure.

- I. What I have Failed on Weekly, today?**
- II. What have not worked well Within a week, today?**
- III. Was there a declined by 1%, where was the decline?**

C. Accountability

- I. Take Accountability for Success and Failure**

D. Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.

- First, he would learn everything he could about it and prepare physically as best as possible.
- Once the physical prep was done, he'd take care of the mental prep with visualization.
- Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.
- Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.
- Side note: visualization is great, but it's no substitute for preparation.

Step 180-Analyse Strength and Weaknesses

1. Analyse.

- I. Find, Study and Analyse My Weakness.**
- II. Find, Study and Analyse The Opponent Weakness.**
- III. Find, Study and Analyse My Strengths.**
- IV. Find, Study and Analyse Opponent Strengths.**
- V. Work hard on my weaknesses.**
- VI. Perfect my strengths and work hard on my strengths.**

Step 181-Analyse Opportunities and Threats

1. Analyse.

- I. Find, Study and Analyse My Opportunities.**
- II. Find, Study and Analyse Opponent Opportunities I gave**
- III. Find, Study and Analyse The Threats I gave to Opponent**
- IV. Find, Study and Analyse The Threats the Opponent gave me.**

Step 182-Improvement

1. Improvement.

- I. Find the things I could do better.**
- II. What First to Improve in Steps of Performance.**
- III. What to Change for better Performance.**
- IV. No Shortcut. Mastery does not tolerate shortcuts. Shortcuts exist to get better results with the same amount of pain/effort. It can neither scale nor work in the long term. The only way to go beyond your limitations is to do more, and better**

Step 183-Steps to Take To Do Better and Improve

1. Steps to Improve.

- I. Decide and Prioritise 1-3 Challenges and Problems to improve**
- II. Steps I will Take To Improve.**
- III. Look at the improvement over the long period of time, and decide the steps I will take to improve. Look at the improvement as marathon, where you step by step improving.**
- IV. Take One Step at the time to move forward.**

Step 184-Ideas and Gratitude

1. Ideas

- I. Investigate each Ideas I have.**
- II. Decide The Ideas To Proceed.**

2. Gratitude.

- I. What I am Thankful for?**
- II. What is my Gratitude For?**

Part 27: Stoic and Stoicism.

Step 185-You Have Required To Do The Work For Stoicism

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 186-Use Rules of Reading for Stoicism

1. Listen, Follow and Apply Rules of Reading of Bible Study, Deep Work, Deep Study, Analysis, Syntopicon and Research For Stoicism and Stoic.
 - A. **VERY VERY FAST Reading- Skimming. Pages 47-51.**
 - B. **VERY FAST READING- Entertainment.**
 - I. **Method 1-Speed Reading. FAST Reading. Pages 59-64.**
 - C. **FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.**
 - I. **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - II. **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - III. **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - IV. **Method 4-Flip Through Pages and Analyse. Page 70.**
 - V. **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - VI. **Method 6-Devotional Bible Read. Pages 73-74.**

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
- X. Method 10-Paragraph Study. Pages 216-229.**
- XI. Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- XIV. Method 14-Studying Bible Prophecy. Pages 246-259.**
- XV. Method 15-Typological Study Method. Pages 260-262.**
- XVI. Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

E. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
- V. Method 25-Research Books can Be Used. Pages 883-897.**
- VI. Method 26-Investigative Journalism. Pages 898-923.**
- VII. Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

2. Apply The Books To Stoicism and Stoic

Step 187-Stoic and Stoicism Books

1. Do not become victim, and looking to be victimise, That the world is owed you everything. World does not owed you anything. Work Hard, Love God, Love Your Country and Embrace Stoicism.
2. Does the Character has died as a Hero, or living long enough to become a villain. There are no Heroes in this world.
3. **Listen, Follow And Apply Rules of Reading Part 1 to 21, before looking into Stoicism and Stoic.**
4. **Listen, Follow and Apply the following Books.**
 - A. **Guide to the good life_ the ancient art of Stoic joy.**
 - B. **Dialogues and Essays By Seneca.**
 - C. Emotion and Peace of Mind_ From Stoic Agitation to Christian Temptation.
 - D. A Stoic and Socratic Guide to Life by Epictetus.
 - E. Great Books of the Western World By Mortimer Adler.
 - F. The Stoic_ Elements of Ethics, Fragments, and Excerpts By Hierocles.
 - G. How to be a stoic _ using ancient philosophy to live a modern life By Massimo Pigliucci.
 - H. How to Be Free: A Guide To Stoic Life BY Epictetus.
 - I. Letter from Stoic By Seneca.
 - J. Meditation By Marcus Aurelius.
 - K. Meditation on Discipline and Failure By Ferraiolo.
 - L. One True Life By Kevin Rowe.
 - M. Pursuits of Wisdom_ Six Ways of Life in Ancient Philosophy from Socrates to Plotinus.
 - N. Stoic Logic By Benson Mates.
 - O. The Philosophy of Cognitive Behavior Therapy: Stoic Philosophy and Rational.
 - P. Stoic Pack.
 - Q. Stoic Warriors_ The Ancient Philosophy Behind the Military Mind.
 - R. Stoicism and Emotion.
 - S. Stoicism and the Art of Happiness_ A Teach Yourself Guide.
 - T. Stoicism Today_ Selected Writings (Volume Two).
 - U. Stoicism a Beginners guide to Stoicism.
 - V. Stoic Notes.

W. The Stoics: A GUIDE FOR PERPLEXED.

X. Stoicism.

Y. The Art of Living_ The Stoics on the Nature and Function of Philosophy.

Z. Cambridge Companion to STOICS.

AA.The Daily Stoic_ 366 Meditations on Wisdom, Perseverance, and the Art of Living

BB.The Little Book of Stoicism_ Timeless Wisdom to Gain Resilience, Confidence,
and Calmness.

CC.ROUTLEDGE HANDBOOK TO STOIC TRADITION.

DD.Sniper Mind.

EE.The Stoic Life_ Emotions, Duties, and Fate.

FF. Stoic Sage.

GG.Stoics On Ambiguity.

HH.The Wisdom of the Stoics_ Selections from Seneca, Epictetus and Marcus
Aurelius.

II. The Stoics.

Step 188- Thinking, Logic and Mental Model

1. Listen, Follow and Apply Thinking, Logic and Mental Model PART 7

Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- 1. Step 57- Slow Down. Pages 1061-1063.**
- 2. Step 58- NOT MULTITASK. Pages 1064.**
- 3. Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- 4. Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- 5. Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- 6. Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- 7. Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- 8. Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- 9. Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- 10. Step 66-Journaling. Pages 1299.**
- 11. Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- 12. Step 68-Journaling. Pages 1306.**
- 13. Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Step 189-Journaling

1. **Step 1-So keep a journal. Write your experiences down. When you identify a model at work in the world, write that down too. Then you can explore the applications you've observed, and start being more in control of the models you use every day. For instance, instead of falling victim to confirmation bias, you will be able to step back and see it at work in yourself and others. Once you get practice, you will start to naturally apply models as you go through your life, from reading the news to contemplating a career move. As we have seen, we can run into problems when we apply models to situations in which they don't fit. If a model works, we must invest the time and energy into understanding why it worked so we know when to use**
2. **Visualization- Remember, visualization will never compensate for the work undone. You cannot visualize lies. All the strategies I employ to answer the simple questions and win the mind game are effective because I put in work. It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day, but if you do, you'll find that at the other end of that suffering is a whole other life just waiting for you.**
 - **First, he would learn everything he could about it and prepare physically as best as possible.**
 - **Once the physical prep was done, he'd take care of the mental prep with visualization.**
 - **Since he knew almost everything about his challenge, he visualized what awaited him. He would imagine himself struggling, suffering, and eventually succeeding.**
 - **Preparing himself this way helped him pace his future, and improve the odds of avoiding quitting.**
 - **Side note: visualization is great, but it's no substitute for preparation.**

Step 190-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

Part 28: Learning.

Step 191-Books For Studies

1. **Listen, Follow And Apply Rules of Reading Part 1 to 22, before looking into Learning.**
2. **How To Read A Book By Mortimer Adler for Various Editions**
3. **Listen, Follow and Apply the following Books.**
 - A. **How to Study by Ron Fry**
 - B. **Learning How to Learn.**
 - C. **Learning to Read Critically in Teaching and Learning.**
 - D. **Polyglot.**
 - E. **The Well Educated Mind.**
 - F. **The Well Trained Mind.**
 - G. **A Well Educated Mind/**
 - H. **Trivium: Liberal Arts of Logic, Grammar and Rhetoric by Miriam Joseph**
 - I. **Quadrivium: The Four Classical Liberal Arts of Number, Geometry, Music and Cosmology.**
 - J. **Trivium 21 C Preparing Young People For The fUTURE WITH IESSONS fROM THE Past. By Martin Robinson**
 - K. **Final Trivium- Learning Skills**
 - L. **UltraLearning.**
 - M. **Deep Work.**
4. **Listen, Follow and Apply The following Books on Discussion.**
 - A. **Tactics By Greg Koukl**
 - B. **Tactics and Socratic Method.**
 - C. **Socratic Method By Rebecca Cain.**
 - D. **Plato Euthyphro**
 - E. **Socrates Guide for Preplexed**
 - F. **Socrates way.**
 - G. **Plato Complete Work.**
 - H. **Socratic Method In the classroom.**
 - I. **The Power of Socratic Classroom.**
 - J. **Thinker Guide to Socratic Questioning.**
 - K. **Teaches Like Socrates Guide.**

L. Socratic method Today.

5. Trivium: Listen, Follow and Apply The following Books on Discussion.

A. Grammar

- **The Cambridge Grammar of The English Language B Rodney Huddleston.**
- **Any Grammar that Teaches grammar to children from beginner to Most Advanced.**

B. Logic

- **A Concise Introduction to Logic By Patrick Hurley**
- **Any Logic Book that teaches children Logic**
- **Aristotle on Logic**
- **Material Logic**
- **Traditional Logic**
- **Socratic Logic By Peter Kreeft**

C. Rhetoric

- **Rhetoric By Aristotle**
- **On Rhetoric By Aristotle**
- **Art of Rhetoric By Aristotle**

D. Reading

- **How To Read A book by Mortimer Adler 1940 Edition**
- **How to Read A Book by Mortimer aDLER 1966 eDITION**
- **How To read A Book by Mortimer Adler 1972 Edition**

Step 192 - Classical Education Curriculum

Books For Classical Education Curriculum

- **Ambrose Curriculum Guide**
- **Classical Curriculum**
- **Classical Education**
- **ICE_PSE- An Introduction to classical Education**
- **Rhetoric Booklet**
- **The Educational Plan**
- **Trivium**
- **What is Classical Education**
- **How to study**
- **UltraLearning.**
- **Deep Work**

Study in Classical Education For Curriculum:

- **Socratic Questioning, Socratic Method and Socratic Discussion.**
- **Use Plato Dialogue for Socratic Method, Socratic Questioning and Socratic Discussion.**
- **UltraLearning.**
- **Deep Work**
- **Trivium**
 - I. **Logic (Aristotelian Logic) and Then Hard Mathematical Logic**
 - II. **Grammar**
 - III. **Rhetorics**
- **Quadrivium**
 - I. **Arithmetic**
 - II. **Music**
 - III. **Geometry**
 - IV. **Astronomy**

- **Fine Art**

- I. **Architecture**
- II. **Sculpture**
- III. **Painting**
- IV. **Literature**
- V. **Music**
- VI. **Performing**
- VII. **Film**

- **Science-Moral**

- I. **Literature**
- II. **History**
- III. **Philosophy**

- **Science- Natural**

- I. **Physical**
- II. **Earth**
- III. **Life**

- **Reason**

- **Critical Thinking, Thinking and Thinking in Models**

- **Classical Language: Latin, Greek, Hebrew, Arabic**

- **Languages: English, Lithuanian, Ukrainian, French, Spanish, Portuguese, Chinese.**

- **Speech-As Parent I need to find a way that My children would stand up and speak in front of other people, and Give them all the tools necessary.**

- **How To Put Ideas into Practice. How The Idea can be put into practice.**

6. Introduce Alexandra and Adelina to Good Literature:

- **Have A Deep Literature Hour with Both of them**

7. When Reading with Alexandra and Adelina, ask Question:

- **What**
- **Who**
- **When**
- **Where**
- **Why**
- **How**

- What does the text Says?
- What does the author mean based on text?
- Lets try to find what does the author mean by writing this
- Use Rules of Reading.

Step 193 - UltraLearning.

Summary

CHAPTER 1: CAN YOU GET AN MIT EDUCATION WITHOUT GOING TO MIT?

- His friend's advice: ***always have a challenge***

CHAPTER 2: WHY ULTRALEARNING MATTERS

- **Ultralearning**: a strategy for acquiring skills that is both *self-directed* and *intense*
 - Ultralearning is a powerful tool and a small investment
 - Rapidly learning hard skills can have a greater impact than years of mediocre striving on the job
- Your deepest moments of happiness don't come from easy things. They come from realizing your potential and overcoming your own limiting beliefs about yourself
- Medium-skilled technical work is being outsourced overseas or replaced with technology. Only high-skilled jobs and lower-skilled jobs are remaining due to developing technology
 - You need to move to the higher-skilled category where *learning is constant*, or you'll be pushed into the lower skilled category
- Ultralearning can fill in the gaps where higher education does not fill the need in the market and is also *more flexible* to the students lifestyle demands

Reader's note: this reminds me a lot of the argument for learning things quickly and efficiently as referenced in the book [Deep Work by Cal Newport](#)

- The best ultralearners are those who blend the practical reasons for learning a skill with an inspiration that comes with something that excites them
 - Learning and growth also *builds your confidence* and brightens your perspective of what's possible

CHAPTER 3: HOW TO BECOME AN ULTRA LEARNER

- What makes ultra learning interesting is also what makes it hard to boil down into step-by-step formulas

Principles of becoming an ultralearner:

1. **Metalearning** – *first draw a map*
2. **Focus** – *sharpen your knife*. Cultivate the ability to concentrate
3. **Directness** – *go straight ahead*
 - Learn by doing the thing you want to become good at
4. **Drill** – *attack your weakest point*
 - Be ruthless in improving your weakest points
5. **Retrieval** – *test to learn*
6. **Feedback**– *don't dodge the punches*
7. **Retention** – *don't fill a leaky bucket*. Understand what you forget and why
8. **Intuition**– *dig deep before building up*
 - Develop through play and exploration of concept and skills. Understand how understanding works
9. **Experimentation** – *explore outside your comfort zone*

CHAPTER 4: PRINCIPLE ONE – METALEARNING: FIRST DRAW A MAP

- **Metalearning** means *learning about learning*, such as how knowledge is structured and acquired within the subject
- People who speak other languages can pick up new languages more quickly
 - Also people who study new languages are more familiar with language acquisition
- Break down metalearning you do for a specific project into three questions:
 - Why
 - What
 - How
- Do your research first. Determine if learning a topic is likely to have a the effect you want it to before you get started
- Two ways to answer “how” you’ll learn something:
 - **Benchmarking** – finding the common ways people learn a subject to design a default strategy as a starting point
 - **Emphasize-exclude method** – finding the areas most relevant to your learning goals and excluding those that aren’t from your curriculum
- Rule of thumb: invest about 10% of your total expected learning time in research before you get started
- The true benefits of metalearning are long-term

CHAPTER 5: PRINCIPLE TWO – FOCUS: SHARPEN YOUR KNIFE

- In the realm of great intellectual accomplishments, an *ability to focus quickly and deeply* is nearly ubiquitous
- The struggles with focus that people have generally come in three broad varieties:
 - Starting
 - Sustaining
 - Optimizing the quality
- Ultralearners are relentless in coming up with solutions to handle these 3 problems which form the basis of an ability to *focus well* and *learn deeply*

Problem 1: Failing to start focusing a.k.a. Procrastinating

- Make a mental note when you are procrastinating, either recognizing the feeling some *desire to not do a task* or *stronger urge to do something else*
 - Building this awareness is the first step
- Sometimes the worry about the unpleasantness of a task only lasts a few minutes before going away
- One crutch is to get yourself to continue for only 5 minutes
 - After a while, you can utilize the [Pomodoro Technique](#) to further improve productivity
 - 1 pomodoro = 25 minute work sessions followed by a 3-5 minute break
 - After 4 pomodoros, take a 15-30 minute break

Problem 2: Failing to sustain focus a.k.a. Getting distracted

- **Flow** is a state of mind where you are in the zone and stop being distracted by interrupting thoughts
 - Your mind becomes *completely absorbed* in the task at hand
 - While flow may be possible in ultralearning, the environment of deliberate practice is not conducive because the difficulty makes flow very difficult
 - Additionally, the self-consciousness that is absent in flow may need to be present in ultralearning and deliberate practice as you need to constantly adjust your approach
 - His advice: ***don't worry about flow***
- Some research says breaking up studying into chunks of different subjects may help with focus
 - A proper balance is needed. *50-60 minutes* is a good length of time for many learning tasks
 - For more concentrated schedules, you can use *several-minute breaks* every hour and split up the different areas in your subject
- Ultimately, however, you need to find what works best for you
- 3 sources that causes focus to break down:
 - *Your environment*
 - Be aware, test your environment, and experiment
 - *Your task*

- Consider the different tools for learning
- Consider slight modifications in learning that increase difficulty to make it cognitively harder to zone out
- *Your mind* – negative emotions, restlessness, daydreaming
 - A clear, calm mind is always best for focusing on all learning problems
 - Dealing with problems may need to be dealt with first
 - For things you cannot control, acknowledge and be aware of your negative feelings, then let it pass

Problem 3: Failing to create the right kind of focus

- This deals with the *quality* and *direction* of your attention
- How you should apply your attention deals with two variables:
 - **Arousal** – your overall feeling of energy and alertness
 - This is caused by the sympathetic nervous system activation
 - Mentally, arousal also includes *attention*
 - High arousal creates a feeling of keen alertness, which is often characterized by feeling a narrow focus, but one that can also be somewhat brittle
 - **Task complexity**
 - More complex tests such as math problems or writing an essay tend to benefit from a *more relaxed* kind of focus
 - The space of focus is often larger and more diffuse
 - This has advantages when an order is the solve the problem you must consider many different inputs and ideas
 - Some tasks may require this *mental quietness*
 - Some particularly creative tasks may benefit from no focus at all and taking a break from the problem to allow for eureka moments
 - This however only occurs when one has focused on a problem for long enough that the breakthrough can occur in a relaxed state
 - Consider optimizing your arousal levels to sustain the ideal level of focus
 - **Complex tasks** may benefit from *lower arousal*, so working in a quiet room may work
 - **Simpler tasks** might benefit from a *noisier environment* like working at a coffee shop

CHAPTER 6: PRINCIPLE THREE – DIRECTNESS: GO STRAIGHT AHEAD

- **Directness** is the hallmark of most ultralearning projects
 - His example approach is to show that the learning activities are always *done in connection to the context* in which the skills learned will eventually be used
 - The easiest way to learn directly this is simply do the thing you want to get good at
 - This won't work for all projects, but it is something you can gradually increase to improve your performance
- Studies over decades show that general transfer of knowledge in one area into another doesn't exist and general discipline as a muscle is not a valid concept
 - However, one researcher says the **transfer** is paradoxical
 - "When we want it, we don't get it. Yet it occurs all the time"
 - Transfer tends to be harder when our knowledge is more limited
 - As we develop more knowledge and skill in one area, they become more flexible and easier to apply outside the narrow context which they were learned
 - His own hypothesis as an explanation for the transfer problem: *most formal learning is woefully indirect*
- Initial learning efforts often stick stubbornly to the *situations we learn them in*
 - The problem is that learning directly is hard
 - It is often more frustrating, challenging, and intense than reading a book or attending a lecture
 - But this very difficulty creates a potential source of *competitive advantage* for any would-be ultralearner

Learning Tactics

- Tactic 1: *project-based learning*
- Tactic 2: *immersive learning*
- Tactic 3: *the flight simulator method*
- Tactic 4: *the overkill approach*
 - Put yourself in an environments where the *demands will be extremely high* so you're unlikely to miss any important lessons or feedback

CHAPTER 7: PRINCIPLE FOUR – DRILL: ATTACK YOUR WEAKEST POINT

- Benjamin Franklin's mastery of writing is what made him great
 - It was how he practice, the way he decided to *break apart the skill of writing* and *practiced its elements in isolation* which allowed him to apply this mastery to other pursuits
- There are **rate-determining steps** in learning anything that acts as a bottleneck and determines your overall performance
 - **Drills** allow you to improve these rate-determining step in isolation which will improve your overall performance
- A **direct-then-drill approach** is first trying to practice a skill directly, then analyze the direct skill and try to isolate components that are either rate-determining steps in your performance, or sub-skills you find difficult to improve because there are too many other things going on for you to focus on them
 - The final step is to go back to direct practice and integrate what you've learned

Drills

- Drill 1: *Time slicing* – Isolate a slice in time of the longer sequence of actions
- Drill 2: *Cognitive components*
- Drill 3: *The copycat* – Copy the aspects you don't want to drill so that you can isolate the aspects you do, such as copying a painting from someone else but practicing one aspect component
- Drill 4: *The magnifying glass method* – spend more time on one component of the scale than you would otherwise
- Drill 5: *Prerequisite chain* – start on hard skills and learn prerequisite foundational skills as needed, which saves time from learning sub skills that don't drive performance

Reader's note: this section of drilling reminds me of the idea of removing the bottleneck to improve the overall performance of a system from the book [The Goal by Eliyahu Goldratt](#)

- Drilling is difficult, but something *mentally strenuous provides a greater benefit* to learning than some thing easy

CHAPTER 8: PRINCIPLE FIVE – RETRIEVAL: TEST TO LEARN

- Study showed *testing yourself*, trying to retrieve information without looking at the text, aka **free recall** or **self-testing**, clearly outperformed both simple review and concept mapping methods
 - This might be because:
 1. You get feedback
 2. Self-testing is more directly related to actual testing and therefore transfer is more likely
- Increasing the difficulty and testing yourself way *before you are ready* is more efficient compared to low-intensity learning strategies which involve less or easier retrieval
 - Giving a test later when information is not top of mind improves retention because it is more difficult
 - However, testing too late so that you forgotten the information entirely is not beneficial
 1. You need to find a good midpoint
- The concept of **forward retrieval** is that early testing may help for retrieval later on for information not yet learned
- Nearly any fact or concept is now available to anyone with a smart phone. However this hasn't made the modern person thousands of times smarter than before
 - Being able to look things up is certainly an advantage, but without a certain amount of knowledge inside your head, it doesn't help you solve hard problems

Useful methods to apply retrieval to almost any subject

1. *Flashcards*
2. *Free recall*
3. *The question book method* – rephrase your recorded notes as questions to be answered later
 - What's harder and more useful is to restate the big idea of a chapter or section as a question because it requires deeper thinking
4. *Self-generated challenges*
5. *Closed book learning*

CHAPTER 9: PRINCIPLE SIX – FEEDBACK: DON'T DODGE THE PUNCHES

- The ability to gain immediate feedback on one's performance is an essential ingredient in reaching expert levels of performance
- The type of feedback is important
 - Feedback works well when it provides useful information that can guide future learning such as what you were doing wrong and how you can fix it
 - However, feedback often backfires when it is *aimed at a person's ego*
 - **Praise**, for example, is usually harmful to further learning
 - When feedback steers into an evaluation of you as an individual, it usually has a *negative impact on learning*
- Ultralearners need to be sensitive to what feedback that is actually useful and tune out the rest
- **Fear of feedback** often feels more uncomfortable than experiencing the feedback itself
 - It is not so much negative feedback on its own that can impede progress, but the fear of hearing criticism that causes us to shut down
 - Sometimes the best action is to dive straight into the hardest environment which can reduce your fears of getting started initially
 - It will allow you to adjust accordingly if the feedback is too harsh to be useful
- Three types of feedback:
 - *Outcome feedback*
 - *Informational feedback*
 - *Corrective feedback*
- **Outcome feedback** tells you how you are doing overall, but not what you're doing right or wrong, why, or how to improve
- **Informational feedback** can tell you what you are doing wrong, but not how to fix it
 - This is easy to obtain when you can get live, real time feedback like an audience's reaction
- **Corrective feedback** is the best type of feedback because it can show you what you're doing wrong and how to fix it
 - This type is typically only available through a coach, mentor, or teacher, or certain studying tools
- The best **feedback** is *informative* and *usable* by the student who receives it
 - Optimal feedback *indicates the difference between the current state and the desired state*, and helps students *take a step to improve their learning*
- Research shows that *immediate feedback* is superior in regards to timing
- Trying to avoid situations that always make you feel good or bad about your performance
 - Sometimes is the easiest way to improve feedback is simply to get a lot more of it a lot more often
- Though short-term feedback can be stressful, once you get into the habit of receiving it, it becomes easier to process without overreacting emotionally

CHAPTER 10: PRINCIPLE SEVEN – RETENTION: DON'T FILL A LEAKY BUCKET

- **Memory** is essential to learning things well
 - In terms of memory, *our minds are a leaky bucket*
 - But most of the holes are at the top so the water that remains at the bottom leaks out more slowly
 - We tend to forget information quickly but then it tapers off after a while
- Four mechanisms of retention:
 - Spacing
 - Proceduralization
 - Overlearning
 - Numonics
- **Spacing** learning sessions over more intervals across a longer periods of time helps with *long-term retention*, though lower performance in the short-term because of forgetting
 - Another strategy for applying spacing is to semi-regularly do refresher projects
- **Procedural information** tends to be stored for much longer so it may benefit to you practice a core set of information instead of everything evenly
 - Not all skills can become automatic and proceduralized
- **Overlearning** is additional practice beyond what is required to perform adequately which can *increase the length of time* that memory is stored
- **Numonics** – a picture retains 1000 words
 - Book reference: [Moonwalking with Einstein by Joshua Foer](#)

CHAPTER 11: PRINCIPLE EIGHT – INTUITION: DIG DEEP BEFORE BUILDING UP

Useful guidelines for doing things differently:

1. *Rule one:* don't give up on hard problems easily
2. *Rule two:* prove things to understand them. Working through things yourself can help you develop the capacity for deep intuition
3. *Rule three:* always start with a concrete example
4. *Rule four:* don't fool yourself. Explaining things clearly and asking dumb questions can keep you from fooling yourself into thinking you know something you don't
- **The Feynman Technique:**
 - First, write down the problem or concept you want to understand at the top of the paper
 - Second, in the space below, explain the idea as if you had to teach it to someone else or convey the idea to someone who's never heard of it
 - Explain how to solve it and why the procedure makes sense
 - Third, when you get stuck and your understanding fails to provide a clear answer, go back to your reference material to find your answer

Reader's note: This concept is just like teaching in order to understand and learn better

CHAPTER 12: PRINCIPLE NINE – EXPERIMENTATION: EXPLORE OUTSIDE YOUR COMFORT ZONE

- **Variation** is important to finding style or method that works for you
 - Find one that will take advantage of your strengths and diminish your weaknesses, just like what Van Gogh did
 - *Aggressive exploration* and *tenacity* we're also key to Van Gogh's success
- **Experimentation** is the key to mastery
 - As you approach mastery, many skills reward *proficiency* as well as *originality*
 - As ***creativity becomes valuable, experimentation becomes essential***
- Three types of experimentation:
 - Experimenting with *learning methods, materials, and resources*
 - Experimenting with *technique*
 - Experimenting with *style*
- The key to experimenting with different styles is to be aware of all the different styles that exist

The mindset to experimentation

- Experimentation requires a **growth mindset**, as referenced by psychologist Carol Dweck
 - Book reference: [Mindset by Carol Dweck](#)
- How to experiment:
 - *Copy then create*
 - *Compare methods side-by-side*
 - *Introduce new constraints* – The best innovations come from working within constraints
 - *Find your superpower in the hybrid of unrelated skills*
 - *Explore the extremes*

CHAPTER 13: YOUR FIRST ULTRALEARNING PROJECT

- **Step one:** do your research
 - Ultralearning “packing” checklist:
 1. What *topic* you’re going to learn and it’s *approximate scope*. He suggest starting with a narrow scope and expanding it as needed
 2. The *primary resources* you’re going to use
 3. A *benchmark* for how others I have successfully learned this skill or subject
 4. Direct practice *activities*
 5. Back up *materials* and *drills*
- **Step two:** schedule your time
 - Consistency breeds good habits, reducing the effort required to study
- **Step three:** execute it
- **Step four:** review your results
- **Step five:** choose to maintain or master what you’ve learned
 - If you want to maintain your skills, schedule in time to practice it every so often or try to integrate your new skills into your life somehow
 - Sometimes the *cost of re-learning a skill* is smaller than the cost of keeping it continuously sharp
 1. One reason may be you might have learned more than you actually need. Also, *re-learning* is generally easier than first time learning

Alternatives to ultralearning: Low intensity habits and formal instruction

- Being an ultralearner doesn’t imply that everything one learns has to be done in the most aggressive and dramatic fashion possible
- Two main alternative strategies to ultralearning to see how they fit into a *bigger picture of lifelong learning*
- Alternative strategy one: **low intensity habits**
 - These work well when engaging in *learning is spontaneous, frustration level is low, and learning is automatically rewarding*
 - **Enjoyment** tends to come from being good at things. Once you feel competent in a skill, it starts to get a lot more fun
 - Therefore, he thinks pursuing aggressive ultralearning projects is often the surer way to *enjoy learning more* as you’re more likely to reach a level where learning automatically becomes fun
- Alternative strategy two: **formal, structured education**
 - The benefits of formal structured education is it allows you to interact with people in groups and with teachers or mentors

CHAPTER 14: AN UNCONVENTIONAL EDUCATION

- Psychologists recognize large difference between goals ***pursued intrinsically*** based on their own decisions, interests, and targets, and goals that they ***pursue extrinsically*** pushed by overbearing parents, punishing curricula, or demanding employers
 - The latter type, because the motivation for conforming to them comes primarily from *outside social pressures* are the cause of much misery

How to raise an Ultralearner

- [László Polgár](#), the man who raised his three daughters to be chess geniuses, outlined in his book how to turn any normal, healthy child into a genius
 - Book reference: [Bring Up Genius! \(Nevelj zsenit!\) by László Polgár](#)
- First step is to start early
 - Education should begin no later than three, and specialization to begin no later than six
 - There is evidence from other fields that children's brains are more plastic and flexible when younger
- The second step is to specialize
 - Even though the girls learned mathematics, language, sports, and other subjects, their focus was always in chess
 - Here they played 5 to 6 hours per day
 - By specializing in one subject, the children could reach proficiency at an early age
 - Winning against older and more experienced opponents in chess with build their self-confidence and competitive spirit so that they actively wanted to practice more to improve themselves
- The third step was to make practice into play
 - Keeping the game *fun and light* was a key steppingstone to developing a drive and self-confidence that would support more serious effort later
 - However, he insisted that "play is not the opposite of work, and a child does not need play separate from work, but meaningful action"
- Fourth, he was careful to create positive reinforcement, to make chess a pleasant rather than frustrating experience
 - Failure, suffering, and fearfulness decreased achievement
- Lastly, he was against coercive learning
 - *Self-discipline, motivation, and commitment* must come from the children themselves
 - One can never achieve serious pedagogical results especially at a high-level through coercion
 - ***One of the most important educational tasks is to teach self-education***
- In the beginning, you can start with projects that are more unique until your skill level and self confidence builds up
 - When your skill increases, you can challenge yourself and create a competitive environment
- In the workplace, make learning a priority and create a culture of learning

- **Learning** isn't about replacing ignorance with understanding. Ignorance expands with knowledge
 - ***Greater knowledge comes a greater appreciation for all the qualities that remain unanswered***
- Confidence must be paired with great humility

Full Book of ULTRALEARNING

Chapter 3- How Become UltraLearner.

"I'd love to be a guinea pig." It was an email from Tristan de Montebello. I had first met the charming, half-French, half-American musician and entrepreneur seven years earlier, at almost exactly the same time as my fateful encounter with Benny Lewis. With tousled blond hair and a closecropped beard, he looked like he belonged on a surfboard on some stretch of California coastline. De Montebello was the kind of guy you liked immediately: confident, yet down to earth, with only the vaguest hints of a French accent in his otherwise perfect English. Over the years, we had kept in touch: me with my strange learning experiments; him hopping around the world, going from working with a Parisian startup that made bespoke cashmere sweaters to guitarist, vagabond, and eventually web consultant in Los Angeles, much closer to the beaches that suited him so well. Now he had heard I was writing a book about learning, and he was interested.

The context of his email was that although I had met and documented dozens of people accomplishing strange and intriguing learning feats, the meetings had been largely after the fact. They were people I had met or heard about after their successes, not before; observations of successes, not experiments that generated them. As a result, it was hard to tell exactly how accessible this ultralearning thing was. If you filter through enough pebbles, you're sure to find a few flecks of gold. Was I doing the same thing, scouring for unusual learning projects? Sift through enough people, and you're bound to find some that seem incredible. But if ultralearning had the potential that I imagined it did, it would be nice to find someone before he or she tried a project and watch the results. To test this, I put together a small group of about a dozen people (mostly readers of my blog) who were interested in giving this ultralearning thing a shot. Among them was de Montebello.

Becoming an Ultralearner

"Maybe piano?" de Montebello suggested. Although he was interested in the concept of ultralearning, he had no idea which skill he'd like to learn. He had played guitar and been the lead singer for a band. With his musical background, learning to play piano seemed like a relatively safe choice. He had even made a course teaching guitar lessons online, so learning another musical instrument could potentially expand his business. Selfishly, I encouraged him to try learning something farther outside his comfort zone. A musician picking up another instrument didn't seem like the ideal case to study for seeing whether ultralearning could be applied broadly. We threw more ideas around. A week or two later, he decided on public speaking. His background as a musician had given him experience being onstage, but otherwise he had little experience giving speeches. Public speaking is a useful skill, too, he argued, so it would be worth getting better at even if nothing noteworthy came from the effort.

De Montebello had a private motivation for wanting to become good at public speaking. He had given only a handful of speeches in his life, and most of those had been in college. He related to me one example, from when he had gone to give a talk to a dozen people at a web design firm in Paris: "I cringe every time I think back to that." He explained, "I could just tell I wasn't connecting. There were many pieces where I was boring them. There

were jokes where I would laugh, because I thought it was funny, but nobody else would.” Being a musician, he was surprised “how little of it translated” to public speaking. Still, it was something in which he saw potential value, if he could get good at it. “Public speaking is a metaskill,” he feels. It’s the kind of skill that assists with other skills: “confidence, storytelling, writing, creativity, interviewing skills, selling skills. It touches on so many different things.” With that in mind, he set to work.

First Steps of a Fledgling Ultralearner

De Montebello had picked his topic, but he wasn’t sure exactly how he should learn it. He decided to attend a meeting of Toastmasters International, the organization for learning public speaking. At that point, his story had two doses of luck. The first was that in attendance at the very first meeting for his public speaking project was Michael Gendler. Gendler was a longtime Toastmaster, and de Montebello’s combination of charm and obsessive intensity to become good at public speaking convinced him to help coach de Montebello through his project. The second dose of luck was something that de Montebello didn’t fully appreciate at the time: he had showed up just ten days before the deadline to be eligible to compete in the World Championship of Public Speaking.

The World Championship of Public Speaking is a competition put on annually by Toastmasters in which members compete, elimination style, starting in individual clubs and going on to larger and larger units of the organization, until a select few make it to the final stage. De Montebello had little more than a week to prepare. Still, the competition provided a potential structure for his ultralearning project, so he went for it, cranking out the six mandatory qualifying speeches in the coming week, finishing the last in the nick of time.

De Montebello practiced obsessively, sometimes speaking twice in one day. He recorded a video of every speech and analyzed it obsessively for flaws. He asked for feedback every time he gave a speech, and he got plenty of it. His coach, Gendler, pushed him far outside of his comfort zone. Once, when faced with the choice between polishing an existing speech and creating a brand-new one from scratch, de Montebello asked what he should do. Gendler’s response was to do whichever was scariest for him.

His relentless drive pushed de Montebello into unusual places. He took improv classes to work on his spontaneous delivery. There he learned to trust whatever was in his head and deliver it without hesitation. That kept him from stammering over his words or fearing freezing up onstage. He talked to a friend who works as a Hollywood director to give feedback on his delivery. The director taught de Montebello to give his speech dozens of times in different styles—angry, monotone, screaming, even as a rap—then go back and see what was different from his normal voice. According to de Montebello, that helped break him of the “uncanny valley” that happened when his normal speaking delivery felt slightly unnatural.

Another friend with a background in theater gave him tips on stage presence. He took de Montebello through his speech and showed how each word and sentence indicated movement that could be translated to where he moved on the stage. Instead of standing constricted under the spotlight, de Montebello could now move gracefully and use his body to communicate his message on top of his words. He even gave his speech at a middle school, knowing that seventh graders would give the most ruthless feedback of all. After bombing terribly outside the comfort of Toastmasters, he learned to talk

to his audience before going onstage: learn their language and emotions and connect with them. That way, applying all he had learned so far, he could change his speech on the fly, so it would be sure to connect with a new audience. Above all, Gendler pushed him relentlessly. “Make me care,” Gendler told him after listening to one of de Montebello’s speeches. “I understand why this is important to you, but the audience doesn’t care about you. You have to make me care.” Diverse advice and voluminous practice would soak those lessons in deeply, allowing de Montebello to quickly surpass his early awkwardness on the stage.

After a month, de Montebello won his area competition, beating out a competitor with two decades of experience in Toastmasters. He won his district and division competitions, too. Finally, less than seven months after he first tried his hand at public speaking, he was going to compete in the World Championships. “There are about thirty thousand people who compete every year,” he noted, adding “I’m pretty confident I’m the fastest competitor in history to make it this far, since if I had started ten days later, I couldn’t have competed.” He made it into the top ten.

From Semifinalist to Career Change

“I knew this project was going to be big for me when I started it,” de Montebello told me months after his top ten placement in the international competition. “But it was literally life changing. I didn’t expect it to actually change my life.” Reaching the final competition in the World Championship had been quite a journey, but it was only afterward that he began to realize how much he had learned. “I was learning for this very narrow world of public speaking. It was only after that I realized the depth of all these skills I had worked so much on: storytelling, confidence, communicating.”

Friends who heard of de Montebello’s success started asking if he could help them work on their own speeches. He and Gendler saw an opportunity to help others improve their public speaking skills. The demand was intense. Authors who command five-figure speaking fees started to approach the duo to see if they could be taught to improve their public speaking the ultralearning way. Soon they had landed their first client, to the tune of twenty thousand dollars. Gendler and de Montebello weren’t mercenary; they wanted to focus only on speakers whose message they really believed in. But the fact that they had attracted such high-status clients certainly helped persuade them to make the switch into coaching public speaking full-time. Gendler and de Montebello even decided to name their consultancy UltraSpeaking, as a nod to the strategy that made it all possible.

De Montebello’s story ended up being much more dramatic than either of us had initially expected. His initial hope had been that he could practice intensely for a few months, deliver a great speech somewhere, and have it recorded—a nice memento and a new skill—but not that he would reach the status of an international competitor and eventually experience a complete career change. Of the other dozen or so people I spent some time coaching into ultralearning, none offered so dramatic an example. Some dropped out. Life got in the way (or perhaps revealed that they weren’t actually as committed as they had initially appeared to be). Others had respectable successes, making significant improvements in learning medicine, statistics, comic book drawing, military history, and yoga, even if they didn’t reach de Montebello’s degree of success.

What differentiated de Montebello wasn’t that he thought he could go from near-zero experience to the finalist for the World Championship in six

months. Rather, it was his obsessive work ethic. His goal wasn't to reach some predetermined extreme but to see how far he could go. Sometimes you'll get lucky and embark on a path that will take you quite far. But even the failure mode of ultralearning is usually that you will learn a skill fairly well. Even those who didn't have such dramatic results among the small group I spent time coaching, those who stuck with their project still ended up learning a new skill they cared about. You may not compete in world championships or completely switch careers, but as long as you stick with the process, you're bound to learn something new. What de Montebello's example encapsulated for me was not only that you can become an ultralearner but that such successes are far from being the inevitable consequences of having a particular kind of genius or talent. Had de Montebello focused on piano instead, his experience with giving speeches would probably have remained that one awkward example from his days in Paris.

Principles of Becoming an Ultralearner

De Montebello's story illustrates that it's possible to decide to become an ultralearner. But ultralearning isn't a cookie-cutter method. Every project is unique, and so are the methods needed to master it. The uniqueness of ultralearning projects is one of the elements that ties them all together. If ultralearning could be bottled or standardized, it would simply be an intense form of structured education. What makes ultralearning interesting is also what makes it hard to boil down into step-by-step formulas.

This is a difficult challenge, but I'm going to try to sidestep it by focusing on principles first. Principles allow you to solve problems, even those you may have never encountered before, in a way that a recipe or mechanical procedure cannot. If you really understand the principles of physics, for instance, you can solve a new problem simply by working backward.

Principles make sense of the world, and even if they don't always articulate exactly how you should solve a particular challenge, they can provide immense guidance. Ultralearning, in my view, works best when you see it through a simple set of principles, rather than trying to copy and paste exact steps or protocols.

The principles of ultralearning are going to be the focus of the second part of this book. In each chapter, I'll introduce a new principle, plus some evidence to back it up both from ultralearning examples and from scientific research. Finally, I'll share possible ways that the principle can manifest itself as specific tactics. These tactics are only a small sample. But they should provide a starting point for you to think creatively about your own ultralearning challenges.

There are nine universal principles that underlie the ultralearning projects described so far. Each embodies a particular aspect of successful learning, and I describe how ultralearners maximize the effectiveness of the principle through the choices they make in their projects. They are:

1. **METALEARNING: FIRST DRAW A MAP.** Start by learning how to learn the subject or skill you want to tackle. Discover how to do good research and how to draw on your past competencies to learn new skills more easily.
2. **FOCUS: SHARPEN YOUR KNIFE.** Cultivate the ability to concentrate. Carve out chunks of time when you can focus on learning, and make it easy to just do it.
3. **DIRECTNESS: GO STRAIGHT AHEAD.** Learn by doing the thing you want to

become good at. Don't trade it off for other tasks, just because those are more convenient or comfortable.

4. DRILL: ATTACK YOUR WEAKEST POINT. Be ruthless in improving your weakest points. Break down complex skills into small parts; then master those parts and build them back together again.

5. RETRIEVAL: TEST TO LEARN. Testing isn't simply a way of assessing knowledge but a way of creating it. Test yourself before you feel confident, and push yourself to actively recall information rather than passively review it.

6. FEEDBACK: DON'T DODGE THE PUNCHES. Feedback is harsh and uncomfortable. Know how to use it without letting your ego get in the way. Extract the signal from the noise, so you know what to pay attention to and what to ignore.

7. RETENTION: DON'T FILL A LEAKY BUCKET. Understand what you forget and why. Learn to remember things not just for now but forever.

8. INTUITION: DIG DEEP BEFORE BUILDING UP. Develop your intuition through play and exploration of concepts and skills. Understand how understanding works, and don't recourse to cheap tricks of memorization to avoid deeply knowing things.

9. EXPERIMENTATION: EXPLORE OUTSIDE YOUR COMFORT ZONE. All of these principles are only starting points. True mastery comes not just from following the path trodden by others but from exploring possibilities they haven't yet imagined.

I organized these nine principles based on my observations of ultralearning projects as well as my own personal experience, referencing, where I could, the vast cognitive science literature. I started with the ultralearners themselves. If one person did something in a certain way, that might be an interesting example, but it might also be an idiosyncrasy of that person. If several people or, better yet, every ultralearner I encountered, did a certain thing in a certain way, it was much stronger evidence that I had stumbled upon a general principle. I then checked those principles against the scientific literature. Are there mechanisms and findings from cognitive science to support the tactics I saw? Better yet, have there been controlled experiments comparing one approach to learning with another? The scientific research supports many of the learning strategies employed by the ultralearners I witnessed. This suggests that ultralearners, with their ruthless focus on efficiency and effectiveness, may have landed on some universal principles in the art of learning.

Beyond principles and tactics is a broader ultralearning ethos. It's one of taking responsibility for your own learning: deciding what you want to learn, how you want to learn it, and crafting your own plan to learn what you need to. You're the one in charge, and you're the one who's ultimately responsible for the results you generate. If you approach ultralearning in that spirit, you should take these principles as flexible guidelines, not as rigid rules. Learning well isn't just about following a set of prescriptions. You need to try things out for yourself, think hard about the nature of the learning challenges you face, and test solutions to overcome them. With that in mind, let's turn to the first ultralearning principle: metalearning.

Chapter 4- Principle 1- Metalearning: First Draw A Map

Dan Everett stands in front of a packed auditorium. A stocky man in his early sixties, he speaks slowly and confidently, his smiling face framed by thinning blond hair and a beard. Next to him is a table filled with assorted objects: sticks, stones, leaves, containers, fruit, a pitcher of water. He signals that the demonstration is about to begin.

Entering from a door on the right, a heavyset middle-aged woman with dark brown hair and olive skin approaches the stage. Everett goes up to her and says something in a language she doesn't understand. She looks around, clearly confused, and then replies hesitantly, "Kuti paoka djalou."¹ He tries to repeat what she has just said. There's some stumbling at first, but after one or two more tries, she seems satisfied with his repetition of her reply. He goes to the blackboard and writes, "Kuti paoka djalou ⇒ 'Greeting (?)'." Next he picks up a small stick and points to it. She guesses correctly that he wants to know the name and replies, "ηkindo." Once again, Everett goes to the blackboard and writes, "ηkindo ⇒ stick." Next he tries two sticks and gets the same response, "ηkindo." He then drops the stick, to which the woman says, "ηkindo paula." The demonstration proceeds, with Everett picking up objects, performing actions, listening to the woman's responses, and recording the results on the blackboard. Soon he's moved past simple naming tasks and starts asking for more complicated sentences: "She drinks the water," "You eat the banana," and "Put the rock in the container." With each new elicitation, he experiments, building new sentences and testing her reaction to see if he is correct. Within half an hour, there are more than two blackboards full of nouns, verbs, pronouns, and phonetic annotations. Learning dozens of words and phrases in a new language is a good start for the first thirty minutes spent with any language. What makes this feat particularly impressive is that Everett isn't allowed to speak any language he might have in common with the speaker.² He can only try to encourage her to say words and phrases and repeat them to try to figure out the language's grammar, pronunciation, and vocabulary. He doesn't even know what language is being spoken.*

How can Everett start speaking a new language from scratch, without teachers or translations or even knowing what language he's learning, in half an hour, when most of us struggle to do the same after years of high school Spanish classes? What enables Everett to pick up vocabulary, decode grammar, and pronunciation so much faster than you or I, even with all those additional constraints? Is he a linguistic genius, or is there something else going on?

The answer is our first principle of ultralearning: metalearning.

What Is Metalearning?

The prefix meta comes from the Greek term μετά, meaning "beyond." It typically signifies when something is "about" itself or deals with a higher layer of abstraction. In this case metalearning means learning about learning. Here's an example: If you're learning Chinese characters, you will learn that 火 means "fire." That's regular learning. You may also learn that Chinese characters are often organized by something called radicals, which indicate what kind of thing the character describes. The character 灶, for example which means "stove," has a 火 on the left-hand side to indicate that it has some relationship to fire. Learning this property of Chinese characters is

metalearning—not learning about the object of your inquiry itself, in this case words and phrases, but learning about how knowledge is structured and acquired within this subject; in other words, learning how to learn it.

In Everett's case, we can see glimpses of the enormous wealth of metalearning that lies just beneath the surface. "Well, what are some of the things we noticed about this?" Everett asks the audience after his brief demonstration has concluded, "It seems to be SVO, a subject-verb-object language, that's not terribly shocking." He continues, "There doesn't seem to be any plural marking on the nouns, unless it's tones and I missed it. . . .

There's clearly pitch going on here; whether it's tone remains to be analyzed." From this jargon we can see that when Everett evokes a word or phrase from his interlocutor, he isn't just parroting back the sounds; he's drawing a map with theories and hypotheses about how the language works grounded on years of experience learning languages.

In addition to his enormous wealth of knowledge as a linguist, Everett has another trick that gives him an enormous advantage. The demonstration he has presented is not his own invention. Called a "monolingual fieldwork" demonstration, this method was first developed by Everett's teacher Kenneth Pike as a means of learning indigenous languages. The method lays out a sequence of objects and actions that the practitioner can use to start piecing together the language. This method even received some Hollywood exposure after Louise Banks, a fictional linguist, used it to decode an alien language in the 2016 science fiction movie *Arrival*.

These two pieces in Everett's linguistic arsenal—a richly detailed map of how languages work and a method that provides a path to fluency—have allowed Everett to accomplish a lot more than just learning some simple sentences. Over the last thirty years he has become one of only a handful of outsiders to become fluent in Pirahã, one of the most unusual and difficult languages on the planet, spoken only by a remote tribe in the Amazon jungle.³

The Power of Your Metalearning Map

Everett's case beautifully illustrates the power of using metalearning to learn new things faster and more effectively. Being able to see how a subject works, what kinds of skills and information must be mastered, and what methods are available to do so more effectively is at the heart of success of all ultralearning projects. Metalearning thus forms the map, showing you how to get to your destination without getting lost.

To see why metalearning is so important, consider one study on the helpful effects of already knowing a second language when learning a third.⁴ The study took place in Texas, where monolingual English speakers and bilingual Spanish/English speakers were enrolled in a French class. Follow-up on subsequent tests showed that the bilingual speakers outperformed the monolingual students when learning a new language. On its own, this isn't terribly surprising. French and Spanish are both Romance languages, so there are shared features of grammar and vocabulary that aren't present in English that could conceivably provide an advantage. More interesting, however, is that even among the Spanish/English bilinguals, those who also took Spanish classes ended up doing better when they later needed to learn French. The reason seems to be that taking classes assists with helping form what the study authors call metalinguistic awareness in a way that simply knowing a language informally does not. The difference between the two types of bilingual speakers mostly came down to metalearning: one group had content

knowledge of the language, but the group that took classes also had knowledge about how information in a language is structured.*

Nor is this idea about metalearning restricted to languages. Linguistic examples are often easier to study because there's a cleaner separation of metalearning and regular learning. This is because the contents of unrelated languages, such as vocabulary and grammar, are often quite different, even if the metalearning structure is the same. Learning French vocabulary won't help you much with learning Chinese vocabulary, but understanding how vocabulary acquisition works in French will likely also help with learning Chinese. By the time my friend and I had reached the last country in our year of learning languages, the process of immersing ourselves and learning a new language from scratch was practically a routine. The words and grammar of Korean may have been completely new, but the process of learning was already well trodden. Metalearning exists in all subjects, but it can often be harder to examine independently from regular learning.

How to Draw Your Map

Now that you have some idea what metalearning is and its importance to learning faster, how can you apply this to get an edge in your own learning efforts? There are two main ways: over the short term and over the long term. Over the short term, you can do research to focus on improving your metalearning before and during a learning project. Ultralearning, owing to its intensity and self-directed nature, has the opportunity for a lot higher variance than normal schooling efforts do. A good ultralearning project, with excellent materials and an awareness of what needs to be learned, has the potential to be completed faster than formal schooling. Language learning through intensive immersion can beat lengthy classes. Aggressively paced coding bootcamps can get participants up to a level where they can compete for jobs much faster than those with a normal undergraduate degree. This is because you can tailor your project to your exact needs and abilities, avoiding the one-size-fits-all approach taken in school. However, there's also a danger of choosing unwisely and ending up much worse off. Metalearning research avoids this problem and helps you seek out points where you might even be able to get a significant advantage over the status quo.

Over the long term, the more ultralearning projects you do, the larger your set of general metalearning skills will be. You'll know what your capacity is for learning, how you can best schedule your time and manage your motivation, and you'll have well-tested strategies for dealing with common problems. As you learn more things, you'll acquire more and more confidence, which will allow you to enjoy the process of learning more with less frustration.

In this chapter, I'm going to devote most of the next section to short-term research strategies, since they will probably benefit you the most. However, this emphasis shouldn't undermine the importance of the long-term effects of metalearning. Ultralearning is a skill, just like riding a bicycle. The more practice you get with it, the more skills and knowledge you'll pick up for how to do it well. This long-term advantage likely outweighs the short-term benefits and is what's easiest to mistake for intelligence or talent when seen in others. My hope is that as you get more practice in ultralearning, you'll start to automatically apply many of those skills to learn faster and more effectively.

Determining Why, What, and How

I find it useful to break down metalearning research that you do for a specific

project into three questions: “Why?,” “What?,” and “How?” “Why?” refers to understanding your motivation to learn. If you know exactly why you want to learn a skill or subject, you can save a lot of time by focusing your project on exactly what matters most to you. “What?” refers to the knowledge and abilities you’ll need to acquire in order to be successful. Breaking things down into concepts, facts, and procedures can enable you to map out what obstacles you’ll face and how best to overcome them. “How?” refers to the resources, environment, and methods you’ll use when learning. Making careful choices here can make a big difference in your overall effectiveness. With these three questions in mind, let’s take a look at each of them and how you can draw your map.

Answering “Why?”

The first question to try to answer is why are you learning and what that implies for how you should approach the project. Practically speaking, the projects you take on are going to have one of two broad motivations: instrumental and intrinsic.

Instrumental learning projects are those you’re learning with the purpose of achieving a different, nonlearning result. Consider the previously mentioned case of Diana Fehsenfeld, who, after a few decades as a librarian, found that her job was becoming obsolete. Computerized file systems and budget cuts meant she would need to learn new skills to stay relevant. She did some research and decided that the best way to do this would be to get a firmer grasp on statistics and data visualization. In this case, she wasn’t learning because of her deep love of statistics and data visualization but because she believed that doing so would benefit her career.

Intrinsic projects are those that you’re pursuing for their own sake. If you’ve always wanted to speak French, even though you’re not sure how you’ll use it yet, that’s an intrinsic project. Intrinsic doesn’t mean useless. Learning French might have benefits later when you decide to travel or need to work with a client from France at your job. The difference is that you’re learning the subject for its own sake, not as a means to some other outcome. If you’re pursuing a project for mostly instrumental reasons, it’s often a good idea to do an additional step of research: determining whether learning the skill or topic in question will actually help you achieve your goal. I’ve often heard stories of people unhappy with their career progress who decide that attending graduate school is the answer. If only they had an MBA or an MA, employers would take them more seriously, they think, and they’d have the career they desire. So they go off to school for two years, rack up tens of thousands of dollars in student debt, and discover that their newly minted credentials don’t actually get them much better job opportunities than before. The fix here is to do your research first. Determine if learning a topic is likely to have the effect you want it to before you get started.⁵

Tactic: The Expert Interview Method

The main way you can do research of this kind is to talk to people who have already achieved what you want to achieve. Let’s say you want to become a successful architect and think that mastering design skills might be the best step to take. Before you get started, it would be a good idea to talk to some successful architects to get a sense of whether they think your project will actually help with your intended goal. Though this method can be used for many parts of the research process, I’ve found it particularly valuable for vetting instrumental projects. If someone who has already accomplished the goal you want to achieve doesn’t think your learning project will help reach it

or thinks it's less important than mastering some other skill, that's a good sign that your motivation and the project are misaligned.

Finding such people isn't as hard as it sounds. If your goal is career related, look for people who have the career you want and send them an email. You can find them at your current workplace, conferences, or seminars, or even on social networking websites such as Twitter or LinkedIn. If your goal is related to something else, you can search online in forums dedicated to the subject you want to learn. If you want to learn programming, with the goal of building your own apps, for example, you can find online forums dedicated to programming or app development. Then you just need to look for frequent posters who seem to have the knowledge you're looking for and email them.

Reaching out and setting up a meeting with an expert isn't hard, either, but it's a step many people shy away from. Many people, particularly the introverts among us, recoil at the idea of reaching out to a stranger to ask for advice. They worry that they'll be rejected, ignored, or even yelled at for presuming to take up a person's time. The truth is, however, that this rarely happens. Most experts are more than willing to offer advice and are flattered by the thought that someone wants to learn from their experience. The key is to write a simple, to-the-point email, explaining why you're reaching out to them and asking if they could spare fifteen minutes to answer some simple questions. Make the email concise and nonthreatening. Don't ask for more than fifteen minutes or for ongoing mentorship. Though some experts will be happy to help you in those ways, it's not good form to ask for too much in the first email.

What if the person you want to interview doesn't live in your city? In that case, phone or online calls are great alternatives.* Email can work in a pinch, too, but I've found that text often doesn't translate tone well, and you often miss sensing the way the person feels about your project. Saying it's a "great idea" lukewarmly versus enthusiastically can make a world of difference, yet that nuance is missing if you communicate via text only.

Even if your project is intrinsically motivated, asking "Why?" is still very useful. Most learning plans you might choose to emulate will be based on curriculum designers' ideas of what is important for you to learn. If these aren't perfectly lined up with your own goals, you may end up spending a lot of time learning things that aren't important to you or underemphasizing the things that do matter. For these kinds of projects, it's useful to ask yourself what you're trying to learn because it will help you evaluate different study plans for their fit with your goals.

Answering "What?"

Once you've gotten a handle on why you're learning, you can start looking at how the knowledge in your subject is structured. A good way to do this is to write down on a sheet of paper three columns with the headings "Concepts," "Facts," and "Procedures." Then brainstorm all the things you'll need to learn. It doesn't matter if the list is perfectly complete or accurate at this stage. You can always revise it later. Your goal here is to get a rough first pass. Once you start learning, you can adjust the list if you discover that your categories aren't quite right.

Concepts

In the first column, write down anything that needs to be understood.

Concepts are ideas that you need to understand in flexible ways in order for them to be useful. Math and physics, for example, are both subjects that lean

heavily toward concepts. Some subjects straddle the concept/fact divide, such as law, which has legal principles that need to be understood, as well as details that need to be memorized. In general, if something needs to be understood, not just memorized, I put it into this column instead of the second column for facts.

Facts

In the second column, write down anything that needs to be memorized.

Facts are anything that suffices if you can remember them at all. You don't need to understand them too deeply, so long as you can recall them in the right situations. Languages, for instance, are full of facts about vocabulary, pronunciation, and, to a lesser extent, grammar. Even concept-heavy subjects usually have some facts. If you're learning calculus, you will need to deeply understand how derivatives work, but it may be sufficient to memorize some trigonometric identities.

Procedures

In the third column, write down anything that needs to be practiced.

Procedures are actions that need to be performed and may not involve much conscious thinking at all. Learning to ride a bicycle, for instance, is almost all procedural and involves essentially no facts or concepts. Many other skills are mostly procedural, while others may have a procedural component yet still have facts to memorize and concepts to understand. Learning new vocabulary in a language requires memorizing facts, but pronunciation requires practice and therefore belongs in this column.

Using This Analysis to Draw Your Map

Once you've finished your brainstorm, underline the concepts, facts, and procedures that are going to be most challenging. This will give you a good idea what the major learning bottlenecks are going to be and can start you searching for methods and resources to overcome those difficulties. You might recognize that learning medicine requires a lot of memorization, so you may invest in a system such as spaced-repetition software. If you're learning mathematics, you might recognize that deep understanding of certain concepts is going to be the tricky spot and consider spending time explaining those concepts to other people so you really understand them yourself. Knowing what the bottlenecks will be can help you start to think of ways of making your study time more efficient and effective, as well as avoid tools that probably won't be too helpful to your goal.

Often this coarse-grained analysis is enough to move on to the next phase of research. However, with more experience, you can dig deeper. You might look at some of the particular features of the concepts, facts, and procedures you're trying to learn to find methods to master them more effectively. When I started my portrait-drawing challenge, for instance, I knew that success would depend highly on how accurately I could size and place facial features. Most people can't draw realistic faces because if those attributes are off even slightly (such as making a face too wide or the eyes too high), they will instantly look wrong to our sophisticated ability to recognize faces.

Therefore, I got the idea of doing lots and lots of sketches and comparing them by overlaying the reference photos. That way I could quickly diagnose what kinds of errors I was making without having to guess. If you can't make these kinds of predictions and come up with these kinds of strategies just yet, don't worry. This is the kind of long-term benefit of metalearning that comes from having done more projects.

Answering "How?"

Now that you've answered two questions—why you're learning and what you're learning—it's time to answer the final question: How are you going to learn it?

I suggest following two methods to answer how you'll learn something: Benchmarking and the Emphasize/Exclude Method.

Benchmarking

The way to start any learning project is by finding the common ways in which people learn the skill or subject. This can help you design a default strategy as a starting point.

If I'm trying to learn something that is taught in school, say computer science, neurology, or history, one thing I'll do is look at the curricula used in schools to teach that subject. This could be the syllabus from a single class or, as in the case of my MIT Challenge, the course list for an entire degree. When I wanted to learn more about cognitive science, I found a list of textbooks that the University of San Diego's Cognitive Science doctoral program recommends for incoming students without cognitive science backgrounds. Good resources to consider for this approach are universities (MIT, Harvard, Yale, and Stanford are good examples but far from the only ones). Generally course lists and syllabi are available by looking on their websites aimed at existing students.

If I'm trying to learn a nonacademic subject or a professional skill, I'll probably instead do online searches for people who have previously learned that skill or use the Expert Interview Method to focus on resources available for mastering that subject. An hour spent searching online for almost any skill should turn up courses, articles, and recommendations for how to learn it. Investing the time here can have incredible benefits because the quality of the materials you use can create orders-of-magnitude differences in your effectiveness. Even if you're eager to start learning right away, investing a few hours now can save you dozens or hundreds later on.

The Emphasize/Exclude Method

Once you've found a default curriculum, you can consider making modifications to it. I find this easier to do with skills that have obvious success criteria (say drawing, languages, or music) and for which you can generally make a guess at the relative importance to the subject topics prior to studying them. For conceptual subjects or topics where you may not even understand the meaning of the terms in the syllabus, it's probably better to stick closer to your benchmark until you learn a bit more.

The Emphasize/Exclude Method involves first finding areas of study that align with the goals you identified in the first part of your research. If you're learning French with the idea of going to Paris for two weeks and speaking in shops and restaurants, I would focus a lot more on pronunciation than being able to spell correctly. If you're learning programming solely to make your own app, I'd focus on the inner workings of app development more than theories of computation.

The second part of the Emphasize/Exclude Method is to omit or delay elements of your benchmarked curriculum that don't align with your goals. For example, one common recommendation for learning Mandarin Chinese, advocated by people such as the renowned linguist and Sinologist Victor Mair, is to focus on learning to speak before you try to read characters.⁶ This isn't the only route available, but if your main goal is to speak, then this path to fluency might be more effective.

How Much Planning Should You Do?

One question you may face is when to stop doing research and just get started. The literature on self-directed learning, as typically practiced, demonstrates that most people fail to do a thorough investigation of possible learning goals, methods, and resources.⁷ Instead they opt for whatever method of learning comes up naturally in their environment. This clearly leaves a gap between what is practiced and the efficiency that is possible using the best possible method. However, research can also be a way of procrastinating, particularly if the method of learning is uncomfortable. Just doing a bit more research then becomes a strategy to avoid doing the work of learning. There will always be some uncertainty in your approach, so it's important to find the sweet spot between insufficient research and analysis paralysis. You know when you're procrastinating, so just get started.

The 10 Percent Rule

A good rule of thumb is that you should invest approximately 10 percent of your total expected learning time into research prior to starting. If you expect to spend six months learning, roughly four hours per week, that would be equal to roughly one hundred hours, which suggests that you should spend about ten hours, or two weeks, doing your research. This percentage will decrease a little bit as your project scales up, so if you plan to do five hundred or a thousand hours of learning, I don't think it necessarily demands fifty or a hundred hours of research, but maybe closer to 5 percent of your time. The goal here isn't to exhaust every learning possibility but simply to make sure you haven't latched onto the first possible resource or method without thinking through alternatives. Prior to starting my MIT Challenge, I spent roughly six months, part-time, combing through all the course materials. A good idea is to be aware of the common methods of learning, popular resources, and tools along with their strengths and weaknesses before starting. Long projects provide more opportunities for getting derailed and delayed, so doing proper research in the beginning can easily save a much larger amount of time later on.

Diminishing Returns and Marginal Benefit Calculation

Metalearning research isn't a onetime activity you do only before starting your project. You should continue to do research as you learn more. Often obstacles and opportunities aren't clear before you start, so reassessing is a necessary step of the learning process. During my portrait-drawing challenge, for instance, I discovered about halfway that I was getting diminishing returns from my sketch-and-compare method. I realized that I needed a better technique for drawing that had higher accuracy. That led me to do a second round of research, leading to a course taught by Vitruvian Studio, which detailed a more systematic method that greatly increased my accuracy.⁸ I hadn't noticed it in my original research because I wasn't aware of the deficiency of my self-developed technique.

A more sophisticated answer to the question of when and how to do research would be to compare the marginal benefits of metalearning to regular learning. One way to do this is to spend a few hours doing more research—interviewing more experts, searching online for more resources, searching for new possible techniques—and then spend a few hours doing more learning along your chosen path. After spending some time on each, do a quick assessment of the relative value of the two activities. If you feel as though the metalearning research contributed more than the hours spent on learning itself, you are likely at a point where more research is still beneficial. If you felt that the extra research wasn't too helpful, you're probably better

off sticking to the plan you had before. This type of analysis depends on something known as the Law of Diminishing Returns. This states that the more time you invest in an activity (such as more research), the weaker and weaker the benefits will be as you get closer and closer to the ideal approach. If you keep doing research, eventually it will be less valuable than simply doing more learning, so at that point you can safely focus on learning. In practice, the return to research tends to be lumpy and variable. You might spend a few hours and get nothing, then stumble onto the perfect resource for accelerating your progress. As you finish more projects, it's easier to judge this point intuitively, but the Law of Diminishing Returns and the 10 Percent Rule can provide good approximations for how much research to do and when.

Long-Term Prospects for Metalearning

So far we've talked only about the short-term benefits. However, the real benefits of metalearning aren't short term but long term. They don't reside in a particular project but influence your overall strengths as a learner.

Each project you do will improve your general metalearning. Every project has the opportunity to teach you new learning methods, new ways to gather resources, better time management, and improved skills for managing your motivation. Success in one project will give you confidence to execute your next one with boldness and without self-doubt and procrastination.

Ultimately, this effect far outweighs the effect of doing a specific project.

Unfortunately, it's also something that can't be boiled down to a tactic or tool. Long-term metalearning is just something you acquire with experience.

The benefits of ultralearning aren't always apparent from the first project because that first project occurs when you're at your lowest level of metalearning ability. Each project you complete will give you new tools to tackle the next, starting a virtuous cycle. Many of the ultralearners I interviewed for this book told me a similar story: that they were proud of their accomplishments in individual projects but that the real benefit had been that they now understood the process of learning hard things. That gave them the confidence to pursue other ambitious goals that they wouldn't have even considered previously. This confidence and ability are the ultimate goals of ultralearning, even though they're often hard to see from the outset. These benefits, however, can be achieved only by putting in the work. The best research, resources, and strategies are useless unless you follow up with concentrated efforts to learn. That brings us to the next principle of ultralearning: focus.

Chapter 5- Principle 2- Focus: Sharpen Your Knife.

If ever there were an unlikely candidate for scientific greatness, it would have been Mary Somerville. She was born into a poor Scottish family in the eighteenth century, when higher education was not seen as proper for a lady. Her mother did not prevent her from reading, but society at large did not approve of it. An aunt, seeing that behavior, commented to her mother, “I wonder you let Mary waste her time in reading, she never sews more than if she were a man.” When she did have an opportunity to attend school briefly, her mother regretted the expense. Somerville explained, “she would have been contented if I had only learnt to write well and keep accounts, which was all that a woman was expected to know.”¹ As a woman, she faced even larger obstacles, with household duties and expectations taking precedence over any kind of self-education. “A man can always command his time under the plea of business, a woman is not allowed any such excuse,” she lamented. Her first husband, Samuel Greig, was strongly against learning in women. Yet despite those obstacles, Somerville’s accomplishments were vast. She won awards in mathematics, learned several languages to fluency, and knew how to paint and play the piano. In 1835, she, along with the German astronomer Caroline Herschel, were the first women elected to the Royal Astronomical Society. The accomplishment that eventually brought her fame was her translation and expansion of the first two volumes of Pierre-Simon Laplace’s *Traité de mécanique céleste*, a massive five-volume work on the theory of gravitation and advanced mathematics, acclaimed as the greatest intellectual achievement since Isaac Newton wrote the *Principia Mathematica*. Laplace himself commented that Somerville was the only woman in the world who understood his work.

The easiest explanation for the vast discrepancy in Somerville’s situation and her accomplishments would be genius. It is no doubt true that she possessed an incredibly sharp mind. Her daughter once commented that while she was being taught, her mother could grow impatient. “I well remember her slender white hand pointing impatiently to the book or slate—‘Don’t you see it? There is no difficulty in it, it is quite clear.’” However, in reading through her descriptions of her life, this seeming genius was beset by many insecurities. She claimed to have “bad memory,” recounted struggles learning new things as a child, and had even at one point “thought [herself] too old to learn to speak a foreign language.” Whether that was polite modesty or genuine feelings of inadequacy, we cannot know, but it does at least put cracks in the idea that she approached learning from a place of unshakable confidence and talent.

Peering deeper, another picture of Somerville emerges. She had a keen intellect, yes, but what she possessed in even greater quantities was an exceptional ability to focus. As an adolescent, when she was put to bed and denied a candle for reading, she would mentally work through the works of Euclid in mathematics. While still breastfeeding her child, an acquaintance encouraged her to study botany, so she devoted “an hour of study to that science” every morning. Even during her greatest achievement, the translation and expansion of Laplace’s *Traité de mécanique céleste*, she had to carry out all the household duties of raising children, cooking, and cleaning. “I was always supposed to be at home,” she explains, “and my friends and acquaintances came so far out of their way on purpose to see me, it would have been unkind and ungenerous not to receive them. Nevertheless,

I was sometimes annoyed when in the midst of a difficult problem one would enter and say, 'I have come to spend a few hours with you.' However, I learnt by habit to leave a subject and resume it again at once, like putting a mark into a book I might be reading."

In the realm of great intellectual accomplishments an ability to focus quickly and deeply is nearly ubiquitous. Albert Einstein focused so intensely during his formulation of the general theory of relativity that he developed stomach problems. The mathematician Paul Erdős was a heavy user of amphetamines to increase his capacity for focus. When a friend bet him that he could not give them up, even for a short time, he did manage to do so. Later, however, he complained that the only result had been that mathematics as a whole was set back a month in his unfocused absence. In these annals of extreme focus, one often conjures up an image of solitary geniuses laboring away without distraction, free from worldly concerns. However remarkable this is, I'm more interested in the kind of focus that Somerville seemed to possess. How can one in an environment such as hers, with constant distractions, little social support, and continuous obligations, manage to focus long enough not only to learn an impressive breadth of subjects, but to such depths that the French mathematician Simon-Denis Poisson once remarked that "there were not twenty men in France who could read [her] book"?

How did Somerville become so good at focusing? What can we glean from her strategies in getting difficult mental work done in less-than-ideal conditions? The struggles with focus that people have generally come in three broad varieties: starting, sustaining, and optimizing the quality of one's focus. Ultralearners are relentless in coming up with solutions to handle these three problems, which form the basis of an ability to focus well and learn deeply.

Problem 1: Failing to Start Focusing (aka Procrastinating)

The first problem that many people have is starting to focus. The most obvious way this manifests itself is when you procrastinate: instead of doing the thing you're supposed to, you work on something else or slack off. For some people, procrastination is the constant state of their lives, running away from one task to another until deadlines force them to focus and then having to struggle to get the job done on time. Other people struggle with more acute forms of procrastination that manifest themselves with particular kinds of tasks. I was more like this second kind of person, where there were certain types of activities I would spend all day procrastinating on. Though I have no problems writing essays for my blog, when I had to do research for this book, I dragged my feet. Similarly, I had no problem sitting and watching the videos of MIT classes, but I always tackled the first problem sets with considerable trepidation. Had it not been for the intense schedule I was on, I might have found excuses to avoid doing so for much longer. In fact, writing this chapter was one of the tasks I procrastinated on a great deal.

Why do we procrastinate? The simple answer is that at some level there's a craving that drives you to do something else, there's an aversion to doing the task itself, or both. In my case, I procrastinated on writing this chapter because I had a lot of ideas and I was unsure where to start. My anxiety was that by committing something to paper, there was a good chance I might end up writing it poorly. Silly, I know. But most motives to procrastinate are silly when you verbalize them, yet that doesn't stop them from ruling your life. Which brings me to the first step to overcoming procrastination: recognize when you are procrastinating.

Much procrastination is unconscious. You're procrastinating, but you don't internalize it that way. Instead you're "taking a much-needed break" or "having fun, because life can't always be about work all the time." The problem isn't those beliefs. The problem is when they're used to cover up the actual behavior—you don't want to do the thing you need to be focusing on, either because you are directly averse to doing it or because there's something else you want to do more. Recognizing that you're procrastinating is the first step to avoiding it.

Make a mental habit of every time you procrastinate; try to recognize that you are feeling some desire not to do that task or a stronger desire to do something else. You might even want to ask yourself which feeling is more powerful in that moment—is the problem more that you have a strong urge to do a different activity (e.g., eat something, check your phone, take a nap) or that you have a strong urge to avoid the thing you should be doing because you imagine it will be uncomfortable, painful, or frustrating? This awareness is necessary for progress to be made, so if you feel as though procrastination is a weakness of yours, make building this awareness your first priority before you try to fix the problem.

Once you can easily and automatically recognize your tendency to procrastinate, when it occurs, you can take steps to resist the impulse. One way is to think in terms of a series of "crutches" or mental tools that can help you get through some of the worst parts of your tendency to procrastinate. As you get better about taking action on the project you're working on, these crutches can be changed or gotten rid of altogether when procrastination is no longer a problem.

A first crutch comes from recognizing that most of what is unpleasant in a task (if you are averse to it) or what is pleasant about an alternative task (if you're drawn to distraction) is an impulse that doesn't actually last that long. If you actually start working or ignore a potent distractor, it usually only takes a couple minutes until the worry starts to dissolve, even for fairly unpleasant tasks. Therefore, a good first crutch is to convince yourself to get over just the few minutes of maximal unpleasantness before you take a break. Telling yourself that you need to spend only five minutes on the task before you can stop and do something else is often enough to get you started. After all, almost anyone can endure five minutes of anything, no matter how boring, frustrating, or difficult it may be. However, once you start, you may end up continuing for longer without wanting to take the break.

As you progress, your first crutch may start to get in the way. You may find yourself starting but then, because the task is unpleasant and focus is hard, taking advantage of the five-minute rule too often to be productive. If this is the case and your problem has switched from being unable to get started to taking breaks too often, you can try something a little harder, say the Pomodoro Technique: twenty-five minutes of focus followed by a five-minute break.* Keep in mind that it's essential not to switch to a harder goal when you're still mostly impeded by an earlier problem. If you still can't start working, even with the five-minute rule, switching to harder and more demanding crutches may backfire.

In some cases, the moment of frustration may not come at the beginning, but still be predictable. When I was learning Chinese characters through flash cards, for instance, I'd always feel an urge to give up whenever I couldn't remember the answer to one of my cards. I knew this feeling was temporary, however, so I added a rule for myself: I can only quit when I've remembered

the most recent card correctly. In practice, the cards were quick, so this usually only took an extra twenty or thirty seconds of persistence; however, my patience for doing flash cards went up dramatically as a result.

Eventually, if working on your project is not troubled by extreme procrastination, you may want to switch to using a calendar on which you carve out specific hours of your day in advance to work on the project. This approach allows you to make the best use of your limited time. However, it works only if you actually follow it. If you find yourself setting a daily schedule with chunked hours and then frequently ignore it to do something else, go back to the start and try building back up again with the five-minute rule and then the Pomodoro Technique.

Eventually, you may reach Mary Somerville's level of focus, one that she could activate on a moment-to-moment basis, making a decision as to whether she had time to spare. Despite her formidable capacity for focus, it seems that even Somerville would deliberately block out time for the study of particular subjects. Therefore it was a conscious habit, not merely spontaneous studying, that enabled her many successes. For myself, I find that some learning activities are so intrinsically interesting that I can focus on them for a long time without pressure. I generally had no problem watching lectures during the MIT Challenge, for instance. Other tasks, however, required the five-minute rule for me to get past my desire to procrastinate. If I had to scan and upload my files, they'd often build up in a pile before I would finally tackle them. Don't ever feel bad if you have to back up a stage, either; you cannot control your aversions or tendency to distraction, but with practice you can lessen their impact.

Problem 2: Failing to Sustain Focus (aka Getting Distracted)

The second problem people tend to encounter is an inability to sustain focus. This can happen when you've sat yourself down to study or practice something, but then your phone buzzes and you look away, a friend knocks on the door to say hello, or you spin off into a daydream only to realize you've been staring at the same paragraph for the last fifteen minutes. Like the challenge of initiating focus, sustaining focus is important if you want to make progress learning hard things. Before I talk about how to sustain focus, however, I'd like to raise a question about what kind of focus is the best to sustain.

Flow, a concept pioneered by the psychologist Mihály Csíkszentmihályi, is often used as the model for what ideal focus looks like. This is the state of mind you associate with being "in the zone." You stop being interrupted by distracting thoughts, and your mind becomes completely absorbed in the task at hand. Flow is the enjoyable state that slides right between boredom and frustration, when a task is neither too hard nor too easy. This rosy picture, however, does have some detractors. The psychologist K. Anders Ericsson, the researcher behind deliberate practice, argues that flow has characteristics that are "inconsistent with the demands of deliberate practice for monitoring explicit goals and feedback and opportunities for error correction. Hence, skilled performers may enjoy and seek out flow experiences as part of their domain-related activities, but such experiences would not occur during deliberate practice."² Ultralearning, with its similar focus on performance-driven learning, would also appear to be unsuitable for flow, in the same way that Ericsson originally argued for deliberate practice.

My own thought is that a flow state is not impossible during ultralearning.

Many cognitive activities associated with learning are in the range of difficulty that makes flow possible or even likely. However, I also agree with Ericsson that learning often involves entering into situations in which the difficulty makes flow impossible. Additionally, the self-consciousness that is absent in flow may need to be present in both ultralearning and deliberate practice, as you need to consciously adjust your approach. Working on a programming problem at the limit of your abilities, pushing yourself to write in a style that is unfamiliar to you, or trying to minimize your accent when speaking a new language is each a task that goes against the automatic patterns you may have accumulated. This resistance to what is natural may make flow harder to achieve, even though it is ultimately beneficial for accomplishing your learning goal.

My advice? Don't worry about flow. In some learning tasks, you'll achieve it easily. I often felt as though I were in a flow state while doing practice problems during the MIT Challenge, drilling vocabulary while learning languages, or drawing. At the same time, don't feel guilty if flow doesn't come automatically. Your goal is to enhance your learning, and this often involves pushing through some sessions that are more frustrating than what could be considered ideal for flow. Remember, even if your learning is intense, your use of the skill later on will not be. Investments made in pushing through learning now will make skillful practice a much more enjoyable activity down the road.

After considering how you should focus, let's consider duration. How long should you study? While this problem presumes that you're getting distracted and giving up focusing long before you should, the literature on focus does not suggest that ever-longer periods of focus are optimal from a learning standpoint. Researchers generally find that people retain more of what they learn when practice is broken into different studying periods than when it is crammed together. Similarly, the phenomenon of interleaving suggests that even within a solid block of focus, it can make sense to alternate between different aspects of the skill or knowledge to be remembered.³ Therefore, if you have several hours to study, you're possibly better off covering a few topics rather than focusing exclusively on one. Doing so has trade-offs, however, so if your study time becomes more and more fractured, it may be difficult to learn at all.

What's needed is a proper balance. To achieve it, fifty minutes to an hour is a good length of time for many learning tasks. If your schedule permits only more concentrated chunks of time, say once per week for several hours, you may want to take several minutes as a break at the end of each hour and split your time over different aspects of the subject you want to learn. Of course, these are merely efficiency guidelines; you ultimately need to find what works best for you, considering not only what is optimal for the purposes of retention but also what fits your schedule, personality, and work flow. For some people, as little as twenty minutes might fit their lives best; others may prefer to spend an entire day learning.

Supposing that you've found a chunk of time to learn that is as optimal for you as it can be, how can you sustain your focus during that time? I've found that there are three different sources that cause focus to break down and distraction to occur. If you're struggling to concentrate, look at each of these three in turn.

Distraction Source 1: Your Environment

The first source of distraction is your environment. Do you have your phone

turned off? Are you accessing the internet, watching television, or playing games? Are there distracting noises and sounds? Are you prepared to work, or might you need to stop to look for pens, a book, or a lamp? This is a source of the problem of sustaining focus, but it's also an aspect people frequently ignore for the same reasons they ignore the fact that they are procrastinating. Many people tell themselves that they focus better while listening to music, let's say, but the reality might be that they don't want to work on a given task, so music provides a low-level, amusing distraction. This isn't to condemn anyone who doesn't work in a perfect environment. I certainly don't. Rather, be aware of what environment you work best in, and test it. Do you actually get more work done with the television on in the background, or do you just like hearing the television and feel that it makes the work more bearable? If it's the latter, you can probably train yourself to avoid multitasking and enjoy greater productivity. Multitasking may feel like fun, but it's unsuitable for ultralearning, which requires concentrating your full mind on the task at hand. It's better to rid yourself of this vice than to strengthen bad habits of ineffective learning.

Distraction Source 2: Your Task

The second source is the task you're trying to learn. Certain activities, due to their nature, are harder to focus on than others. I find reading harder to focus on than watching a video, even when the content is the same. Whenever you have a choice between using different tools for learning, you may want to consider which is easier to focus on when making that decision. This choice of materials shouldn't supersede other considerations—I wouldn't opt for a tool that is much less direct (Principle 3) or offers no feedback (Principle 6), simply for the sake of greater focus. Fortunately, these principles are generally aligned, and it is actually the somewhat less effective methods that are less cognitively demanding and therefore harder to sustain focus on. Sometimes you can subtly modify what you're doing to enable greater focus. If I have difficult reading to do, I will often make an effort to jot down notes that reexplain hard concepts for me. I do this mostly because, while I'm writing, I'm less likely to enter into the state of reading hypnosis where I'm pantomiming the act of reading while my mind is actually elsewhere. More intense strategies, whether solving problems, making something, or writing and explaining ideas aloud, are harder to do in the background of your mind, so there are fewer opportunities for distractions to creep in.

Distraction Source 3: Your Mind

The third source is your mind itself. Negative emotions, restlessness, and daydreaming can be some of the biggest obstacles to focus. This problem has two sides. First, it's obvious that a clear, calm mind is best for focusing on almost all learning problems. A mind filled with angers, anxieties, frustrations, or sadness will be harder to study with. This means that if you're struggling with problems in your life, you'll have a harder time learning well, and you may want to look at dealing with those first. Being in a toxic relationship, having anxiety about some other task you're procrastinating on, or simply knowing you're going down the wrong road in life can interfere with your motivation, so it's often best not to ignore these issues. However, sometimes there's nothing you can do about your emotions, and feelings arise spontaneously without requiring you to do something about them. A random worry about some future event might bubble up, let's say, but you know you shouldn't stop the activity you're working on right now in order to deal with it. Here the solution is to acknowledge the feeling, be aware of it, and gently

adjust your focus back to your task and allow the feeling to pass. Allowing negative feelings to pass, of course, is a lot easier said than done. Emotions can hijack the mind and make the process of returning awareness to your project feel like a Sisyphean task. If I'm really anxious about something, for instance, I may feel as though I'm returning my attention to a task, only for it to jump away fifteen seconds later, repeating again and again for an hour or more. In such moments, recognize that by not reacting to the emotion at the level of abandoning your task entirely, you'll diminish its intensity in the future. You'll also strengthen your commitment to continue working in future situations like this, so they will become easier. Mindfulness researcher and psychiatrist Susan Smalley and meditation teacher Diana Winston of UCLA's Mindful Awareness Research Center argue that when we are engaging in a behavior, our typical reaction is to try to suppress distracting thoughts. If instead you "learn to let it arise, note it, and release it or let it go," this can diminish the behavior you're trying to avoid.⁴ If it ever feels as though continuing working is pointless because you're so distracted by a negative emotion that you can't possibly work, remember that the long-term strengthening of your ability to persist on this task will be useful, so the time is not wasted even if you don't accomplish much in this particular learning session.

Problem 3: Failing to Create the Right Kind of Focus

A third, problem, subtler than the other two, has to do with the quality and direction of your attention. Supposing you've managed to wrangle the problems of procrastination and distraction down long enough to focus on your task, how should you do it? What's the optimal degree of alertness to maximize your learning?

Here there is some interesting research relating two different variables, arousal and task complexity, to the question of how you should apply your attention. Arousal (the general, not sexual, variety) is your overall feeling of energy or alertness. When you're sleepy, you have low arousal; when you're exercising, you have high arousal. This bodily phenomenon occurs due to sympathetic nervous system activation, and it consists of a range of effects in the body that often occur together, including faster heart rate, increased blood pressure, pupil dilation, and sweating. Mentally, arousal also influences attention. High arousal creates a feeling of keen alertness, which is often characterized by a fairly narrow range of focus, but one that can also be somewhat brittle.⁵ This can be very good for focusing on relatively simple tasks or ones that require intense concentration toward a small target.

Athletes require this kind of concentration to throw a dart at a target or shoot a basketball properly, where the task is fairly simple but requires concentration to execute properly. Too much arousal, however, and focus starts to suffer.⁶ It becomes very easy to be distracted, and you may have a hard time holding focus at any particular spot. Anyone who's drunk too much coffee and feels jittery knows how this can impact your work.

More complex tasks, such as solving math problems or writing essays, tend to benefit from a more relaxed kind of focus.⁷ Here the space of focus is often larger and more diffuse. This has advantages when, in order to solve the problem you're facing, you must consider many different inputs or ideas. Trying to solve a complex math problem or write a love sonnet is likely to require this mental quietness. When doing a particularly creative task, if you get stuck, you may benefit from no focus at all.⁸ Taking a break from the problem can widen the space of focus enough that possibilities that were not

in your consciousness earlier can conjoin and you can make new discoveries. This is a scientific explanation of “Eureka!” moments occurring during leisure or while falling asleep, instead of while at work. Still, before you begin to think that sloth is the key to creativity, it’s clear that such an approach often only works when one has been focusing on a problem for long enough that the residue of ideas remains in one’s mind. Not working at all is unlikely to lead to creative genius, but taking a break may help breathe fresh perspective into a hard problem.

The relationship between task complexity and arousal is interesting because the latter can be modified. In one experiment, sleep-deprived and well-rested subjects worked on a cognitive task.⁹ Unsurprisingly, the sleepy subjects didn’t do as well. More interesting, however, was that the sleepy subjects did better when a loud noise was played in the background, while the well-rested subjects did worse. The conclusion drawn by the researchers was that the noise increased arousal levels, which benefited the low-arousal sleepy subjects, but it increased arousal too much for the well-rested ones, causing their decline in performance. This implies that you may want to consider optimizing your arousal levels to sustain the ideal level of focus. Complex tasks may benefit from lower arousal, so working in a quiet room at home might be the right idea for math problems. Simpler tasks might benefit from a noisier environment, say working at a coffee shop. This laboratory experiment shows that you should find out what works best for your own ability to focus through self-testing. You may find you can work better on complex tasks even in the noisy coffee place, or you may find that even for simple tasks you need the quiet room in the library.

Improving Your Ability to Focus

Focus doesn’t need to be exclusive to the domain of those who have endless hours and large swaths of free time on their schedule. As was the case with Somerville, the ability to focus is even more important for those whose lives make such large commitments of time impossible. With practice you can improve your ability to focus. I’m agnostic about whether focus can be trained as an ability, in general. Just because you’re disciplined about one thing doesn’t automatically make you disciplined about everything else. However, what does generalize is that there is a procedure you can follow to get better at focusing. My advice is this: recognize where you are, and start small. If you’re the kind of person who can’t sit still for a minute, try sitting still for half a minute. Half a minute soon becomes one minute, then two. Over time, the frustrations you feel learning a particular subject may become transmuted into genuine interest. The impulse to engage in distractions will weaken each time you resist it. With patience and persistence, your few minutes may become large enough to accomplish great things, just as Somerville did almost two hundred years ago.

Now that we’ve discussed how to get started on learning hard things, let’s move to discussing the right way to learn them. The next principle, directness, is the first to explain what types of things you should do while learning and, more important, which you should avoid if you want to be able to use what you learn.

Chapter 6- Principle 3: Directness: Go Straight Ahead

After growing up in India, Vatsal Jaiswal moved to Canada with the dream of becoming an architect. Now, four years later, armed with a newly minted degree and entering into the worst job market since the Great Depression, that dream was beginning to seem very far away. Getting a foothold in architecture can be difficult, even in good economic times. But just a few years out from the market crash of 2007, it was nearly impossible. Firms were laying off even experienced architects. If anyone was hiring, they weren't taking chances on some kid just out of school. Out of his graduating class, almost nobody had found an architecture job yet. Most had given up, taking jobs outside the field, going back for more education, or moving in with parents until the economic storms abated.

Another rejection. Jaiswal leaves the offices of yet another architecture firm, walking back to his sliver of the one-bedroom apartment he shares with two roommates.¹ After hundreds of resumes submitted with no reply, he's moved on to trying a more aggressive tactic of going directly to a firm's offices, pleading to speak with whomever is in charge. Still, after weeks of knocking on doors and making dozens of unsolicited office visits, there's no job offer in sight. He hasn't even gotten a call back for a single interview. Still, Jaiswal suspected that his struggles could be blamed on more than just the recession. From the snippets of feedback he could pry out of the places he applied to, he sensed that the companies didn't see him as a useful employee. He had studied architecture in school, but his program had focused mostly on design and theory. He had been trained in creative design projects that were isolated from the reality of building codes, construction costs, and tricky software. Because his portfolio of school projects didn't resemble the detailed technical documents the architects worked with, they thought hiring him would involve a lengthy training period, something few firms could currently afford.

Jaiswal needed to come up with a plan. More resume submissions and office walk-ins weren't going to work. He needed a new portfolio that could prove he had the exact skills firms wanted. He needed to show them that, rather than being a burden, he could get to work straightaway and be a valuable team member from the first day.

To do this, he would need to know more about how architects actually drew plans for buildings—not just the big theories and designs, which he had learned in school, but little details of how they did their drawings, what codes they used to represent different materials, and what the drawings showed and omitted. To do that, he found a job at a large-format print shop, the kind that does printing on the large sheets of paper favored for architectural blueprints. Low paying and low skilled, a job in a print shop wasn't Jaiswal's end goal. Still, it could help him scrape by financially while he prepared his new portfolio. Even better, the print store gave him daily exposure to the blueprints firms were using. That allowed him to absorb countless details about how the drawings were put together.

Next, Jaiswal would need to upgrade his technical skills. From his walk-in visits, he was aware that many of the firms he was applying at were using a complex design software called Revit. If he could master its ins and outs, he thought, he could be immediately useful in the technology-heavy entry-level position he desired. At night, he pushed through online tutorials and taught

himself the software.

Finally, he was ready to construct a new portfolio. Combining his new Revit knowledge with the knowledge of architectural drawings he had gained while working at the print shop, he made a new portfolio. Instead of the assorted projects from university, he focused on a single building of his own design: a three-tower residential structure with raised courtyards and a modern aesthetic. The project pushed his skills with software further, forcing him to learn new methods and ideas beyond the basics of his online tutorials and exposure at the print shop. Eventually, after a few months of work, he was ready.

New portfolio in hand, Jaiswal submitted it again, this time to just two architecture firms. To his surprise, they both immediately offered him a job.

The Importance of Being Direct

Jaiswal's story perfectly illustrates the third principle of ultralearning: directness. By seeing how architecture was actually being done and learning a set of skills that was closely related to the job position he wanted to perform, he was able to cut through the swaths of recent graduates with unimpressive portfolios.

Directness is the idea of learning being tied closely to the situation or context you want to use it in. In Jaiswal's case, when he wanted to get enough architectural skill that firms would hire him, he opted to build a portfolio using the software those firms used and design in the style those firms practiced. There are many routes to self-education, but most of them aren't very direct. In contrast to Jaiswal, another architect I spoke with aimed to improve his employability by deepening his knowledge of design theories. Though that might have been interesting and fun, it was disconnected from the actual skills he would be using in entry-level work. Just as Jaiswal struggled to get work with his university portfolio, many of us are building the wrong portfolio of skills for the kinds of career and personal achievements we want to create. We want to speak a language but try to learn mostly by playing on fun apps, rather than conversing with actual people. We want to work on collaborative, professional programs but mostly code scripts in isolation. We want to become great speakers, so we buy a book on communication, rather than practice presenting. In all these cases the problem is the same: directly learning the thing we want feels too uncomfortable, boring, or frustrating, so we settle for some book, lecture, or app, hoping it will eventually make us better at the real thing.

Directness is the hallmark of most ultralearning projects.* Roger Craig did his Jeopardy! testing on the actual questions from past shows. Eric Barone learned video game art by making art for his video game. Benny Lewis learns to speak languages quickly by following a policy of attempting some backand-forth dialog from the very first day. What these approaches share is that the learning activities are always done with a connection to the context in which the skills learned will eventually be used.

The opposite of this is the approach so often favored in more traditional classroom-style learning: studying facts, concepts, and skills in a way that is removed from how those things will eventually be applied: mastering formulas before you understand the problem they're trying to solve; memorizing the vocabulary of a language because it's written on a list, not because you want to use it; solving highly idealized problems that you'll never see again after graduation.

Indirect approaches to learning, however, aren't limited to traditional

education. Many self-directed learners fall into the trap of indirect learning. Consider Duolingo, currently one of the most popular language-learning applications. On the surface, there's a lot to like about this app. It's colorful and fun and gives you a potent sense of progress. But I suspect that much of the sense of progress is an illusion, at least if your goal is to eventually be able to speak the language. To understand why, consider how Duolingo encourages you to practice. It provides English words and sentences and then asks you to pick words from a word bank to translate them.* The problem is that this is nothing like actually speaking a language! In real life, you may start by trying to translate an English sentence into the language you want to learn. However, real speaking situations don't present themselves as a multiple choice. Instead, you have to dredge up the actual words from memory or find alternative words if you haven't learned one of the ones you want to use. This is, cognitively speaking, quite a different task from picking out matching translations from a highly limited word bank, and also much more difficult. Benny Lewis's method of speaking from the start may be hard, but it transfers perfectly to the task he eventually wants to become good at: having conversations.

During the MIT Challenge, I recognized that the most important resource for being able to eventually pass the classes wasn't having access to recorded lectures, it was having access to problem sets. Yet, in the years since this project, when I am asked for help by students, they often decry the absence of lecture videos from some classes, only rarely complaining about incomplete or insufficient problem sets. This makes me think that most students view sitting and listening to a lecture as the main way that they learn the material, with doing problems that look substantially similar to those on the final exam as being a superficial check on their knowledge. Though first covering the material is often essential to begin doing practice, the principle of directness asserts that it's actually while doing the thing you want to get good at when much of learning takes place. The exceptions to this rule are rarer than they may first appear, and therefore directness has been a thorny problem in the side of education for over a century.

The easiest way to learn directly is to simply spend a lot of time doing the thing you want to become good at. If you want to learn a language, speak it, as Benny Lewis does. If you want to master making video games, then make them, as Eric Barone does. If you want to pass a test, practice solving the kinds of problems that are likely to appear on it, as I did in my own MIT Challenge. This style of learning by doing won't work for all projects. The "real" situation may be infrequent, difficult, or even impossible to create, and thus learning in a different environment is unavoidable. Roger Craig couldn't practice Jeopardy! by being on the show hundreds of times. He knew he had to learn in a different environment and prepare to transfer that knowledge to the show when it came time to do so. In such situations, directness isn't an all-or-nothing feature but something you can gradually increase to improve your performance. Craig's approach to start by learning from actual past Jeopardy! questions was a lot more effective than if he had just started learning trivia from random topics. Jaiswal was similarly limited when learning architectural skills, as the places he wanted to work wouldn't hire him. However, he worked around that by training on the same software they used and designing a portfolio that was based on the same types of drawings and renderings that were done in actual practice. The twin challenge of directness is that sometimes the exact situation in which you want to use the

skill isn't available for easy practice. Even if you can go straight into learning by doing, this approach is often more intense and uncomfortable than passively watching lecture videos or playing around with a fun app. If you don't pay attention to directness, therefore, it's very easy to slip into lousy learning strategies.

One of the big takeaways of Jaiswal's story might not be the triumph of his self-directed learning project but the failure of his formal education. After all, his difficulties started after he had already spent four years studying architecture intensely at university. Why, then, would such a small project, postgraduation, make such a large difference in his employability? To answer that, I'd like to turn to one of the most stubborn and disturbing problems in educational psychology: the problem of transfer.

Transfer: Education's Dirty Secret

Transfer has been called the "Holy Grail of education." It happens when you learn something in one context, say in a classroom, and are able to use it in another context, say in real life. Although this may sound technical, transfer really embodies something we expect of almost all learning efforts—that we'll be able to use something we study in one situation and apply it to a new situation. Anything less than this is hard to describe as learning at all.

Unfortunately, transfer is also something that, despite more than a century of intense work and research, has largely failed to occur in formal education. The psychologist Robert Haskell has said in his excellent coverage of the vast literature on transfer in learning, "Despite the importance of transfer of learning, research findings over the past nine decades clearly show that as individuals, and as educational institutions, we have failed to achieve transfer of learning on any significant level." He later added, "Without exaggeration, it's an education scandal."²

The situation is even more disturbing than it sounds. Haskell pointed out, "We expect that there will be transfer of learning, for example, from a high school course in introductory psychology to a college-level introduction to psychology course. It has been known for years, however, that students who enter college having taken a high school psychology course do no better than students who didn't take psychology in high school. Some students who have taken a psychology course in high school do even worse in the college course." In another study, college graduates were asked questions about economic issues and no difference in performance was found between those who had taken an economics class and those who had not.³

Providing multiple examples seems to aid transfer a bit, yet the cognitive science researcher Michelene Chi noted that "in almost all the empirical work to date, on the role of example solutions, a student who has studied examples often cannot solve problems that deviate slightly from the example solution."⁴

In his book *The Unschooled Mind: How Children Think and How Schools Should Teach*, the developmental psychologist Howard Gardner pointed to the body of evidence showing that even "students who receive honors grades in college-level physics courses are frequently unable to solve basic problems and questions encountered in a form slightly different from that on which they have been formally instructed and tested."⁵ Nor has this failure of transfer been limited to schools. Corporate training also suffers, with the former *Times Mirror* Training Group chairman John H. Zenger writing "Researchers who rigorously evaluate training have said that demonstrable changes following training are hard to find."⁶

The recognition of the failure of general transfer has a history as long as

the study of the problem itself. The first attack on the problem came from the psychologists Edward Thorndike and Robert Woodworth in 1901, with their seminal paper “The Influence of Improvement in One Mental Function upon the Efficiency of Other Functions.” In it, they attacked the dominant theory of education at the time, so-called formal discipline theory. This theory suggested that the brain was analogous to a muscle, containing fairly general capacities of memory, attention, and reasoning, and that training those muscles, irrespective of the content, could result in general improvement. This was the predominant theory behind universal instruction in Latin and geometry, on the idea that it would help students think better. Thorndike was able to refute this idea by showing that the ability to transfer was much narrower than most people had assumed.

Although studying Latin has fallen out of favor, many educational pundits are reviving new incarnations of the formal discipline theory by suggesting that everyone learn programming or critical thinking in order to improve their general intelligence. Many popular “brain-training” games also subscribe to this view of the mind, assuming that deep training on one set of cognitive tasks will extend to everyday reasoning. It’s been more than one hundred years since the verdict came in, yet the allure of a general transfer procedure still has many searching for the Holy Grail.

Despite all this, the situation isn’t without hope. Although empirical work and educational institutions have often failed to demonstrate significant transfer, it is not the case that transfer doesn’t exist. Wilbert McKeachie, in reviewing the history of transfer, noted that “Transfer is paradoxical. When we want it, we do not get it. Yet it occurs all the time.”⁷ Whenever you use an analogy, saying something is like something else, you’re transferring knowledge. If you know how to ice skate and later learn to Rollerblade, you’re transferring skills. As Haskell pointed out, if transfer were really impossible, we would be unable to function.

So what explains the disconnect? Why have educational institutions struggled to demonstrate significant transfer, if transfer is something we all need to function in the world? Haskell suggests that a major reason is that transfer tends to be harder when our knowledge is more limited. As we develop more knowledge and skill in an area, they become more flexible and easier to apply outside the narrow contexts in which they were learned. However, I’d like to add my own hypothesis as an explanation for the transfer problem: most formal learning is woefully indirect.

Overcoming the Problem of Transfer with Directness

Directness solves the problem of transfer in two ways. The first and most obvious is that if you learn with a direct connection to the area in which you eventually want to apply the skill, the need for far transfer is significantly reduced. Given a century of research showing the difficulties of transfer along with proposed solutions that have failed to provide lasting results, any student must take seriously the notion that transferring what has been learned between very different contexts and situations will be treacherous. If our learning is, as Haskell suggests, “welded to a place or subject matter,” it is a lot better that those situations be close to the ones we actually want to use. Second, I believe that directness may help with transfer to new situations, beyond its more obvious role in preventing the need for far transfer. Many real-life situations share many subtle details with other real-life situations that they never share with the abstract environment of the classroom or textbook. Learning something new rarely depends just on the mass of easily articulated

and codified knowledge present but on the myriad tiny details of how that knowledge interacts with reality. By learning in a real context, one also learns many of the hidden details and skills that are far more likely to transfer to a new real-life situation than from the artificial environment of a classroom. Using a personal example, one of the skills I found most important in the no-English project was being able to quickly use a dictionary or translation app on my phone, so I could fill gaps in my linguistic knowledge in midconversation. However, it's exactly this kind of practical skill that is rarely covered in a language-learning curriculum. While this is a trivial example, real-life situations contain thousands of such pieces of skill and knowledge that are necessary if you're going to apply academically learned subjects in the real world.

Ultimately, it will be for researchers to decide whether the Holy Grail of education will ever be found. In the meantime, as learners, we must accept that initial learning efforts often stick stubbornly to the situations we learn them in. The programmer who learns about an algorithm from a class may have trouble recognizing when to use it in her code. The leader who learns a new management philosophy from a business book may go back to working with the same approach she has always used with her employees. My favorite example, though, has to be when a group of friends invited me to join them at a casino. I asked them if their studies ever kept them from enjoying gambling, and they just looked at me blankly. I thought it was funny because the students were actuaries. Their years spent studying statistics in the classroom should have convinced them that you can't expect to beat the house, yet that connection didn't seem to dawn on them. When we learn new things, therefore, we should always strive to tie them directly to the contexts we want to use them in. Building knowledge outward from the kernel of a real situation is much better than the traditional strategy of learning something and hoping that we'll be able to shift it into a real context at some undetermined future time.

How Ultralearners Avoid the Problem of Transfer and Learn Directly

Given the problem of transfer and the importance of learning directly, let's look at some of the ways that this is managed in different ultralearning projects. The simplest way to be direct is to learn by doing. Whenever possible, if you can spend a good portion of your learning time just doing the thing you want to get better at, the problem of directness will likely go away. If this isn't possible, you may need to create an artificial project or environment to test your skills. What matters most here is that the cognitive features of the skill you're trying to master and the way you practice it be substantially similar. Consider again Craig's simulation of Jeopardy! games by doing questions from old tests. The fact that he was using actual past questions is more important than whether his program matched the signature blue background color present on the show's display. This is because the background color didn't provide any information that would have changed his responses to the questions. The skill he was practicing wasn't changed much by it. In contrast, if he had taken trivia questions from a different game (say the board game Trivial Pursuit) there might have been differences in how questions are typically asked, the topics they are drawn from, or the difficulty level. Worse, if he had spent all his time reading random Wikipedia articles to learn trivia, he wouldn't have been practicing the fundamental skill of recalling answers based on cryptic Jeopardy!-style clues at all.

In other cases, what you're trying to achieve may not be a practical skill. Many of the ultralearners I encountered wanted, as their end goal, to understand a subject particularly well, such as Vishal Maini with machine learning and artificial intelligence. Even my own MIT Challenge was based around gaining a deep understanding of computer science, as opposed to a more practical goal of building an app or video game. Though this may seem like a case where directness no longer matters, that really isn't true. It's simply that the place you want to apply these ideas is less obvious and concrete. In Maini's case, he wanted to be able to think and talk intelligently about machine learning, enough to be able to land a nontechnical role in a company that utilized those methods. That meant that being able to communicate his ideas articulately, understanding the concepts clearly, and being able to discuss them with both knowledgeable practitioners and laypeople was important. That's why his goal to make a minicourse explaining the basics of machine learning fit so well. His learning was directly connected with where he wanted to apply the skill: communicating it to others.

Although the findings of the research on transfer are fairly bleak, there is a glimmer of hope, which is that gaining a deeper knowledge of a subject will make it more flexible for future transfer. Whereas the structures of our knowledge start out brittle, welded to the environments and contexts we learn them in, with more work and time they can become flexible and can be applied more broadly. This is the conclusion of Robert Haskell, and although it does not provide a short-term solution to the problem for new learners, it does suggest a path out for those who want to continue working on a subject until they master it. Many ultralearners who have specialized in a smaller subset of fields are masters at transfer; no doubt this is largely due to their depth of knowledge, which makes transfer easier to accomplish. Dan Everett, who was featured in the opening of the chapter on the first principle, metalearning, is a prime example of this. His linguistic depth allows him to learn new languages relatively easily, compared to someone who has learned only a second language or has learned only languages academically.

How to Learn Directly

Given the well-documented difficulty with indirect forms of learning, why are they still the default both in schools and in many failed attempts at selfeducation? The answer is that learning directly is hard. It is often more frustrating, challenging, and intense than reading a book or sitting through a lecture. But this very difficulty creates a potent source of competitive advantage for any would-be ultralearner. If you're willing to apply tactics that exploit directness despite these difficulties, you will end up learning much more effectively.

Let's examine some of the tactics ultralearners use to maximize this principle and take advantage of the inadequacies of more typical schooling.

Tactic 1: Project-Based Learning

Many ultralearners opt for projects rather than classes to learn the skills they need. The rationale is simple: if you organize your learning around producing something, you're guaranteed to at least learn how to produce that thing. If you take classes, you may spend a lot of time taking notes and reading but not achieve your goal.

Learning to program by creating your own computer game is a perfect example of project-based learning. Engineering, design, art, musical composition, carpentry, writing, and many other skills naturally lend

themselves to projects that produce something at the end. However, an intellectual topic can also be the basis of a project. One ultralearner I interviewed, whose project is still ongoing, wanted to learn military history. His project, in this case, was to work toward producing a thesis paper. Since his end goal was to be able to converse knowledgeably about the subject, a project to produce an original paper applied learning more directly than simply trying to read a lot of books without creating anything.

Tactic 2: Immersive Learning

Immersion is the process of surrounding yourself with the target environment in which the skill is practiced. This has the advantage of requiring much larger amounts of practice than would be typical, as well as exposing you to a fuller range of situations in which the skill applies.

Learning a language is the canonical example of where immersion works. By immersing yourself in an environment where a language is spoken, not only do you guarantee that you'll end up practicing the language a lot more than you would otherwise (since you have no choice), but you also face a broader diversity of situations that require learning new words and phrases. However, language learning is not the only place where you can apply immersion to learn more. Joining communities of people who are actively engaged in learning can have a similar impact, since it encourages constant exposure to new ideas and challenges. For example, novice programmers might join open-source projects to expose themselves to new coding challenges.

Tactic 3: The Flight Simulator Method

Immersion and projects are great, but for many skills there's no way to actually practice the skill directly. For skills such as piloting a plane or performing surgery, it's not even legal to practice them in a real situation until you've already invested considerable time into training. How can you overcome this?

It's important to note that what matters for transfer is not every possible feature of the learning environment, such as what room you're in or what clothes you're wearing while you learn. Rather, it's the cognitive features—situations where you need to make decisions about what to do and cue knowledge you've stored in your head. This suggests that when direct practice is impossible, a simulation of the environment will work to the degree to which it remains faithful to the cognitive elements of the task in question. For flying a plane, this means that practicing on a flight simulator may be as good for learning as flying an actual plane if it sufficiently calls on the discriminations and decisions a pilot needs to make. Better graphics and sounds aren't important, unless they change the nature of the decisions being made or the cues pilots receive for when to use certain skills or knowledge.⁸ When evaluating different methods for learning, those that significantly simulate the direct approach will transfer a lot better. Therefore, if you're trying to evaluate what's the best way to learn French before your trip to France, you'll get more (although not perfect) transfer from doing Skype tutoring than you will from flipping through flash cards.

Tactic 4: The Overkill Approach

The last method I've found for enhancing directness is to increase the challenge, so that the skill level required is wholly contained within the goal that is set. Tristan de Montebello, when preparing to compete in the World Championship of Public Speaking, pushed to speak at middle schools, giving early versions of his talk. His feeling was that the feedback he received at

Toastmasters clubs might be too soft or congratulatory to cut deep at what worked and didn't work in his speech. Middle school students, in contrast, would be merciless. If a joke he said wasn't funny or his delivery was boring or cheesy, he would be able to tell immediately from their faces what needed to be reworked. The overkill approach is to put yourself into an environment where the demands are going to be extremely high, so you're unlikely to miss any important lessons or feedback.

Going into this environment can feel intense. You may feel as though you're "not ready" to start speaking a language you've barely learned. You may be afraid to stand onstage and deliver a speech you haven't memorized perfectly. You might not want to dive right into programming your own application and prefer to stick to watching videos where someone else does the coding. But these fears are often only temporary. If you can get enough motivation to start this method, it's often a lot easier to continue it long term. The first week in each new country in my language learning project was always a shock, but soon it became completely normal to live entirely within the new language.

One way you can overkill a project is to aim for a particular test, performance, or challenge that will be above the skill level you strictly require. Benny Lewis likes to attempt language exams, because they provide a concrete challenge. In his German project, he wanted to attempt the highest level exam, because his awareness of that goal would push him to study more than he might if he were satisfied with comfortable conversations alone. Another friend of mine decided to exhibit her photography as a means of pushing her skills and talent. Deciding in advance that your work will be viewable publicly alters your approach to learning and will gear you toward performance in the desired domain, rather than just checking off boxes of facts learned.

Learn Straight from the Source

Learning directly is one of the hallmarks of many of the successful ultralearning projects I've encountered, particularly because of how different it can be from the style of education most of us are used to. Whenever you learn anything new, it's a good habit to ask yourself where and how the knowledge will manifest itself. If you can answer that, you can then ask whether you're doing anything to tie what you're learning to that context. If you're not, you need to tread carefully, as the problem of transfer may rear its ugly head.

The act of learning directly, however, is only half of the answer to the question of what you should do to learn well. Doing a lot of direct practice in the environment where you want to eventually use your skills is an important start. However, in order to master skills quickly, bulk practice isn't enough. This brings us to our next principle of ultralearning: drill.

Chapter 7: Principle 4: Drill: Attack Your Weakest Point

Of all the roles Benjamin Franklin played throughout his life—entrepreneur, inventor, scientist, diplomat, and founding father of the United States—he was first and foremost a writer. It was in writing that he first found success. After fleeing Boston to escape the final years of his indentured labor as an apprentice to his brother's printing company, he went to Philadelphia. There, penniless and unknown, he first worked for another printing company before establishing himself as a competitor. His *Poor Richard's Almanack* became an international bestseller and allowed him to retire at forty-two. However, it was in the latter half¹ of his life that his writing would have world-changing consequences.²

As a scientist, Franklin was bad at math and more interested in practical consequences than in grand theories of the universe. However, his prose was “written equally well for the uninitiated as well as the philosopher,” noted the English chemist Sir Humphrey Davy, adding “he has rendered his details as amusing as well as perspicuous.”³ The strength of his writing and its practical consequences made him an international sensation.

In politics, it was again Franklin's writing talent that helped him win allies and persuade potential antagonists. Prior to the American Revolution, he penned an essay, supposedly written by King Frederick II of Prussia, entitled “An Edict by the King of Prussia.” In it he satirized British-American relations by proposing that, due to early settlers of the British Isles being of German origin, “revenue [should] be raised from said colonies in Britain” by the Prussian king.

Later, his skill with a pen would make his writing into the Declaration of Independence, where he edited Thomas Jefferson's words to become the now famous “We hold these truths to be self-evident.”

With such an amazing skill for writing and persuasion, it's worth asking how Franklin acquired it. Fortunately, unlike so many other great writers, whose efforts at honing their skills remain mysterious, we have Franklin's own words for how he did it. In his *Autobiography*, he details his sophisticated efforts to slice apart sections of his writing skill for practice as a young boy. Beginning with a childhood debate against a friend about the merits of educating women (Franklin was for, his friend against), his father noticed that aspects of his writing lacked persuasive ability. Franklin thus “determined to endeavor at improvement” and went about a series of exercises to practice his writing skill.

One such exercise he documents was taking a favorite magazine of his, *The Spectator*, and taking notes on articles that appeared there. He would then leave the notes for a few days and come back to them, trying to reconstruct the original argument from memory. After finishing, he “compared my *Spectator* with the original, discovered some of my faults, and corrected them.” Realizing that his vocabulary was limited, he developed another strategy. By turning the prose into verse, he could replace words with synonyms that matched in meter or rhyme. To improve his sense of the rhetorical flow of an essay, he tried his imitation approach again, but this time he jumbled up the hints so he would have to determine the correct order of the sequence of ideas as he wrote again.

Once he had established some of the mechanics of writing, he moved on to the more difficult task of writing in a style that would persuade. When

reading an English grammar book, he was exposed to the idea of the Socratic method, of challenging another's ideas through probing questions rather than direct contradiction. He then went to work, carefully avoiding "abrupt contradiction and positive argumentation," instead focusing on being the "humble inquirer and doubter."

Those early efforts produced results. At age sixteen, he wanted to try to get his work published. Fearing that his elder brother might reject it out of hand, however, he disguised his penmanship and submitted his essay under the pseudonym Silence Dogood, purporting to be a widowed woman living in the countryside. His brother, not knowing the true author, approved and published the essay, so Franklin returned and wrote more. Although initiated as a ruse to have his writing considered fairly, Franklin's practice in adopting other characters would prove invaluable in his later career. Poor Richard's Almanack, for example, was written from the perspective of a simple husband and wife, Richard and Bridget Saunders, and his political essays such as his "An Edict by the King of Prussia" similarly made use of his flexibility to adopt imagined perspectives.

It's difficult to imagine Franklin having become the household name he is today without his having first established a mastery of writing. Whether it was business, science, or statecraft, the unchanging core of what made him persuasive and great was his ability to write well. What distinguished Franklin wasn't merely the amount he wrote or his raw talent but how he practiced. The way in which he decided to break apart the skill of writing and practice its elements in isolation enabled him to master writing at a young age and apply it to the other pursuits for which he would later become famous. Such careful analysis and deliberate practice forms the basis for the fourth ultralearning principle: drill.

The Chemistry of Learning

In chemistry, there's a useful concept known as the rate-determining step. This occurs when a reaction takes place over multiple steps, with the products of one reaction becoming the reagents for another. The rate-determining step is the slowest part of this chain of reactions, forming a bottleneck that ultimately defines the amount of time needed for the entire reaction to occur. Learning, I'd like to argue, often works similarly, with certain aspects of the learning problem forming a bottleneck that controls the speed at which you can become more proficient overall.

Consider learning mathematics. This is a complex skill that has many different parts: you need to be able to understand the fundamental concepts, you need to be able to remember the algorithm for solving a certain type of problem, and you need to know in what context it applies. Underlying this ability, however, is the ability to do arithmetic and algebra so as to be able to solve the problems in question. If your arithmetic is weak or your algebra sloppy, you'll get the wrong answers even if you've mastered the other concepts.

Another rate-determining step could be vocabulary when learning a foreign language. The number of sentences you can successfully utter depends on how many words you know. If you know too few, you won't be able to talk about very much. If you were able to suddenly inject hundreds of new words into your mental database, you might drastically expand your fluency even if your pronunciation, grammar, or other linguistic knowledge remains unchanged.

This is the strategy behind doing drills. By identifying a rate-determining

step in your learning reaction, you can isolate it and work on it specifically. Since it governs the overall competence you have with that skill, by improving at it you will improve faster than if you try to practice every aspect of the skill at once. That was Franklin's insight that allowed him to rapidly improve his writing: by identifying components of the overall skill of writing, figuring out which mattered in his situation, and then coming up with clever ways to emphasize them in his practice, he could get better more quickly than if he had just spent a lot of time writing.

Drills and Cognitive Load

Rate-determining steps in learning—where one component of a complex skill determines your overall level of performance—are a powerful reason to apply drills. However, they aren't the only one. Even if there isn't one isolatable aspect of the skill that is holding back your performance, it may still be a good idea to apply drills.

The reason is that when you are practicing a complex skill, your cognitive resources (attention, memory, effort, etc.) must be spread over many different aspects of the task. When Franklin was writing, he had to consider not only the logical content of the argument he was making but word choice and rhetorical style. This can create a learning trap. In order to improve your performance in one aspect, you may need to devote so much attention to that one aspect that the other parts of your performance start to go down. If you can judge yourself only on how much you improve at the overall task, it can lead to a situation in which your improvement slows down because you will be getting worse at the overall task while becoming better at a specific component of it.

Drills resolve this problem by simplifying a skill enough that you can focus your cognitive resources on a single aspect. When Franklin focused on reconstructing the order of an essay he had read previously, he could devote all his attention to asking what sequence of ideas leads to a good essay rather than also needing to worry about word usage, grammar, and the content of the arguments.

Astute readers will probably notice a tension between this principle and the last. If direct practice involves working on a whole skill nearest to the situation in which it will eventually be used, drills are a pull in the opposite direction. A drill takes the direct practice and cuts it apart, so that you are practicing only an isolated component. How can you resolve this contradiction?

The Direct-Then-Drill Approach

The tension between learning directly and doing drills can be resolved when we see them as being alternating stages in a larger cycle of learning. The mistake made in many academic strategies for learning is to ignore the direct context or abstract it away, in the hope that if enough component skills are developed, they will eventually transfer. Ultralearners, in contrast, frequently employ what I'll call the Direct-Then-Drill Approach.

The first step is to try to practice the skill directly. This means figuring out where and how the skill will be used and then trying to match that situation as close as is feasible when practicing. Practice a language by actually speaking it. Learn programming by writing software. Improve your writing skills by penning essays. This initial connection and subsequent feedback loop ensure that the transfer problem won't occur.

The next step is to analyze the direct skill and try to isolate components that are either rate-determining steps in your performance or subskills you

find difficult to improve because there are too many other things going on for you to focus on them. From here you can develop drills and practice those components separately until you get better at them.

The final step is to go back to direct practice and integrate what you've learned. This has two purposes. The first is that even in well-designed drills, there are going to be transfer hiccups owing to the fact that what was previously an isolated skill must be moved to a new and more complex context. Think of this as being like building the connective tissue to join the muscles you strengthened separately. The second function of this step is as a check on whether your drill was well designed and appropriate. Many attempts to isolate a drill may end in failure because the drill doesn't really cut at the heart of what was difficult in real practice. That's okay; this feedback is important to help you minimize wasting time learning things that don't matter much to your end goals.

The earlier you are in the learning process, the faster this cycle should be. Cycling between direct practice and drills, even within the same learning session, is a good idea when you're just starting out. Later, as you get better at what you are trying to do and a lot more effort is required to noticeably improve your overall performance, it's more acceptable to take longer detours into drills. As you approach mastery, your time may end up focused mostly on drills as your knowledge of how the complex skill breaks down into individual components becomes more refined and accurate and improving any individual component gets harder and harder.

Tactics for Designing Drills

There are three major problems when applying this principle. The first is figuring out when and what to drill. You should focus on what aspects of the skill might be the rate-determining steps in your performance. Which aspect of the skill, if you improved it, would cause the greatest improvement to your abilities overall for the least amount of effort? Your accounting skills might be limited by the fact that your Excel knowledge is superficial, which prevents you from applying all the things you know to practical situations. Your language abilities may be held back by having inaccurate pronunciation, even though you know the right words. Look as well to aspects of a skill that you need to juggle simultaneously. These may be harder to improve because you can't devote enough cognitive resources to improving them. When writing a new article, you may have to juggle research, storytelling, vocabulary, and many other aspects simultaneously, making it hard to get a lot better at just one. Determining what to drill may seem tricky, but it doesn't have to be. The key is to experiment. Make a hypothesis about what is holding you back, attack it with some drills, using the Direct-Then-Drill Approach, and you can quickly get feedback about whether you're right.

The second difficulty with this principle is designing the drill to produce improvement. This is often hard because even if you recognize an aspect of your performance you're weak on, it may be tricky to design a drill that trains that component without artificially removing what makes it difficult in actual application. Franklin's drills were uncommon, I believe, because most people, even recognizing specific deficits in their writing ability, would not have had the ingenuity to find ways to drill subskills such as ordering arguments persuasively and emulating a successful writing style.

Finally, doing drills is hard and often uncomfortable. Teasing out the worst thing about your performance and practicing that in isolation takes guts. It's

much more pleasant to spend time focusing on things you're already good at. Given this natural tendency, let's look at some good ways to do drills so you can start applying them yourself.

Drill 1: Time Slicing

The easiest way to create a drill is to isolate a slice in time of a longer sequence of actions. Musicians often do this kind of training when they identify the hardest parts of a piece of music and practice each one until it's perfect before integrating it back into the context of the entire song or symphony. Athletes similarly engage in this process when they drill skills that are normally a fraction of total playing time, such as layups or penalty shots. In the early phase of learning a new language, I often obsessively repeat a few key phrases, so they quickly get embedded into my long-term memory. Look for parts of the skill you're learning that can be decomposed into specific moments of time that have heightened difficulty or importance.

Drill 2: Cognitive Components

Sometimes what you'll want to practice isn't a slice in time of a larger skill but a particular cognitive component. When speaking a language, grammar, pronunciation, and vocabulary occur at all moments, but they form different cognitive aspects that must be managed simultaneously. The tactic here is to find a way to drill only one component when, in practice, others would be applied at the same time. When learning Mandarin Chinese, I would do tone drills that involved pronouncing pairs of words with different tones and recording myself speaking. That allowed me to practice producing different tones quickly, without the distraction of needing to remember what the words meant or how to form grammatically correct sentences.

Drill 3: The Copycat

A difficulty with drills in many creative skills is that it is often impossible to practice one aspect without also doing the work of the others. When Franklin was trying to improve his ability to order arguments logically, for instance, it wasn't possible to do so without writing an entire essay. To solve this problem in your own learning, you can take a page from Franklin: by copying the parts of the skill you don't want to drill (either from someone else or your past work), you can focus exclusively on the component you want to practice. Not only does this save a lot of time, because you need to repeat only the part you're drilling, it also reduces your cognitive burden, meaning you can apply more focus to getting better at that one aspect. When practicing drawing, I started by drawing not just from photos but from drawings other people had done. That helped me focus on the skill of accurately rendering the picture, simplifying the decision about how to frame the scene and which details to include. For flexible creative works, editing works you've created in the past may have the same effect, allowing you to selectively improve an aspect of your work without having to consider the other demands of an original composition.

Drill 4: The Magnifying Glass Method

Suppose you need to create something new and can't edit or separate out the part you want to practice. How can you create a drill? The Magnifying Glass Method is to spend more time on one component of the skill than you would otherwise. This may reduce your overall performance or increase your input time, but it will allow you to spend a much higher proportion of your time and cognitive resources on the subskill you want to master. I applied this method when trying to improve my ability to do research when writing articles, by spending about ten times as long on research as I had previously.

Although I still had to do all the other parts of writing the article, by spending much longer on research than I would normally, I could develop new habits and skills for doing so.

Drill 5: Prerequisite Chaining

One strategy I've seen repeatedly from ultralearners is to start with a skill that they don't have all the prerequisites for. Then, when they inevitably do poorly, they go back a step, learn one of the foundational topics, and repeat the exercise. This practice of starting too hard and learning prerequisites as they are needed can be frustrating, but it saves a lot of time learning subskills that don't actually drive performance much. Eric Barone, for instance, started his pixel art experiments simply by making them. When he struggled with certain aspects, such as colors, he went back, learned color theory, and repeated his work. Benny Lewis has a similar habit of starting with speaking from a phrase book and only later learning the grammar that explains how the phrases function.

Mindful Drilling

To many, the idea of drilling may seem to be a push in the wrong direction. We've all spent time doing homework designed to drill into us facts and procedures that turned out to be a total waste of time. That was often because we didn't know the reasons behind what we were practicing or how it fit into a broader context. Drilling problems without context is mind-numbing. However, once you've identified that it's the bottleneck preventing you from going further, they become instilled with new purpose. In ultralearning, which is directed by the student, not an external source, drills take on a new light. Instead of being forced to do them for unknown purposes, it is now up to you to find a way to enhance the learning process by accelerating learning on the specific things that you find most difficult. In this sense, drills take on a very different flavor in ultralearning as opposed to traditional learning. Far from being meaningless drudgery, carefully designed drills elicit creativity and imagination as you strive to solve a more complex learning challenge by breaking it into specific parts.

Drills are hard to do, which is why many of us would rather avoid them. When we do engage in drills, it's often in subjects where we feel competent and comfortable. Drills require the learner not only to think deeply about what is being learned but also figure out what is most difficult and attack that weakness directly rather than focus on what is the most fun or what has already been mastered. This requires strong motivation and a comfort with learning aggressively. Franklin, in his Autobiography, remarked about the lengths he went to so he could dedicate himself to his writing drills: "My time for these exercises and for reading was at night, after work or before it began in the morning." Despite the prominence writing would play in his life, Franklin still had to work long hours under his taskmaster brother in the print shop, diligently improving his craft in what little leisure time he had. Eric Barone similarly repeated his pixel art dozens of times, going back to master prerequisite concepts and theory until he got it perfect.

The difficulty and usefulness of drills repeat a pattern that will recur throughout the ultralearning principles: that something mentally strenuous provides a greater benefit to learning than something easy. Nowhere is this pattern more clear than in the next principle, retrieval, where difficulty itself may be the key to more effective learning.

Chapter 8- Principle 5; Retrieval: Test To Learn

In the spring of 1913, the mathematician G. H. Hardy received a letter that would forever define the course of his life. Sent by an accounting clerk working for the Port Trust Office of Madras in India, the letter contained a humble note of introduction along with some startling assertions. The author claimed that he had found theorems for problems that the best mathematical minds of the time had yet to solve. What's more, he claimed that he had "no University education" and had derived these results from his own solitary investigations.¹

Receiving letters from amateur crackpots who claimed to have solutions to famous problems was a common occurrence for someone of Hardy's stature in mathematics, so at first he simply dismissed the letter as being more of the same. Still, flipping through the several pages of notes attached to the letter, the equations wouldn't leave his mind. When he found himself thinking about them hours later, he brought the letter to the attention of his colleague John Littlewood. As the two of them toyed at trying to prove the strange assertions, they found that some of them they were able to prove with great effort, while others remained, in Hardy's words, "scarcely possible to believe." Maybe, Hardy thought, this wasn't a letter from a crackpot but something rather different.

The formulas written were so bizarre and alien that Hardy remarked, "They must be true because, if they were not true, no one would have had the imagination to invent them." What he only vaguely understood that day was that he had just had his first introduction to one of the most brilliant and bizarre mathematicians of all time, Srinivasa Ramanujan.

Ramanujan's Genius

Before writing his letter to Hardy, which changed the course of mathematical history, Ramanujan was a poor, pudgy south Indian boy with a special love of equations. More than anything else, he loved math. In fact, his love of math often got him into difficulties. His unwillingness to study other subjects flunked him out of university. Equations were all he cared about. In his spare time and during stretches of unemployment, he would sit for hours on the bench in front of his family home, slate in hand, playing with formulas. Sometimes he would stay up so late that his mother would need to put food into his hand so he would eat.

As he was thousands of miles away from the center of mathematics of his day, access to high-quality textbooks was quite a challenge for Ramanujan. One resource he did encounter and mined extensively was a volume by George Shoobridge Carr called *A Synopsis of Elementary Results in Pure and Applied Mathematics*. Carr himself was hardly a towering figure of mathematical genius. The book, intended as a guide for students, included large lists of various theorems from different fields of mathematics, usually without explanation or proof. However, even without having proofs or explanations available, Carr's book became a powerful resource in the hands of someone smart and obsessed like Ramanujan. For instead of simply copying and memorizing how certain theorems were derived, he had to figure them out for himself.

Though many commentators of the time, including Hardy, argued that Ramanujan's impoverished upbringing and late access to the cutting edge of mathematics likely did irreparable harm to his genius, modern psychological

experiments may offer an alternative perspective, for when Ramanujan dealt only with Carr's extensive list of theorems using his own quirky obsession with mathematical formulas, he was unwittingly practicing one of the most powerful methods known to build a deep understanding.

The Testing Effect

Imagine you're a student preparing for an exam. You have three choices about how you can allocate your limited studying time. First, you can review the material. You can look over your notes and book and study everything until you're sure you'll remember it. Second, you can test yourself. You can keep the book shut and try to remember what was in it. Finally, you can create a concept map. You can write out the main concepts in a diagram, showing how they're organized and related to other items you need to study. If you can pick only one, which one should you choose to do best on the final exam?

This is essentially the question posed by the psychologists Jeffrey Karpicke and Janell Blunt in one study examining students' choice of learning strategy.² In the study, students were divided into four groups, each given the same amount of time but told to use different study strategies: reviewing the text a single time, reviewing it repeatedly, free recall, and concept mapping. In each group, students were asked to predict their score on the upcoming test. Those who did repeated reviewing predicted that they'd score the best, followed by the single-study and concept-mapping groups. Those who practiced free recall (trying to remember as much as they could without looking in the book) predicted the worst for their final performance. The actual results, however, weren't even close. Testing yourself—trying to retrieve information without looking at the text—clearly outperformed all other conditions. On questions based directly on the content of the text, those who practiced free recall remembered almost 50 percent more than the other groups. How could students, who have spent years getting firsthand experience about what matters to learning, be so misguided about what actually produces results?

One might be tempted to argue that this benefit of self-testing is an artifact of the way success is measured. The principle of directness asserts that transfer is difficult. Since self-testing and actual testing are most similar, perhaps it is this similarity that allows this method to work better. Had the method of evaluation differed, it might be reasonable to suspect that review or concept mapping might come out on top. Interestingly, in another experiment, Karpicke and Blunt showed that this wasn't the explanation, either. In this experiment the final test was to produce a concept map. Despite the overwhelming similarity to the evaluation task, free recall still did better than using concept mapping to study.

Another possible explanation for why self-testing works is feedback. When you review something passively, you don't get any feedback about what you know and don't know. Since tests usually come with feedback, that might explain why students who practiced self-testing beat the concept mappers or passive reviewers. Though it is true that feedback is valuable, once again, retrieval doesn't simply reduce down to getting more feedback. In the experiments mentioned, students were asked to do free recall but weren't provided any feedback about items they missed or got wrong. The act of trying to summon up knowledge from memory is a powerful learning tool on its own, beyond its connection to direct practice or feedback.

This new perspective on learning shows how Carr's book, with its lists of

proofs without solutions, could have become, in the hands of someone sufficiently motivated to master them, an incredible tool for becoming brilliant at math. Without the answers at hand, Ramanujan was forced to invent his own solutions to the problems, retrieving information from his mind rather than reviewing it in a book.

The Paradox of Studying

If retrieval practice—trying to recall facts and concepts from memory—is so much better for learning, why don't students realize it? Why do many prefer to stick to concept mapping or the even less effective passive review, when simply closing the book and trying to recall as much as possible would help them so much more?

Karpicke's research points to a possible explanation: Human beings don't have the ability to know with certainty how well they've learned something. Instead, we need to rely on clues from our experience of studying to give us a feeling about how well we're doing. These so-called judgments of learning (JOLs) are based, in part, on how fluently we can process something. If the learning task feels easy and smooth, we are more likely to believe we've learned it. If the task feels like a struggle, we'll feel we haven't learned it yet. Immediately after spending some time studying, these JOLs may even be accurate. Minutes after studying something using a strategy of passive review, students perform better than they would if they had practiced retrieval.³ The feeling that you're learning more when you're reading rather than trying to recall with a closed book isn't inaccurate. The problem comes after. Test again days later, and retrieval practice beats passive review by a mile. What helped in the immediate time after studying turns out not to create the long-term memory needed for actual learning to take place.

Another explanation for why students opt for low-efficiency review instead of retrieval is that they don't feel they know the material well enough to test themselves on it. In another experiment, Karpicke had students choose a strategy for learning. Inevitably, students who were performing more weakly elected to review the material first, waiting until they were "ready" to start practice testing.⁴ If through experimental intervention, however, they were forced to practice retrieval earlier, they learned more. Whether you are ready or not, retrieval practice works better. Especially if you combine retrieval with the ability to look up the answers, retrieval practice is a much better form of studying than the ones most students apply.

Is Difficulty Desirable?

What makes practicing retrieval so much better than review? One answer comes from the psychologist R. A. Bjork's concept of desirable difficulty.⁵ More difficult retrieval leads to better learning, provided the act of retrieval is itself successful. Free recall tests, in which students need to recall as much as they can remember without prompting, tend to result in better retention than cued recall tests, in which students are given hints about what they need to remember. Cued recall tests, in turn, are better than recognition tests, such as multiple-choice answers, where the correct answer needs to be recognized but not generated. Giving someone a test immediately after they learn something improves retention less than giving them a slight delay, long enough so that answers aren't in mind when they need them. Difficulty, far from being an obstacle to making retrieval work, may be part of the reason it does so. The idea of desirable difficulties in retrieval makes a potent case for the ultralearning strategy. Low-intensity learning strategies typically involve either less or easier retrieval. Pushing difficulty higher and opting for testing

oneself well before you are “ready” is more efficient. One can think back to Benny Lewis’s strategy of speaking a new language from the first day. Though this approach is high in difficulty, research suggests why it might be more useful than easier forms of classroom study. Placing himself in a more difficult context means that every time Lewis needs to recall a word or phrase, it will be remembered more strongly than when doing the same act of retrieval in a classroom setting and much better than when simply looking over a list of words and phrases.

Difficulty can become undesirable if it gets so hard that retrieval becomes impossible. Delaying the first test of a newly learned fact has some benefits over testing immediately.⁶ However, if you delay the test too long, the information may be forgotten entirely.⁷ The idea, therefore, is to find the right midpoint: far enough away to make whatever is retrieved remembered deeply, not so far away that you’ve forgotten everything. Although waiting too long before you test yourself may have disadvantages, increasing difficulty by giving yourself fewer clues and prompts are likely helpful, provided that you can get some feedback on them later.

Should You Take the Final Exam Before the Class Even Begins?

The standard way of viewing tests is that they work to evaluate the knowledge you have learned elsewhere—through reading or listening to lectures. The concept of retrieval flips this view on its head, suggesting that the act of taking a test not only is a source of learning but results in more learning than a similar amount of time spent in review. However, this still fits within the conventional idea of knowledge being first acquired, and then strengthened or tested later.

An interesting observation from retrieval research, known as the forward-testing effect, shows that retrieval not only helps enhance what you’ve learned previously but can even help prepare you to learn better.⁸ Regular testing of previously studied information can make it easier to learn new information. This means that retrieval works to enhance future learning, even when there is nothing to retrieve yet!

A variety of mechanisms has been proposed for explaining why this forward testing effect exists. Some researchers argue that it may be that trying to find knowledge that hasn’t been learned yet—say, by trying to solve a problem you haven’t learned the answer to yet—nonetheless helps reinforce search strategies that are put to use once the knowledge is encountered later.

An analogy here is that trying to retrieve an answer that doesn’t yet exist in your mind is like laying down a road leading to a building that hasn’t been constructed yet. The destination doesn’t exist, but the path to get to where it will be, once constructed, is developed regardless. Other researchers argue that the mechanism might be one of attention. By confronting a problem you don’t yet know how to answer, your mind automatically adjusts its attentional resources to spot information that looks like a solution when you learn it later. Whatever the exact mechanism is, the reality of the forward-testing effect implies that practicing retrieval might not only benefit from starting earlier than one is “ready” but even before you have the possibility of answering correctly.

What Should Be Retrieved?

The research is clear: if you need to recall something later, you’re best off practicing retrieving it. However, this neglects an important question: What kinds of things should you invest the time in to remember in the first place?

Retrieval may take less time than review to get the same learning impact, but not learning something at all is faster still. This is an important practical question. Nobody has time to master everything. During the MIT Challenge, I covered a lot of different ideas. Some were directly relevant to the kind of programming I wanted to do when I was done, so making sure I retained those ideas was a priority. Others were interesting, but since I had no plans to use them immediately, I put more effort into practicing retrieving the underlying concepts than doing technical calculations. One class I did, for instance, was Modal Logic. As I have no plans to be a logician, I can honestly say, eight years later, that I couldn't prove theorems in modal logic today. However, I can tell you what modal logic is for and when it is used, so if a situation arises in which the techniques I learned in that class might be useful, I'd have a much better time spotting it.* There will always be some things you choose to master and others you satisfy yourself with knowing you can look up if you need to.

One way to answer this question is simply to do direct practice. Directness sidesteps this question by forcing you to retrieve the things that come up often in the course of using the skill. If you're learning a language and need to recall a word, you'll practice it. If you never need a word, you won't memorize it. The advantage of this strategy is that it automatically leads you to learn the things with the highest frequency. Things that are rarely used or that are easier to look up than to memorize won't be retrieved. These tend to be the things that don't matter so much.

The problem with relying on direct practice exclusively is that knowledge that isn't in your head can't be used to help you solve problems. For instance, a programmer may realize a need to use a certain function to solve a problem but forgets how to write it out. Needing to look up the syntax might slow her down, but she will still be able to solve the problem. However, if you don't have enough knowledge stored to recognize when you can use a function to solve your problem, no looking up can help you. Consider that over the last twenty years, the amount of knowledge easily accessible from a quick online search has exploded. Nearly any fact or concept is now available on demand to anyone with a smartphone. Yet despite this incredible advance, it is not as if the average person is thousands as times as smart as people were a generation ago. Being able to look things up is certainly an advantage, but without a certain amount of knowledge inside your head, it doesn't help you solve hard problems.

Direct practice alone can fail to encourage enough retrieval by omitting knowledge that can help you solve a problem but isn't strictly necessary to do so. Consider our programmer who has two different ways to solve her problem, A and B. Option A is much more effective, but B will also get the job done. Now suppose that she knows only about option B. She'll continue to use the way she knows to solve the problem, even though it is less effective. Here, our fledgling programmer might read about option A on a blog somewhere. But since simply reading is much less effective than repeated retrieval practice, chances are that she'll forget about it when it comes time to apply the technique. This may sound abstract, but I'd argue that this is quite common with programmers, and often the thing separating mediocre programmers from great ones isn't the range of problems they can solve but that the latter often know dozens of ways to solve problems and can select the best one for each situation. This kind of breadth requires a certain amount of passive exposure, which in turn benefits from retrieval practice.

How to Practice Retrieval

Retrieval works, but it isn't always easy. Not only is the effort itself an obstacle, but sometimes it's not clear exactly how to do it. Passive review may not be very efficient, but at least it's straightforward: you open your book and reread material until you retain it. Most books and resources don't have a handy list of questions at the end to test you to see if you remember what they contain. To help with that, below are some useful methods that can be used to apply retrieval to almost any subject.

Tactic 1: Flash Cards

Flash cards are an amazingly simple, yet effective, way to learn paired associations between questions and answers. The old way of creating paper flash cards to drill yourself is powerful, but it has largely been superseded by spaced-repetition systems, as I'll discuss in Principle 7. These software algorithms can handle tens of thousands of "cards" and also organize a review schedule so you can manage them.

The major drawback of flash cards is that they work really well for a specific type of retrieval—when there's a pairing between a specific cue and a particular response. For some forms of knowledge, for example memorizing foreign-language vocabulary, this works perfectly. Similarly, maps, anatomical diagrams, definitions, and equations can often be memorized via flash cards. However, when the situation in which you need to remember the information is highly variable, this kind of practice can have drawbacks. Programmers can memorize syntax via flash cards, but concepts that need to be applied in real programs often don't fit the cue-response framework that flash cards demand.

Tactic 2: Free Recall

A simple tactic for applying retrieval is, after reading a section from a book or sitting through a lecture, to try to write down everything you can remember on a blank piece of paper. Free recall like this is often very difficult, and there will be many things missed, even if you just finished reading the text in question. However, this difficulty is also a good reason why this practice is helpful. By forcing yourself to recall the main points and arguments, you'll be able to remember them better later. While doing research for this book, for instance, I would often print out journal articles and put them in a binder with a few blank sheets of paper after each of them. After I had finished reading, I'd do a quick free recall exercise to make sure I would retain the important details when it came time for writing.

Tactic 3: The Question-Book Method

Most students take notes by copying the main points as they encounter them. However, another strategy for taking notes is to rephrase what you've recorded as questions to be answered later. Instead of writing that the Magna Carta was signed in 1215, you could instead write the question "When was the Magna Carta signed?" with a reference to where to find the answer in case you forget. By taking notes as questions instead of answers, you generate the material to practice retrieval on later.

One mistake I've made in applying this technique is to focus on the wrong kinds of things to ask questions about. I tried applying this method to a book on computational neuroscience, and I ended up asking myself all sorts of detailed questions such as what was the firing rate of certain neuronal circuits or who proposed a specific theory. That wasn't intentional but rather a byproduct of lazily restating the factual content in the book as questions. What's harder and more useful is to restate the big idea of a chapter or section as a

question. Since this is often implicit, it requires some deeper thinking and not just adding a question mark to some notes you copied verbatim. One rule I've found helpful for this is to restrict myself to one question per section of a text, thus forcing myself to acknowledge and rephrase the main point rather than zoom in on a detail that will be largely irrelevant later.

Tactic 4: Self-Generated Challenges

The above tactics work best with retrieval of simple information, such as facts or summaries of broad ideas you might encounter in a book or lecture. However, if you're trying to practice a skill, not merely remember information, they might not be enough. For a programmer, it's not enough to know what an algorithm means, but be able to write it in code. In this case, as you go through your passive material, you can create challenges for yourself to solve later. You may encounter a new technique and then write a note to demonstrate that technique in an actual example. Creating a list of such challenges can serve as a prompt for mastering that information later in practice and can expand your library of tools that you are able to actually apply.

Tactic 5: Closed-Book Learning

Nearly any learning activity can become an opportunity for retrieval if you cut off the ability to search for hints. Concept mapping, the strategy that didn't work particularly well for students in Karpicke and Blunt's experiments, could be beefed up considerably by preventing yourself from looking at the book when generating your concept map. I suspect that had this been done in the original experiment, students using this form of closedbook concept mapping would likely have done better on the eventual test that relied on creating a concept map. Any practice, whether direct or a drill, can be cut off from the ability to look things up. By preventing yourself from consulting the source, the information becomes knowledge stored inside your head instead of inside a reference manual.

Revisiting Ramanujan

Ramanujan was smart, there's no denying it. However, his genius was aided immeasurably by two hallmarks of the ultralearner's tool kit: obsessive intensity and retrieval practice. As he worked on his slate from morning to night, trying to figure out Carr's sparsely written list of theorems was incredibly hard work. But it also created the desirable difficulties that allowed him to build a huge mental library of tools and tricks that would assist him in his later mathematical efforts.

Retrieval played an important role in Ramanujan's mathematical upbringing, but he is hardly the only one to take advantage of the tactic. In nearly every biography of great geniuses and contemporary ultralearners I have encountered, some form of retrieval practice is mentioned. Benjamin Franklin practiced his writing by reconstructing essays from memory. Mary Somerville worked through problems mentally when no candle was available for night reading. Roger Craig practiced trivia questions without looking at the answers. Retrieval is not a sufficient tool to create genius, but it may be a necessary one.

Trying to produce the answer rather than merely reviewing it is only half of a bigger cycle, however. To make retrieval really effective, it helps to know whether the answer you dredged up from your mind was correct. Just as we often avoid testing ourselves until we're ready because struggling with a test is uncomfortable, we often avoid seeking information about our skill level until we think it will be favorable. Being able to process that

information effectively, hearing the message it contains loud and clear, isn't always easy. Yet this is also why it is so important. This brings us to the next principle of ultralearning: feedback.

Chapter 9: Principle 6 Feedback: Don't Dodge the Punches

From a narrow staircase in the back, Chris Rock enters the stage just as his name is being announced. With sold-out shows and HBO specials, Rock is no neophyte to stand-up comedy. His performances feel like a rock concert. With an energetic and punctuated delivery, he's known for repeating the key phrase of a joke like the chorus of a song, the rhythm of it so precise that you get the feeling he would be able to make anything funny. And that's exactly the problem. When everything you do is funny, how do you know what really makes a joke good?

Far from the packed concert halls and jubilant crowds, Rock walks to the mic on the modest brick-backed stage at the Comedy Cellar in Greenwich Village, New York City. In his hand are scraps of cards on which he has scribbled bits of phrases, a trick for working out new material he learned from his grandfather, a cab driver who preached on weekends. Instead of his signature aggressive style, he slumps against the back wall. This is his laboratory, and he's going to perform comedy with the precision of an experiment.

"It's not going to be that good," Rock warns the crowd, who are stunned at his unannounced arrival on the small comedy stage. "Not at these prices," he adds, joking "At these prices, I could leave right now!" He envisions the reviews: "Chris came out and he left. It was good! He didn't tell any jokes—but it was good!" Notes in hand, Rock warns the audience playfully that this isn't going to be a typical Chris Rock performance. Instead, he wants to work out new material under controlled conditions. "They'll give you about six minutes because you're famous," he explains. "... then you're back to square one." He wants to know what's funny, when he's not trying to be funny.¹

Rock's method is not unique. The Comedy Cellar is famous for big-name drop-ins: Dave Chappelle, Jon Stewart, and Amy Schumer are just a few comedians who have tested out their material in front of small crowds here before performing it on prime-time specials and in concert-scale gigs. Why perform at a small club when you can easily draw large crowds and thousands of dollars from a huge performance? Why show up unannounced and then deliberately undersell your own comedic abilities? What Rock and these other famous comedians recognize is the importance of the sixth principle of ultralearning: feedback.

The Power of Information

Feedback is one of the most consistent aspects of the strategy ultralearners use. From the simple feedback of Roger Craig testing himself on Jeopardy! clues without knowing the answer to the uncomfortable feedback of Benny Lewis's approach of walking up to strangers to speak a language he only started learning the day prior, getting feedback was one of the most common tactics of the ultralearners I encountered. What often separated the ultralearning strategy from more conventional approaches was the immediacy, accuracy, and intensity of the feedback being provided. Tristan de Montebello could have taken the normal route of carefully preparing his script and then delivering a speech once every month or two, as is the case for most Toastmasters. Instead he dove straight in, speaking several times per week, jumping among different clubs to gather different perspectives on his performance. This deep dive into feedback was uncomfortable, but the rapid immersion also desensitized him to a lot of the anxiety that being onstage can create.

Feedback features prominently in the research on deliberate practice, a scientific theory of the acquisition of expertise initiated by K. Anders Ericsson and other psychologists. In his studies, Ericsson has found that the ability to gain immediate feedback on one's performance is an essential ingredient in reaching expert levels of performance. No feedback, and the result is often stagnation—long periods of time when you continue to use a skill but don't get any better at it. Sometimes the lack of feedback can even result in declining abilities. Many medical practitioners get worse with more experience as their accumulated knowledge from medical school begins to fade and the accuracy of their diagnoses is not given the rapid feedback that would normally promote further learning.²

Can Feedback Backfire?

The importance of feedback probably isn't too surprising; we all intuitively sense how getting information about what we're doing right and wrong can accelerate learning. More interestingly, the research on feedback shows that more isn't always better. Crucially, what matters is the type of feedback being given.

In a large meta-analysis, Avraham Kluger and Angelo DeNisi looked at hundreds of studies on the impact of providing feedback for learning.³

Though the overall effect of feedback was positive, it's important to note that in over 38 percent of cases, feedback actually had a negative impact. This leads to a confusing situation. On the one hand, feedback is essential for expert attainment, as demonstrated by the scientific studies of deliberate practice. Feedback also figures prominently in ultralearning projects, and it's difficult to imagine their being successful if their sources of feedback had been turned off. At the same time, a review of the evidence doesn't paint the picture of feedback being universally positive. What's the explanation?

Kluger and DeNisi argue that the discrepancy is in the type of feedback that is given. Feedback works well when it provides useful information that can guide future learning. If feedback tells you what you're doing wrong or how to fix it, it can be a potent tool. But feedback often backfires when it is aimed at a person's ego. Praise, a common type of feedback that teachers often use (and students enjoy), is usually harmful to further learning. When feedback steers into evaluations of you as an individual (e.g., "You're so smart!" or "You're lazy"), it usually has a negative impact on learning. Further, even feedback that includes useful information needs to be correctly processed as a motivator and tool for learning. Kluger and DeNisi noted that some of the studies that showed a negative impact of feedback occurred because the subjects themselves chose not to use the feedback constructively. They may have rejected the feedback, lowered the standards they expect from themselves, or given up on the learning task altogether. The researchers note that who is giving the feedback can matter, as feedback coming from a peer or teacher has important social dynamics beyond mere information on how to improve one's abilities.

I find two things interesting about this research. First, it is clear that although informative feedback is beneficial, it can backfire if it is processed inappropriately or if it fails to provide useful information. This means that when seeking feedback, the ultralearner needs to be on guard for two possibilities. The first is overreacting to feedback (both positive and negative) that doesn't offer specific information that leads to improvement.

Ultralearners need to be sensitive to what feedback is actually useful and tune out the rest. This is why, although all the ultralearners I met employed

feedback, they didn't act on every piece of possible feedback. Eric Barone, for instance, did not attend to every comment and critique on early drafts of his game. In many cases he ignored them, when the feedback conflicted with his vision. Second, when it is incorrectly applied, feedback can have a negative impact on motivation. Not only can overly negative feedback lower your motivation, but so can overly positive feedback. Ultralearners must balance both concerns, pushing for the right level of feedback for their current stage of learning. Though we all know (and instinctively avoid) harsh and unhelpful criticism, the research also supports Rock's strategy of disregarding the positive feedback that his celebrity automatically generates. The second interesting point about this research is that it explains why feedback-seeking efforts are often underused and thus remain a potent source of comparative advantage for ultralearners. Feedback is uncomfortable. It can be harsh and discouraging, and it doesn't always feel nice. Standing up on a stage in a comedy club to deliver jokes is probably one of the best ways to get better at stand-up comedy. But the act itself can be terrifying, as an awkward silence cuts deep. Similarly, speaking immediately in a new language can be painful, as the sense of your ability to communicate goes down precipitously from when you use your native tongue.

Fear of feedback often feels more uncomfortable than experiencing the feedback itself. As a result, it is not so much negative feedback on its own that can impede progress but the fear of hearing criticism that causes us to shut down. Sometimes the best action is just to dive straight into the hardest environment, since even if the feedback is very negative initially, it can reduce your fears of getting started on a project and allow you to adjust later if it proves too harsh to be helpful.

All of these acts require self-confidence, resolve, and persistence, which is why many self-directed learning efforts ignore seeking the aggressive feedback that could generate faster results. Instead of going to the source, taking feedback directly, and using that information to learn quickly, people often choose to dodge the punches and avoid a potentially huge source of learning. Ultralearners acquire skills quickly because they seek aggressive feedback when others opt for practice that includes weaker forms of feedback or no feedback at all.

What Kind of Feedback Do You Need?

Feedback shows up in many different forms for different types of learning projects. Getting good at stand-up comedy and learning to write computer programs involve very different kinds of feedback. Learning higher math and learning languages are going to use feedback in different ways. The opportunities for seeking better feedback will vary depending on what you're trying to learn. Rather than try to spell out exactly what feedback you need for your learning project, I think it's important to consider different types of feedback, along with how each one can be used and cultivated. By knowing what kind of feedback you're getting, you can make sure to use it best, while also recognizing its limitations. In particular, I want to consider three types of feedback: outcome feedback, informational feedback, and corrective feedback. Outcome feedback is the most common and in many situations the only type of feedback available. Informational feedback is also fairly common, and it's important to recognize when you can split apart outcomes to get feedback on parts of what you're learning and when feedback only on holistic outcomes is possible. Corrective feedback is the toughest to find but when employed well can accelerate learning the most.

Outcome Feedback: Are You Doing It Wrong?

The first type of feedback, and the least granular, is outcome feedback. This tells you something about how well you're doing overall but offers no ideas as to what you're doing better or worse. This kind of feedback can come in the form of a grade—pass/fail, A, B, or C—or it can come in the form of an aggregate feedback to many decisions you're making simultaneously. The applause Tristan de Montebello received (or the crickets he heard) after a speech is an example of outcome feedback. It could tell him if he was getting better or worse, but it couldn't really say why or how to fix it. Every entrepreneur experiences this kind of feedback when a new product hits the market. It may sell wildly well or abysmally, but that feedback comes in bulk, not directly decomposable into the various aspects of the product. Did the product cost too much? Was the marketing message not clear enough? Was the packaging unappealing? Customer reviews and comments can provide clues, but ultimately the success or failure of any new product is a complex bundle of factors.

This type of feedback is often the easiest to get, and research shows that even getting this feedback, which lacks a specific message about what you need to improve, can be helpful. In one study, feedback for a task involving visual acuity facilitated learning, even when it was delivered in blocks that were too large to get any meaningful information about which responses were correct and which were incorrect.⁴ Many projects that wholly lack feedback can easily be changed to get this broad-scale feedback. Eric Barone, for instance, provided a development blog to publish work on his game and solicit feedback from early drafts. It couldn't provide him with detailed information about what exactly to improve and change, but his simply being immersed in an environment that provided feedback at all was helpful. Outcome feedback can improve how you learn through a few different mechanisms. One is by providing you with a motivational benchmark against your goal. If your goal is to reach a certain quality of feedback, this feedback can give you updates on your progress. Another is that it can show you the relative merits of different methods you're trying. When you are progressing rapidly, you can stick to those learning methods and approaches. When progress stalls, you can see what you might be able to change in your current approach. Although outcome feedback isn't complete, it is often the only kind available and can still have a potent impact on your learning rate.

Informational Feedback: What Are You Doing Wrong?

The next type of feedback is informational feedback. This feedback tells you what you're doing wrong, but it doesn't necessarily tell you how to fix it. Speaking a foreign language with a native speaker who doesn't share a language with you is an exercise in informational feedback. That person's confused stare when you misuse a word won't tell you what the correct word is, but it will tell you that you're getting it wrong. Tristan de Montebello, in addition to the overall assessment of his performance by audience members at the end of a speech, can also get live informational feedback about how it's going moment to moment. Did that joke work? Is my story boring them? This is something you can spot in the distracted glances or background chatter throughout your speech. Rock's stand-up experiment is also a type of informational feedback. He can tell when a certain joke lands or doesn't, based on the reaction of the audience. However, they can't tell him what to do to make it funnier—he's the comedian, not them.

This kind of feedback is easy to obtain when you can get real-time access

to a feedback source. A computer programmer who gets error messages when her programs don't compile properly may not have enough knowledge to understand what she's doing wrong. But as errors increase or diminish, depending on what she does, she can use that signal to fix her problems. Self-provided feedback is also ubiquitous, and in some pursuits it can be almost as good as feedback from others. When painting a picture, you can simply look at it and get a sense of whether your brushstrokes are adding to or detracting from the image you want to convey. Because this kind of feedback often comes from direct interaction with the environment, it often pairs well with the third principle, directness.

Corrective Feedback: How Can You Fix What You're Doing Wrong?

The best kind of feedback to get is corrective feedback. This is the feedback that shows you not only what you're doing wrong but how to fix it. This kind of feedback is often available only through a coach, mentor, or teacher. However, sometimes it can be provided automatically if you are using the right study materials. During the MIT Challenge, I did most of my practice by going back and forth between assignments and their solutions, so that when I finished a problem, I was shown not only whether I had gotten it right or wrong but exactly how my answer differed from the correct one. Similarly, flash cards and other forms of active recall provide corrective feedback by showing you the answer to a question after you make your guess.

The educators Maria Araceli Ruiz-Primo and Susan M. Brookhart argue, "The best feedback is informative and usable by the student(s) who receive it. Optimal feedback indicates the difference between the current state and the desired learning state AND helps students to take a step to improve their learning."⁵

The main challenge of this kind of feedback is that it typically requires access to a teacher, expert, or mentor who can pinpoint your mistakes and correct them for you. However, sometimes the added edge of having corrective over merely informational feedback can be worth the effort needed to find such people. Tristan de Montebello worked with Michael Gendler to help him with his public speaking performance, and that helped him spot subtle weaknesses in his presentations that would have gone unnoticed by himself or by a less experienced audience member giving broader feedback. This type of feedback trumps outcome feedback, which can't indicate what needs improving, and informational feedback, which can indicate what to improve but not how. However, it can also be unreliable. Tristan de Montebello would often get conflicting advice after delivering a speech; some audience members would tell him to slow down, while others said to speed up. This can also be a situation in which paying for a tutor can be useful, because that person can spot the exact nature of your mistake and correct it with less struggle on your part. The self-directed nature of ultralearning shouldn't convince you that learning is best done as an entirely solitary pursuit.

Further Notes on Types of Feedback

A few things are worth noting here. First, you need to be careful when trying to "upgrade" feedback from a weaker form to a stronger form if it's not actually possible. To switch from outcome feedback to informational feedback, you need to be able to elicit feedback on a per element basis of what you're doing. If instead the feedback is being provided as a holistic assessment of everything you're doing, trying to turn it into informational

feedback can backfire. Game designers know to watch out for this, because asking play testers what they don't like about a game can often return spurious results: for example, they don't like the color of the character or the background music. The truth is, the players are evaluating the game holistically, so they often can't offer this kind of feedback. If their responses come from using it as a whole, not from each aspect individually, asking for greater specificity may lead to guesses from those giving feedback. Similarly, corrective feedback requires a "correct" answer or the response of a recognized expert. If there is no expert or a single correct approach, trying to turn informational feedback into corrective feedback can work against you when the wrong change is suggested as an improvement. De Montebello noted to me that the advice most people gave him wasn't terribly useful, but the consistency of it was. If his speech elicited wildly different reactions each time, he knew there was still a lot of work to do. When the speech started to get much more consistent comments, he knew he was onto something. This illustrates that ultralearning isn't simply about maximizing feedback but also knowing when to selectively ignore elements of it to extract the useful information. Understanding the merits of these different types of feedback, as well as the preconditions that make them possible, is a big part of choosing the right strategy for an ultralearning project.

How Quick Should Feedback Be?

An interesting question in the research on feedback is how quick it should be. Should you get immediate information about your mistakes or wait some period of time? In general, research has pointed to immediate feedback being superior in settings outside of the laboratory. James A. Kulik and Chen-Lin C. Kulik review the literature on feedback timing and suggest that "Applied studies using actual classroom quizzes and real learning materials have usually found immediate feedback to be more effective than delay."⁶ Expertise researcher K. Anders Ericsson agrees, arguing in favor of immediate feedback when it assists in identifying and correcting mistakes and when it allows one to execute a corrected version of their performance revised in response to the feedback.⁷

Interestingly, laboratory studies tend to show that delaying the presentation of the correct response along with the original task (delayed feedback) is more effective. The simplest explanation of this result is that presenting the question and answer again offers a second, spaced exposure to the information. If this explanation were correct, all it would mean is that that immediate feedback is best paired with delayed review (or further testing) to strengthen your memory compared with a single exposure. I'll cover more on spacing and how it impacts your memory in the next chapter on retention. Despite the superficially mixed results on the timing of feedback from the scientific literature, I generally recommend faster feedback. This enables a quicker recognition of mistakes. However, there's a possible risk that this recommendation might backslide into getting feedback before you've tried your best to answer the question or solve the problem at hand. Early studies on feedback timing tended to show a neutral or negative impact of immediate feedback on learning. In those studies, however, experimenters often gave subjects the ability to see the correct answer before subjects had finished filling out the prompt.⁸ That meant subjects could often copy the correct answer rather than try to retrieve it. Feedback too soon may turn your retrieval practice effectively into passive review, which we already know is less effective for learning. For hard problems, I suggest setting yourself a

timer to encourage you to think hard on difficult problems before giving up to look at the correct answer.

How to Improve Your Feedback

By now you see the importance of feedback to your learning efforts. I've explained why feedback, especially when delivered to others, can sometimes backfire. I've also showed how the three types—outcome, informational, and corrective—have different strengths and the preconditions that need to be in place in order to make them effective. Now I want to focus on some concrete tactics you can apply to get better feedback.

Tactic 1: Noise Cancellation

Anytime you receive feedback, there are going to be both a signal—the useful information you want to process—and noise. Noise is caused by random factors, which you shouldn't overreact to when trying to improve. Say you're writing articles that you post online, trying to improve your writing ability. Most of them won't attract much attention, and when they do, it's often because of factors outside of your control; for example, just the right person happens to share it, causing it to spill across social networks. The quality of your writing does drive these factors, but there's enough randomness that you need to be careful not to change your entire approach based on one data point. Noise is a real problem when trying to improve your craft because you need to do far more work to get the same information about how to write well. By modifying and selecting the streams of feedback you pay attention to, you can reduce the noise and get more of the signal.

A noise-cancelling technique used in audio processing is filtering. Sound engineers know that human speech tends to fall within a particular range of frequencies, whereas white noise is all over the spectrum. They can boost the signal, therefore, by amplifying the frequencies that occur in human speech and quieting everything else. One way to do this is to look for proxy signals. These don't exactly equal success, but they tend to eliminate some of the noisy data. For blog writing, one way to do so would be to use tracking code to figure out what percentage of people read your articles all the way to the end. This doesn't prove your writing is good, but it's a lot less noisy than raw traffic data.

Tactic 2: Hitting the Difficulty Sweet Spot

Feedback is information. More information equals more opportunities to learn. A scientific measure of information is based on how easily you can predict what message it will contain. If you know that success is guaranteed, the feedback itself provides no information; you knew it would go well all along. Good feedback does the opposite. It is very hard to predict and thus gives more information each time you receive it.

The main way this impacts your learning is through the difficulty you're facing. Many people intuitively avoid constant failure, because the feedback it offers isn't always helpful. However, the opposite problem, of being too successful, is more pervasive. Ultralearners carefully adjust their environment so that they're not able to predict whether they'll succeed or fail. If they fail too often, they simplify the problem so they can start noticing when they're doing things right. If they fail too little, they'll make the task harder or their standards stricter so that they can distinguish the success of different approaches. Basically, you should try to avoid situations that always make you feel good (or bad) about your performance.

Tactic 3: Metafeedback

Typical feedback is performance assessment: your grade on a quiz tells you

something about how well you know the material. However, there's another type of feedback that's perhaps even more useful: metafeedback. This kind of feedback isn't about your performance but about evaluating the overall success of the strategy you're using to learn.

One important type of metafeedback is your learning rate. This gives you information about how fast you're learning, or at least how fast you're improving in one aspect of your skill. Chess players might track their Elo ratings growth. LSAT studiers might track their improvements on mock exams. Language learners might track vocabulary learned or errors made when writing or speaking. There are two ways you can use this tool. One is to decide when you should focus on the strategy you're already using and when you should experiment with other methods. If your learning rate is slowing to a trickle, that might mean you're hitting diminishing returns with your current approach and could benefit from different kinds of drills, difficulties, or environments. A second way you can apply metafeedback is by comparing two different study methods to see which works better. During the MIT Challenge, I'd often split up questions from different subtopics before testing myself on an exam and try different approaches side by side. Does it work better to dive straight into trying to answer questions or to spend a little time to try to see that you understand the main concepts first? The only way you can know is to test your own learning rates.

Tactic 4: High-Intensity, Rapid Feedback

Sometimes the easiest way to improve feedback is simply to get a lot more of it a lot more often. This is particularly true when the default mode of learning involves little or infrequent feedback. De Montebello's strategy of improving public speaking relied largely on getting far more frequent exposure to the stage than most speakers do. Lewis's language immersion exposes him to information about his pronunciation at a point when most students still haven't uttered a word. High-intensity, rapid feedback offers informational advantages, but more often the advantage is emotional, too. Fear of receiving feedback can often hold you back more than anything. By throwing yourself into a high-intensity, rapid feedback situation, you may initially feel uncomfortable, but you'll get over that initial aversion much faster than if you wait months or years before getting feedback.

Being in such a situation also provokes you to engage in learning more aggressively than you might otherwise. Knowing that your work will be evaluated is an incredible motivator to do your best. This motivational angle for committing to high-intensity feedback may end up outweighing the informational advantage it provides.

Beyond Feedback

Receiving feedback isn't always easy. If you process it as a message about your ego rather than your skills, it's easy to let a punch become a knockout. Though carefully controlling the feedback environment so it is maximally encouraging may be a tantalizing option, real life rarely affords such an opportunity. Instead, it's better to get in and take the punches early so that they don't put you down for the count. Though short-term feedback can be stressful, once you get into the habit of receiving it, it becomes easier to process without overreacting emotionally. Ultralearners use this to their advantage, exposing themselves to massive amounts of feedback so that the noise can be stripped away from the signal.

Feedback and the information it provides, however, is useful only if you remember the lessons it teaches. Forgetting is human nature, so it is not

enough to learn; you also need to make the information stick. This brings us to the next principle of ultralearning, retention, in which we'll discuss strategies that will ensure the lessons you learn aren't forgotten.

Chapter 10- Principle 7: Retention: Don't Fill A Leaky Bucket

In the small Belgian city of Louvain-la-Neuve, Nigel Richards has just won the World Scrabble Championships. On its own, this isn't too surprising. Richards has won a championship three times before, and both his prowess with the game and his mysterious personality have made him something of a legend in competitive Scrabble circles. This time, however, is different: instead of the original English-language version of the famous crossword game, Richards has won the French World Championship. This is a much harder feat: most English dictionary versions have roughly 200,000 valid word entries; French, with its gendered nouns and adjectives and copious conjugations, has nearly double that with around 386,000 valid word forms.¹ To pull off such a feat is quite remarkable, even more so due to one simple fact: Richards doesn't speak French.

Richards, an engineer born and raised in Christchurch, New Zealand, is an unusual character. With his long beard and retro aviator sunglasses, he looks like a cross between Gandalf and Napoleon Dynamite. His skills at Scrabble, however, are no joke. A late starter to the game, his mother encouraged him to start in his late twenties, saying "Nigel, since you're no good at words, you won't be good at this game, but it will keep you occupied."² From those inauspicious beginnings Richards has gone on to dominate the competitive Scrabble scene. Some people even argue that he may be the greatest player of all time.

In case you've been living under a rock, Scrabble is based on forming crosswords. Each player has seven letter tiles, drawn from a bag, with which to form words. The catch is that the words must link up with the words already on the board. To be a good player requires a voluminous memory, not only of the words we use every day but of obscure words that are useful because of their length or the letters they contain. A decent casual player quickly learns all the valid two-letter words, including unusual ones such as "AA" (a type of lava) and "OE" (a windstorm in the Faroe Islands). To perform at tournament level, however, requires memorizing nearly all of the short words, as well as longer seven- and eight-letter words, since if a player uses up all seven tiles in one turn, there is an extra fifty-point bonus (or "bingo," in Scrabble jargon). Memory, however, isn't the only skill needed. Like other competitive games, tournament Scrabble uses a timing system, so skilled players must not only be able to construct valid words from a scrambled set of tiles but quickly find spaces and calculate which words will score the most points. In this regard, Richards is a master: given the tiles CDHLRN and one blank (which can be used for any letter), Richards ignored the obvious CHILDREN and instead linked up multiple crosswords to make the even higher scoring CHLORODYNE.

Richards's virtuosity is only intensified by the mystery that surrounds it. He is quiet and mostly keeps to himself. He refuses all interviews with reporters and seems completely uninterested in fame, fortune, or even providing explanations for how he does it. A fellow competitor, Bob Felt, bumping into Richards at a tournament noted his monklike serenity, telling him "When I see you, I can never tell whether you've won or lost." "That's because I don't care" was Richard's monotone response.³ Even his competing in Belgium, which briefly pulled him into the international media spotlight, was done as an excuse to do a cycling trip through Europe. In fact, prior to his victory, he had spent only nine weeks preparing. After he beat a

Francophone player, Schelick Ilagou Rekawe from Gabon, in the final match, he was given a standing ovation but needed a translator to thank the audience. What Is Nigel Richards's Secret?

The more I read about Nigel Richards, the more intrigued I became. Richards was as mysterious as he was incredible in his mnemonic abilities. He steadfastly ignores opportunities for interviews and is famously laconic in descriptions of his methods. After his victory in Louvain-la-Neuve, one reporter asked him if he had any special methods for memorizing all those words. "No" was Richards's monosyllabic response. Still, even if he wouldn't divulge his strategies publicly, perhaps some digging could reveal clues.

The first thing I discovered was that although Richards's victory in Belgium was astounding, it wasn't entirely without precedent. Other players of the game have won World Championships without being fluent in the language of competition. Scrabble is particularly popular in Thailand, for instance, and two former world champions, Panupol Sujjayakorn and Pakorn Nemitrmansuk, are not fluent in English. The reason is simple: remembering words in one's native language and remembering words in Scrabble are different mnemonic feats. In spoken language, the meaning of a word, its pronunciation, and its feel are important. In Scrabble, those things don't matter; words are just combinations of letters. Richards could win at French Scrabble without speaking French because the game wasn't much different from English; he just had to memorize different patterns of letters. A native speaker has an advantage, of course, since many spellings will already be familiar. But there will still be a large number of arcane and unfamiliar words to memorize, and the skill of rearranging the letters into valid board positions and calculating to achieve maximal points remains the same in every language in which Scrabble can be played.

The next piece of the puzzle I discovered was that Scrabble, it turns out, isn't the only activity in which Richards possesses a strange intensity. His other love is cycling. Indeed, in an early tournament in Dunedin, New Zealand, he got onto his bicycle after work finished, pedaled through the night from Christchurch to Dunedin, a distance of over two hundred miles, without sleeping, and started the tournament first thing in the morning. After he won, competitors he met at the tournament offered to give him a ride home. He politely declined, preferring to bicycle back the entire way home to Christchurch for another sleepless night before starting work again Monday morning.⁴ At first that felt like just another odd quirk in his profile, like his home-done haircuts and reluctance to be interviewed. Now, though, I believe it may hold some keys to unlocking some of his mystery.

Cycling, of course, isn't a great mnemonic technique. If it were, Lance Armstrong would have been a fierce contender. However, it does illustrate a common theme in Richards's personality that overlaps with that of other ultralearners I have encountered: an obsessive intensity that exceeds what is considered a normal investment of effort. Richards's cycling, it turns out, also lines up well with the only other clues I've been able to uncover about his methods: he reads lists; long lists of words, starting with two-letter words and then moving up. "The cycling helps," he explains, "I can go through lists in my mind."⁵ He reads the dictionary, focusing exclusively on combinations of letters, ignoring definitions, tenses, and plurals. Then, drawing from memory, he repeats them over and over again as he cycles for hours. This aspect also corresponds with a method that is common to other ultralearners

and that has shown up in other principles of learning so far: active recall and rehearsal. By retrieving words, Richards likely takes his already impressive memory and makes it unassailable through active practice.

There are other clues about Richards's performance: he focuses on memory, not anagramming (rearranging the tiles to create words); he works forward and backward, starting from small words, going on to big ones and back again; he claims to recall the words visually, as he cannot remember words when they're spoken. All of these clues provide glimpses into Richards's mind, but they leave out even more than they reveal. How many times does he have to read the words from his list before he can rehearse it mentally? Are the words organized in some way or just listed alphabetically? Is he a savant with exceptional abilities and lower-than-normal general intelligence or an all-round genius for whom memorizing Scrabble words is just one of many impressive abilities? Maybe his intelligence is quite average and his dominance in Scrabble represents his extreme dedication to the game. We might never know the answers to those questions.

I certainly can't rule out the theory that Richards's mind is simply hardwired differently or better for memory than my own. After all, nothing I've encountered so far about his method is so boldly original that serious Scrabble players would be unaware of it. Yet Richards has completely dominated his competition. Part of me suspects that his intense, obsessive personality, which enables him to cycle for hours reviewing lists mentally, might also form at least a partial explanation. Whatever gifts he might possess, he also seems to possess the ultralearner ethos I've described thus far in the book. For whatever it is worth, Richards himself argues for more of the latter than the former: "It's hard work, you have to have dedication to learn,"⁶ elsewhere adding "I'm not sure there is a secret, it's just a matter of learning the words."⁷

Scrabble words may not be important to your life. However, memory is essential to learning things well. Programmers must remember the syntax for the commands in their code. Accountants need to memorize ratios, rules, and regulations. Lawyers must remember precedents and statutes. Doctors need to know tens of thousands of factoids, from anatomical descriptions to drug interactions. Memory is essential, even when it is wrapped up in bigger ideas such as understanding, intuition, or practical skill. Being able to understand how something works or how to perform a particular technique is useless if you cannot recall it. Retention depends on employing strategies so the things you learn don't leak out of your mind. Before discussing strategies of retention, however, let's take a look at why remembering things is so difficult.

Why Is It So Hard to Remember Things?

Richards is an extreme case, but his story nonetheless illustrates many themes that are important for anyone who wants to learn something: How can you retain all of the things you learn? How can you defend against forgetting hard-won facts and skills? How can you store the knowledge you've acquired so that it can be easily retrieved exactly when you need it? In order to understand learning, you need to understand how and why you forget. Losing access to previously learned knowledge has been a perennial problem for educators, students, and psychologists. Fading knowledge impacts the work you do as well. One study reported that doctors give worse medical care the longer they have worked, as their stored knowledge from medical school is gradually forgotten, despite their working in the profession

full-time. Quoting from the original abstract:

Physicians with more experience are generally believed to have accumulated knowledge and

skills during years in practice and therefore to deliver high-quality care. However, evidence suggests that there is an inverse relationship between the number of years that a physician has

been in practice and the quality of care that the physician provides.⁸

Hermann Ebbinghaus, in one of the first psychological experiments in history, spent years memorizing nonsense syllables, much in the same way

Richards memorizes Scrabble words, and carefully tracking his ability to recall them later. From this original research, later verified by more

experimentally robust studies, Ebbinghaus discovered the forgetting curve.

This curve shows that we tend to forget things incredibly quickly after learning them, there being an exponential decay in knowledge, which is steepest right after learning. However, Ebbinghaus noted, this forgetting tapers off, and the amount of knowledge forgotten lessens over time. Our minds are a leaky bucket; however, most of the holes are near the top, so the water that remains at the bottom leaks out more slowly.

Over the intervening years, psychologists have identified at least three dominant theories to help explain why our brains forget much of what we initially learn: decay, interference, and forgotten cues. Though the jury is still out on the exact mechanism underlying human long-term memory, these three ideas likely form some part of explaining why we tend to forget things and, conversely, provide insight into how we might better retain what we've learned.

Decay: Forgetting with Time

The first theory of forgetting is that memories simply decay with time. This idea does seem to match common sense. We remember events, news, and things learned in the past week much more clearly than things from last month. Things learned this year are recalled with much greater accuracy than events from a decade ago. By this understanding, forgetting is simply an inevitable erosion by time. Like sands in an hourglass, our memories inexorably slip away from us as we become more distant from them.

There are flaws with this theory being the complete explanation, however.

Many of us can vividly recall events from early childhood, even if we can't remember what we ate for breakfast last Tuesday. There also seem to be patterns in which things are remembered and which are forgotten that go beyond the time since they were originally learned: vivid, meaningful things are more easily recalled than banal or arbitrary information. Even if there is a component to our forgetting that is simply decay, it seems exceedingly unlikely that this is the only factor.

Interference: Overwriting Old Memories with New Ones

Interference suggests a different idea: that our memories, unlike the files of a computer, overlap one another in how they are stored in the brain. In this way, memories that are similar but distinct can compete with one another. If you're learning programming, for instance, you may learn what a for loop is and remember it in terms of doing something repeatedly. Later, you may learn about while loops, recursion, repeat-until loops, and go-to statements. Now, each of these has to do with doing something repeatedly, but in different ways, so they may interfere with your ability to remember correctly what a for loop does. There are at least two flavors of this: proactive

interference and retroactive interference. Proactive interference occurs when previously learned information makes acquiring new knowledge harder. Think of this as if the “space” where that information wants to be stored is already occupied, so forming the new memory becomes harder. This can happen when you want to learn the definition of a word but have difficulty because that word already has a different association in your mind. Consider trying to learn the concept of negative reinforcement in psychology—here the word “negative” has the meaning “absent,” as opposed to “bad,” so negative reinforcement is when you encourage a behavior by removing something, say a painful stimulus. However, since the earlier meaning of negative as “bad” already exists, you may have difficulty remembering this and it becomes easy to incorrectly equate negative reinforcement with punishment. Retroactive interference is the opposite—where learning something new “erases” or suppresses an old memory. Anyone who has learned Spanish and later tried to learn French knows how tricky retroactive interference can be, as French words pop out when you want to speak Spanish again.

Forgotten Cues: A Locked Box with No Key

The third theory of forgetting says that many memories we have aren't actually forgotten but simply inaccessible. The idea here is that in order to say that one has remembered something, it needs to be retrieved from memory. Since we aren't constantly experiencing the entirety of our longterm memories simultaneously, this means there must be some process for dredging up the information, given an appropriate cue. What may happen in this case is that one of the links in the chain of retrieving the information has been severed (perhaps by decay or interference) and therefore the entire memory has become inaccessible. However, if that cue were restored, or if an alternative path to the information could be found, we would remember much more than is currently accessible to us.

This explanation also has some advantages. Intuitively it seems to be somewhat true, as we all know the tip-of-the-tongue experience, when we feel as though we should be able to remember a fact or word but we're not able to summon it up immediately. It might also suggest that relearning things is much faster than learning them initially, because relearning is closer to repair work, while original learning is a completely new construction.

Forgetting cues seems highly likely as a partial, if not complete, explanation of forgetting many things.

Cue forgetting as a complete explanation for our memory woes isn't without its problems, however. Many memory researchers now believe that the act of remembering is not a passive process. In recalling facts, events, or knowledge, we're engaging in a creative process of reconstruction. The memories themselves are often modified, enhanced, or manipulated in the process of remembering. It may be, then, that “lost” memories that are retrieved through new cues are actually fabrications. This seems especially likely in the case of “recovered” witness testimony from traumatic events, as experiments have shown that even highly vivid memories that feel completely authentic to the subject can be untrue.⁹

How Can You Prevent Forgetting?

Forgetting is the default, not the exception, so the ultralearners I encountered had devised various strategies for coping with this fact of life. These methods roughly divide into tackling two similar but different problems. The first set of methods deals with the problem of retention while undertaking the ultralearning project: How can you retain the things you learned the first

week, so that you don't need to relearn them by the last week? This is particularly important for memory-intensive ultralearning efforts such as Benny Lewis's language learning and Roger Craig's Jeopardy! trivia mastery. In these domains and many others, the volume of information to be learned is often so large that the forgetting becomes a practical obstacle almost immediately. The second set of methods, in contrast, has to do with the longevity of the skills and knowledge acquired after the project has been completed: Once a language has been learned to a level you're satisfied with, how can you keep yourself from forgetting it completely a couple years later? The ultralearners I encountered had devised differing methods for dealing with these two problems, which varied in effort and intensity. Some, like Craig, preferred elaborate electronic systems that can optimize memory with fancy algorithms, leaving little waste and inefficiency, if at the cost of introducing greater complexity. Others, like Richards, seem to prefer basic systems that succeed on their simplicity.

You need to pick a mnemonic system, which will both accomplish your goals and be simple enough to stick to. During intense periods of language learning, the sheer volume of vocabulary often meant that spaced-repetition systems were helpful for me. Other times, I preferred having conversations to maintain my speaking ability, even though this method is not quite as precise. With other subjects, I'm happier to allow for some degree of forgetting as long as I practice the skills I need to use continuously and have the ability to relearn.

My approaches may not reach a theoretical ideal, but they may end up working better because they have fewer possibilities for error and can be sustained more easily. Regardless of the exact system used, however, all systems seemed to work according to one of four mechanisms: spacing, proceduralization, overlearning, or mnemonics. Let's look at each of these mechanisms of retention first, in order to make sense of the quite different and idiosyncratic manifestations used in different ultralearning projects.

Memory Mechanism 1—Spacing: Repeat to Remember

One of the pieces of studying advice that is best supported by research is that if you care about long-term retention, don't cram. Spreading learning sessions over more intervals over longer periods of time tends to cause somewhat lower performance in the short run (because there is a chance for forgetting between intervals) but much better performance in the long run. This was something I needed to be careful about during the MIT Challenge. After my first few classes, I switched from doing one class at a time to doing a few in parallel, to minimize the impact that the crammed study time would have on my memory.

If you have ten hours to learn something, therefore, it makes more sense to spend ten days studying one hour each than to spend ten hours studying in one burst. Obviously, however, if the amount of time between study intervals gets longer and longer, the short-term effects start to outweigh the long-term ones. If you learn something with a decade separating study intervals, it's quite possible that you'll completely forget whatever you had learned before you reach the second session.

Finding the exact trade-off point between too long and too short has been a minor obsession for some ultralearners. Space your study sessions too closely, and you lose efficiency; space them too far apart, and you forget what you've already learned. This has led many ultralearners to apply what are known as spaced-repetition systems (SRS) as a tool for trying to retain the

most knowledge with the least effort. SRS was a major force behind Roger Craig's Jeopardy! trivia memorization, and I used the systems extensively when learning Chinese and Korean. Although you may not have heard of this term, the general principle is the backbone of many language-learning products, including Pimsleur, Memrise, and Duolingo. These programs tend to hide the spacing algorithm in the background, so you don't need to bother yourself with it. However, other programs, such as the open-source Anki, are the preferred tool of more extreme ultralearners who want to squeeze out a little more performance.

SRS is an amazing tool, but it tends to have quite focused applications. Learning facts, trivia, vocabulary words, or definitions is ideally suited for flash card software, which presents knowledge in terms of a question with a single answer. It's more difficult to apply to more complicated domains of knowledge, which rely on complex information associations that are built up only through real-world practice. Still, for some tasks, the bottleneck of memory is so tight that SRS is a powerful tool for widening it, even if there are some drawbacks. The authors of a popular study guide for medical students center their approach around SRS, because a medical student must remember so many things and the default strategy of forgetting and relearning is quite costly in terms of time.¹⁰

Spacing does not require complex software, however. As Richards's story clearly demonstrates, simply printing lists of words, reading them over, and then rehearsing them mentally without having them in front of you is an incredibly powerful technique. Similarly, semiregular practice of a skill is often quite helpful. After my year of learning languages, I wanted to ensure that I didn't forget them. My approach was fairly simple: schedule thirty minutes of conversation practice once a week, to be done over Skype using italki, an online service for tutoring and language exchange partners all over the world. I maintained this for one year, after which I dropped to once-permonth practice for another two years. I don't know whether this practice schedule was ideal, and I had other opportunities to practice that came up spontaneously in that time period that also helped, but I believe it was much better than doing nothing and letting the skills atrophy. When it comes to retention, don't let perfect become the enemy of good enough.

Another strategy for applying spacing, which can work better for more elaborate skills that are harder to integrate into your daily habits, is to semiregularly do refresher projects. I leaned toward this approach for the things I learned during the MIT Challenge, since the skill I wanted most to retain was writing code, which is tricky to do on only half an hour per week. This approach has the disadvantage of sometimes deviating quite a lot from optimal spacing; however, if you're prepared to do a little bit of relearning to compensate, it can still be a better approach than completely giving up practice. Scheduling this kind of maintenance in advance can also be helpful, as it will remind you that learning isn't something done once and then ignored but a process that continues for your entire life.

Memory Mechanism 2—Proceduralization: Automatic Will Endure

Why do people say it's "like riding a bicycle" and not "like remembering trigonometry?" This common expression may be rooted in deeper neurological realities than it first appears. There's evidence that procedural skills, such as riding a bicycle, are stored in a different way from declarative knowledge, such as knowing the Pythagorean Theorem or the Sine Rule for

triangles. This difference between knowing how and knowing that may also have different implications for long-term memory. Procedural skills, such as the ever-remembered bicycling, are much less susceptible to being forgotten than knowledge that requires explicit recall to retrieve.¹¹

This finding can actually be used to our advantage. One dominant theory of learning suggests that most skills proceed through stages—starting declarative but ending up procedural as you practice more. A perfect example of this declarative-to-procedural transition is typewriting. When you start typing on a keyboard, you must memorize the positions of the letters. Each time you want to type a word, you have to think in terms of its letters, recall each one's position on the keyboard, and then move your finger to that spot to press it. This process may fail; you may forget where a key is and need to look down to type it. However, if you practice more and more, you stop having to look down. Eventually you stop having to think about the letters' positions or how to move your fingers to meet them. You may even reach a point where you don't think of letters at all and whole words come out at a time. Such procedural knowledge is quite robust and tends to be retained much longer than declarative knowledge. A quick observation is enough to verify this: when you've gotten really good at typing and someone asks you to quickly say where on a keyboard the letter w is, you might need to actually put your hands in the keyboard position (or imagine you're doing so) and pretend to type the w to say definitively. This is exactly what happened to me as I was typing out this paragraph. What has happened is that what was originally the primary access point to knowledge, your explicit memory of the key location, has faded away and now needs to be recalled with the more durable procedural knowledge encoded in your motor movements. If you've ever had to enter a password or pin code you use often, you may be in a similar position, where you remember it by feel and not by its explicit combination of numbers and letters.

Because of the fact that procedural knowledge is stored for longer, this may suggest a useful heuristic. Instead of learning a large volume of knowledge or skills evenly, you may emphasize a core set of information much more frequently, so that it becomes procedural and is stored far longer. This was an unintentional side effect of my friend's and my language learning project. Being forced to speak a language constantly meant that a core set of phrases and patterns was repeated so often that neither of us will ever forget them. This may not hold true for a bunch of less frequently used words or phrases, but the starting points of conversations are nearly impossible to forget. The classic approach to language studies, in which students "move on" from beginner words and grammatical patterns to more complicated ones may sidestep this, so that those core patterns aren't sticky enough to last for years without repeated practice.

Failing to fully proceduralize core skills was a major flaw of my first major self-education effort, the MIT Challenge, which I was able to improve upon in my subsequent language-learning and portrait-drawing projects. Whereas the MIT Challenge did have core mathematical and programming skills that were often repeated, what ended up being proceduralized was more haphazard rather than reflecting a conscious decision to automate the most essential skills of applying computer science.

Most skills we learn are incompletely proceduralized. We may be able to do some of them automatically, but other parts require us to actively search our minds. You might, for instance, be able to easily move variables from

one side of an equation to the other in algebra without thinking. But you may have to think a bit more when exponents or trigonometry is involved.

Perhaps, owing to their nature, some skills cannot be completely automated and will always require some conscious thought. This creates an interesting mix of knowledge, with some things retained quite stably over longer periods of time and others susceptible to being forgotten. One strategy for applying this concept might be to ensure that a certain amount of knowledge is completely proceduralized before practice concludes. Another approach might be to spend extra effort to proceduralize some skills, which will serve as cues or access points for other knowledge. You may aim to completely proceduralize the process you use to start working on a new programming project, for example, so that you can get over that hump in the process of writing a new program. These strategies are somewhat speculative, but I think there are lots of potential ways the declarative-to-procedural transition of knowledge might be applied by clever ultralearners in the future.

Memory Mechanism 3—Overlearning: Practice Beyond Perfect

Overlearning is a well-studied psychological phenomenon that's fairly easy to understand: additional practice, beyond what is required to perform adequately, can increase the length of time that memories are stored.¹² The typical experimental setup is to give subjects a task, such as assembling a rifle or going through an emergency checklist, allowing them enough time to practice that they can do it correctly once. The time from zero to this point is considered the “learning” phase. Next, allow the subjects different amounts of “overlearning,” or practice that continues after the first correct application. Since subjects are already doing the skill correctly, performance doesn't improve past this point. However, the overlearning can extend the durability of the skill.

In the typical setting in which overlearning has been studied, the duration of the overlearning effects tends to be quite short; practicing a little longer in one session produces an additional week or two of recall. This may imply that overlearning is primarily a short-term phenomenon: something useful for skills like first aid or emergency response protocols, which are rarely practiced but need to be kept fresh in between regular training sessions. I suspect, however, that overlearning might have longer-term implications if it is combined with spacing and proceduralization over much longer projects. In my own personal experience drawing portraits, for instance, the thought process used for mapping out the facial features I learned from Vitruvian Studio was repeated so many times that it's hard to forget, even though my major practice time was only during one month. Similarly, certain reflexes of programming or mathematics I can still easily recall from my MIT Challenge days, even without practice in the interim, because they happened to be patterns that were repeated far more than was necessary to perform them adequately at the time (because they were components of more elaborate problems).

Overlearning dovetails nicely with the principle of directness. Because direct use of a skill frequently involves overpracticing certain core abilities, that kernel is usually quite resistant to forgetting, even years later. In contrast, academically learned subjects tend to distribute practice more evenly to cover the entire curriculum to a minimum level of competency in each area, regardless of the centrality of subtopics to practical applications. Many people I've known who have learned a language that I also speak but who

learned it through years of formal schooling have much more impressive vocabularies or knowledge of grammatical nuances than I do. However, those same people may trip over fairly basic phrases, because they learned every fact and skill evenly, rather than overlearning the smaller subset of very common patterns.

There seem to be two main methods I've encountered for applying overlearning. The first is core practice, continually practicing and refining the core elements of a skill. This approach often works well paired with some kind of immersion or working on extensive (as opposed to intensive) projects, after the initial ultralearning phase has been completed. The shift from learning to doing here may actually involve a deeper, subtler form of learning, which shouldn't be discounted as simply applying previously learned knowledge.

The second strategy is advanced practice, going one level above a certain set of skills so that core parts of the lower-level skills are overlearned as one applies them in a more difficult domain. One study of algebra students demonstrated this second strategy.¹³ Most students who had taken an algebra class and were retested years later had forgotten huge amounts of what they had learned. This could have been either because the information was truly lost or simply because forgotten cues rendered the majority of it inaccessible. Interestingly, this rate of forgetting was the same for better- and poorer-performing students; better students retained more than weaker ones, but the rate at which they had forgotten was the same. One group, however, did not show such a steep decline in forgetting: those who had taken calculus. This suggests that moving up a level to a more advanced skill enabled the earlier skill to be overlearned, thus preventing some forgetting.

Memory Mechanism 4—Mnemonics: A Picture Retains a Thousand Words

The final tool common to many ultralearners I encountered was mnemonics. There are many mnemonic strategies, and covering them all is outside the scope of this book. What they have in common is that they tend to be hyperspecific—that is, they are designed to remember very specific patterns of information. Second, they usually involve translating abstract or arbitrary information into vivid pictures or spatial maps. When mnemonics work, the results can be almost difficult to believe. Rajveer Meena, the Guinness World Record holder for memorizing digits of the mathematical constant pi, knows the number to 70,000 decimal places.¹⁴ Master mnemonicists, who compete in championships of memory, can memorize the order of a deck of cards in under sixty seconds and can repeat a poem verbatim after only a minute or two of studying. These feats are quite impressive, and even better, they can be learned by anyone patient enough to apply them. How do they work? One common, and useful, mnemonic is known as the keyword method. The method works by first taking a foreign-language word and converting it into something it sounds like in your native language. If I were doing this with French, for example, I might take the word *chavirer* (to capsize) and convert it into “shave an ear,” to which it is close enough in sound for the latter to serve as an effective cue for recalling the original word. Next I create a mental image that combines the sounds-like version of the foreign word and an image of its translation in a fantastical and vivid setting that is bizarre and hard to forget. In this case, I could imagine a giant ear shaving a long beard while sitting in a boat that capsizes. Then, whenever I need to remember what “capsize” is in French, I think of capsizing, recall my elaborate picture, which

links to “shaving an ear” and thus . . . chavirer. This process sounds needlessly complicated and elaborate at first, but it benefits from converting a difficult association (between arbitrary sounds and a new meaning) into a few links that are much easier to associate and remember. With practice, each conversion of this type may take only fifteen to twenty seconds, and it really does help with remembering foreign-language words. This particular kind of mnemonic works for this purpose, but there are others that work for remembering lists, numbers, maps, or sequences of steps in a procedure. For a good introduction to this topic, I highly recommend Joshua Foer’s book *Moonwalking with Einstein: The Art and Science of Remembering Everything*.

Mnemonics work well, and with practice, anyone can do them. Why, then, are they not front and center in this chapter, instead of at the end? I believe that mnemonics, like SRS, are incredibly powerful tools. And as tools, they can open new possibilities for people who are not familiar with them. However, as someone who has spent much time exploring them and applying them to real-world learning, their applications are quite a bit narrower than they first appear, and in many real-world settings they simply aren’t worth the hassle.

I believe there are two disadvantages to mnemonics. The first is that the most impressive mnemonics systems (like the one for memorizing thousands of digits of the mathematical constant pi), also require a considerable up-front investment. After you’re done, you can memorize digits easily, but this isn’t actually a very useful task. Most of our society adapts around the fact that people generally cannot memorize digits, so we have paper and computers do it for us. The second disadvantage is that recalling from mnemonics is often not as automatic as directly remembering something. Knowing a mnemonic for a foreign-language word is better than failing to remember it entirely, but it’s still too slow to allow you to fluently form sentences out of mnemonically remembered words. Thus mnemonics can act as a bridge for difficult-to-remember information, but it’s usually not the final step in creating memories that will endure forever.

Mnemonics, therefore, are an incredibly powerful if somewhat brittle tool. If you are doing a task that requires memorizing highly dense information in a very specific format, especially if the information is going to be used over a few weeks or months, they can enable you to do things with your mind that you might not have thought possible. Alternatively, they can be used as an intermediate strategy to smooth initial information acquisition when the information is quite dense. I’ve found them useful for language learning and terminology, and, paired with SRS, they can form an effective bridge from feeling as though there’s no way you can possibly remember everything to remembering it so deeply that you can’t possibly forget. Indeed, in a world before paper, computers, and other externalized memories, mnemonics were the main game in town. However, in the modern world, which has developed excellent coping mechanisms for the fact that most people cannot remember things as a computer can, I feel that mnemonics tend to serve more as cool tricks than as a foundation you should base your learning efforts on. Still, there is a devoted subset of ultralearners who are fiercely committed to applying these techniques, so my word shouldn’t be the final verdict.

Winning the War Against Forgetting

To retain knowledge is ultimately to combat the inevitable human tendency to forget. This process occurs in all of us, and there’s no way to avoid it

completely. However, certain strategies—spacing, proceduralization, overlearning, and mnemonics—can counteract your short- and long-term rates of forgetting and end up making a huge difference in your memorization.

I opened this chapter by discussing Nigel Richards's mysterious Scrabble mastery. How he is able to recall so many words so quickly and see them in a set of scrambled tiles will likely remain an enigma. What we do know about him fits the picture of other ultralearners who have dominated memory-intensive subjects: active recall, spaced rehearsal, and an obsessive commitment to intense practice. Whether you or I have the will to go as far as Richards does is an open question, but with hard work and a good strategy, it seems likely to me that the battle against forgetting need not be a losing one. Though Richards's Scrabble practice may give him the benefit of memorizing words he doesn't know the meaning of, real life tends to reward a different kind of memory: one that integrates knowledge into a deep understanding of things. In the next principle, we'll look at going from memory to intuition.

Chapter 11: Principle 8: Intuition: Dig Deep Before Building Up

To the world, he was an eccentric professor and Nobel Prize–winning physicist; to his biographer, he was a genius; but to those who knew him, Richard Feynman was a magician. His colleague the mathematician Mark Kac once posited that the world holds two types of geniuses. The first are ordinary geniuses: “Once we understand what they have done we feel certain that we, too, could have done it.” The other type are magicians, whose minds work in such inscrutable ways that “Even after we understand what they have done, the process by which they have done it is completely dark.” Feynman, by his reckoning, was “a magician of the highest caliber.”¹

Feynman could take problems others had worked on for months and immediately see the solution. In high school, he competed in mathematics tournaments, where he would often get the correct answer while the problem was still being stated. While his competitors had just begun to compute, Feynman already had the answer circled on the page. In his college days, he competed in the Putnam Mathematics Competition, with the winner receiving a paid scholarship to Harvard. This competition is notoriously difficult, requiring clever tricks rather than straightforward application of previously learned principles. Time is also a factor, and some examination sessions have a median score of zero, meaning the typical competitor didn’t get even one right. Feynman walked out of the exam early. He scored first place, with his fraternity brothers later being amazed at the drastic gap between Feynman’s score and the next four on the list. During his work on the Manhattan Project, Niels Bohr, then one of the most famous and important living physicists, asked to speak with Feynman directly, to run his ideas by the young grad student before talking with the other physicists. “He’s the only guy who’s not afraid of me” was Bohr’s explanation. “[He] will say when I’ve got a crazy idea.”²

Nor was Feynman’s magic restricted to physics. As a child he went around fixing people’s radios, in part because paying an adult for repairs in the Depression was too costly but also because the radio owners marveled at his process. Once, while he was lost in thought trying to figure out why a radio was producing an awful noise as it started up, the owner of the radio got impatient. “What are you doing? You come to fix the radio, but you’re only walking back and forth!” “I’m thinking!” came the reply, at which the owner, startled at the boldness for which Feynman would later become famous, laughed. “He fixes radios by thinking!”

As a young man during the construction of the atomic bomb in the Manhattan Project, he occupied his free time picking the locks of his supervisors’ desks and cabinets. He once broke into a senior colleague’s filing cabinet, where the secrets for building a nuclear bomb were kept, as a practical joke. Another time, he demonstrated his technique to a military official, who, instead of fixing the security flaw, decided the proper course was to warn everyone to keep Feynman away from their safes! Later, upon meeting a locksmith, he found that his reputation had grown to the point where the professional said, “God! You’re Feynman—the great safecracker!” He also created the impression of being a human calculator. On a trip to Brazil, he went toe to toe against an abacus salesman, computing difficult figures such as the cube root of 1,729.03. Not only did Feynman get the right answer, 12.002, but he got it to more decimal places than the abacus salesman, who was still furiously calculating to get to 12 when Feynman

displayed his five-digit result. This ability impressed even other professional mathematicians, to whom he argued that he could, within one minute, get the answer to any problem that could be stated in ten seconds to within 10 percent of the correct number. The mathematicians threw questions at him such as “e to the power of 3.3” or “e to the power of 1.4,” and Feynman managed to spit back the correct answer almost immediately.

Demystifying Feynman's Magic

Feynman was certainly a genius. Many people, including his biographer James Gleick, are satisfied to leave it at that. A magic trick, after all, is most dazzling when you don't know how it is done. Perhaps this is why many accounts of the man have focused on his magic instead of his method.

Though Feynman was quite smart, his magic had its gaps. He excelled in math and physics but was abysmal in the humanities. His college grades in history were in the bottom fifth of his class, in literature in the bottom sixth, and his fine arts grades were worse than those of 93 percent of his fellow students. At one point, he even resorted to cheating on a test to pass. His intelligence, measured while he was in school, scored 125. The average college graduate has a score of 115, which puts Feynman only modestly higher. Perhaps, as has been argued afterward, Feynman's genius failed to be captured in his IQ score, or it simply was a poorly administered test.

However, for someone so celebrated for a mind beyond comprehension, these facts remind us that Feynman was mortal.

What about Feynman's mental calculus? In this case, we have Feynman's words himself for how he could compute so much faster than the abacus salesman or his mathematician colleagues. The cube root of 1,729.03? Feynman explained, “I happened to know that a cubic foot contains 1728 cubic inches, so the answer is a tiny bit more than 12. The excess, 1.03, is only one part in nearly 2000, and I had learned in calculus that for small fractions, the cube root's excess is one-third of the number's excess. So all I had to do was find the fraction 1/1728, and multiply by 4.” The constant e to the power of 1.4? Feynman revealed, “because of radioactivity (mean-life and half-life), I knew the log of 2 to the base e, which is .69315 (so I also knew that e to the power of .7 is nearly equal to 2).” To go to the power of 1.4, he'd just have to multiply that number against itself. “[S]heer luck,” he explained.³ The secret was his impressive memory for certain arithmetic results and an intuition with numbers that enabled him to interpolate. However, the lucky picks of his examiners allowed him to leave an impression of a magical ability to calculate.

How about the famous lock picking? Once again, it was magic, in the same sense as a magician performing well-practiced tricks. He obsessed over figuring out how combination locks worked. One day he realized that by fiddling with a lock when it was open, he could figure out the last two numbers on the safe. He would write them down on a note after he left the person's office and then could sneak back in, crack the remaining number with some patience, and leave ominous notes behind.

Even his magical intuition for physics had its explanation: “I had a scheme, which I still use today when somebody is explaining something that I'm trying to understand: I keep making up examples.” Instead of trying to follow an equation, he would try to imagine the situation it described. As more information was given, he'd work it through on his example. Then whenever his interlocutor made a mistake, he could see it. “As they're telling me the conditions of the theorem, I construct something which fits all the conditions.

You know, you have a set (one ball)—disjoint (two balls). Then the balls turn colors, grow hairs, or whatever, in my head as they put more conditions on. Finally they state the theorem, which is some dumb thing about the ball which isn't true for my hairy green ball thing, so I say, 'False!'"⁴

Magic, perhaps, Feynman did not possess, but an incredible intuition for numbers and physics he certainly did. This might downplay the idea that his mind worked in a fundamentally different way from yours or mine, but it doesn't negate the impressiveness of his feats. After all, even knowing the logic behind Feynman's sleight of hand, I'm certain I wouldn't have been able to calculate the numbers he did so effortlessly or follow some complex theory in my mind's eye. This explanation doesn't provide the satisfying "Aha!" that it would have had the magician's trick been revealed as something trivial. Therefore, we need to dig deeper to an understanding of how someone such as Feynman could develop this incredible intuition in the first place.

Inside the Mind of the Magician

Psychological researchers have investigated the problem of how intuitive experts, such as Feynman, think differently about problems than novices do. In a famous study, advanced PhDs and undergraduate physics students were given sets of physics problems and asked to sort them into categories.⁵ Immediately, a stark difference became apparent. Whereas beginners tended to look at superficial features of the problem—such as whether the problem was about pulleys or inclined planes—experts focused on the deeper principles at work. "Ah, so it's a conservation of energy problem," you can almost hear them saying as they categorized the problem by what principles of physics they represented. This approach is more successful in solving problems because it gets to the core of how the problems work. The surface features of a problem don't always relate to the correct procedure needed to solve it. The students needed much more trial and error to home in on the correct method, whereas the experts could immediately start with the right approach.

If the principles-first way of thinking of problems is so much more effective, why don't students start there instead of attending to superficial characteristics? The simple answer may be that they can't. Only by developing enough experience with problem solving can you build up a deep mental model of how other problems work. Intuition sounds magical, but the reality may be more banal—the product of a large volume of organized experience dealing with the problem.

Another study, this time comparing chess masters and beginners, offered an explanation of why this might be so.⁶ The memory for chess positions of experts and novices was tested by showing them a particular chess setup and then asking them to re-create it on an empty board. The masters could recall far more than the beginners. The new players needed to put down pieces one by one and were often unable to fully remember all the details of the position. The masters, in contrast, remembered the board in larger "chunks" with several pieces corresponding to a recognizable pattern put down at the same time. Psychologists theorize that the difference between grand masters and novices is not that grand masters can compute many more moves ahead but that they have built up huge libraries of mental representations that come from playing actual games. Researchers have estimated that having around 50,000 of these mental "chunks" stored in long-term memory is necessary to reach expert status.⁷ These representations allow them to take a complex

chess setup and reduce it to a few key patterns that can be worked with intuitively. Beginners, who lack this ability, have to resort to representing each piece as a single unit and are therefore much slower.*

This facility of chess grand masters, however, is limited to the patterns that come from real chess games. Give beginners and experts a randomized chess board (one that doesn't arise from normal play), and the experts no longer display the same marked advantage. Without the library of memorized patterns at their disposal, they have to resort to the beginner's method of remembering the board piece by piece.

This research gives us a glimpse into how the mind of a great intuitionist such as Feynman operated. He, too, focused on principles first, building off examples that cut straight to the heart of what the problem represented rather than focusing on superficial features. His ability to do this was also built off an impressive library of stored physics and math patterns. His mental calculation feats seem impressive to us but were trivial to him, because he happened to know so many mathematical patterns. Like chess grand masters, when given real physics problems he excelled because he had built a huge library of patterns from real experiences with physics. However, his intuition, too, would fail him when the subject of his study wasn't built on those assumptions. Feynman's mathematician friends would test him on counterintuitive theorems from mathematics. His intuition there would fail when properties of the procedure (such as that an object can be cut into infinitely small pieces) defied the normal physical limitations that aided his intuition elsewhere.

Feynman's magic was his incredible intuition, coming from years of playing with the patterns of math and physics. Could emulating his approach to learning enable someone else to capture some of that magic? Let's look at some of Feynman's hallmark approaches to learning and solving problems and try to reveal some of the magician's secrets.

How to Build Your Intuition

Simply spending a lot of time studying something isn't enough to create a deep intuition. Feynman's own experience demonstrates this. On numerous occasions, he would encounter students who memorized solutions to a particular problem but failed to see how they applied outside the textbook domain. In one story, he tricked some of his classmates into believing that a French curve (a device for drawing curved lines) was special because, no matter how you hold it, the bottom is tangent to a horizontal line. This, however, is true of any smooth shape, and it is an elementary fact of calculus that his fellow classmates should have realized. Feynman saw this as an example of a particularly "brittle" way of learning things, since students didn't really think about relating what they had learned to problems outside the textbook.

How, then, can someone avoid a similar fate—spending a lot of time learning something without really developing the flexible intuition for it that made Feynman famous? There's no precise recipe for doing so, and a healthy dose of experience and smarts certainly helps. However, Feynman's own account of his learning process offers some useful guidelines for how he did things differently.

Rule 1: Don't Give Up on Hard Problems Easily

Feynman was obsessed with solving problems. Starting in his childhood days of tinkering with radios, he would work stubbornly on a problem until it yielded. Sometimes, when the owner of the radio would get impatient, he

recalled, “If [he] had said, ‘Never mind, it’s too much work,’ I’d have blown my top, because I want to beat this damn thing, as long as I’ve gone this far.”⁸ This tendency carried over into mathematics and physics. He’d often eschew easier methods, such as the Lagrangian technique, forcing himself to painstakingly calculate all the forces by hand, simply because with the latter method he came to understand it better. Feynman was a master at pushing farther on problems than others expected of him, and this itself might have been the source of many of his unorthodox ideas.

One way you can introduce this into your own efforts is to give yourself a “struggle timer” as you work on problems. When you feel like giving up and that you can’t possibly figure out the solution to a difficult problem, try setting a timer for another ten minutes to push yourself a bit further. The first advantage of this struggle period is that very often you can solve the problem you are faced with if you simply apply enough thinking to it. The second advantage is that even if you fail, you’ll be much more likely to remember the way to arrive at the solution when you encounter it. As mentioned on the chapter on retrieval, difficulty in retrieving the correct information—even when the difficulty is caused by the information not being there—can prime you to remember information better later.

Rule 2: Prove Things to Understand Them

Feynman told a story of his first encounter with the work by the physicists T. D. Lee and C. N. Yang.⁹ “I can’t understand these things that Lee and Yang are saying. It’s all so complicated,” he declared. His sister, lightly teasing him, remarked that the problem wasn’t that he couldn’t understand it but that he hadn’t invented it. Afterward, Feynman decided to read through the papers meticulously, finding that they weren’t actually so difficult but that he had simply been afraid to go through them.

Though this story illustrates one of Feynman’s quirks, it is also revealing because it illustrates a major point in his method. Feynman didn’t master things by following along with other people’s results. Instead, it was by the process of mentally trying to re-create those results that he became so good at physics. This could be a disadvantage at times, since it caused him to repeat work and reinvent processes that already existed in other forms. However, his drive to understand things by virtue of working through the results himself also assisted in building his capacity for deep intuition.

Feynman was not alone in this approach. Albert Einstein, as a child, built his intuitive powers by trying to prove propositions in math and physics. One of Einstein’s earliest mathematical forays was trying to prove the Pythagorean Theorem on the basis of similar triangles.¹⁰ What this approach indicates is that both men had a tendency to dig much deeper before they considered something to be “understood.” Feynman’s scoffing at not understanding Lee and Yang wasn’t because there was no understanding; indeed, he was familiar with much of the background work on the problem. Instead, it was probably because his notion of understanding was much deeper and more based on demonstrating results himself, rather than merely nodding along while reading.

The challenge of thinking you understand something you don’t is unfortunately a common one. Researcher Rebecca Lawson calls this the “illusion of explanatory depth.”¹¹ At issue here is the notion that we judge our own learning competency, not directly but through various signals. Assessing whether or not we know a factual matter, such as what is the capital of France, is quite easy—either the word “Paris” comes up in your mind, or it

doesn't. Asking whether you understand a concept is a lot harder because you may understand it a little, but not enough for the purposes at hand.

Here's a perfect thought experiment to help you understand the problem.

Get out a piece of paper, and try, briefly, to sketch how a bicycle looks. It doesn't need to be a work of art; just try to place the seat, handles, tires, pedals, and bike chain in the right place. Can you do it?

Don't cheat by just trying to visualize the bicycle. Actually see if you can draw it. If you don't have a pencil or paper handy, you can simulate it by saying which things connect to what. Have you tried it?

Interestingly, Rebecca Lawson's study asked participants to do exactly this. As the illustrations clearly show, most participants had no idea how the machines were assembled, even though they used them all the time and believed they understood them quite well. The illusion of understanding is very often the barrier to deeper knowledge, because unless that competency is actually tested, it's easy to mislead yourself into thinking you understand more than you do. Feynman's and Einstein's approach to understanding propositions by demonstrating them prevents this problem in a way that's hard to do otherwise.¹²

Were you one of the lucky ones who managed to put the chains on correctly? Try the exercise again, except this time with a can opener. Can you explain how it works? How many gears are there? How does it cut the lid open? This one is much harder, yet most of us would say we understand can openers!

Rule 3: Always Start with a Concrete Example

Human beings don't learn things very well in the abstract. As the research on transfer demonstrates, most people learn abstract, general rules only after being exposed to many concrete examples. It's not possible to simply present a general principle and expect that you can apply it to concrete situations. As if presaging this observation, Feynman himself would supply concrete examples even when they were not given. Working through an explicit example in his mind's eye, he could follow along and see what the math was trying to demonstrate.

This process of following along with one's own example forces a deeper level of processing the material as it is being presented. A finding from the literature on memory, known as the levels-of-processing effect, suggests that it isn't simply how much time you spend paying attention to information that determines what you retain but, crucially, how you think about that information while you pay attention to it. In one study of this effect, participants were asked to review a list of words; half of them were told it would be for a test (and thus they were motivated to learn it), while the others were simply told to review the list.¹³ Within each group, participants were again split by what orienting technique they used to review the list. Half were asked to notice whether or not the words contained the letter e, a relatively shallow level of processing, while the others were asked if the word was pleasant or not, a deeper processing of the meaning of the word, not merely its spelling. The result was that motivation played no difference; telling students to study for a test didn't impact how much they retained. However, the orienting technique did make a large difference. Those who processed the words deeply remembered almost twice as much as those who simply scanned their spelling.¹⁴

Feynman's habit of developing a concrete instance of a problem can be seen as an example of this deeper form of processing, which not only

enhances later retention but also fosters an intuitive understanding. This technique also enables some feedback, because when it's not possible to imagine an appropriate example, that's evidence that you don't understand something well enough and would benefit from going back a few steps and learning the material better before continuing. Using feedback-rich processes to test whether or not he knew something was a hallmark of Feynman's learning style.

Rule 4: Don't Fool Yourself

"Don't fool yourself" was one of Feynman's most popular aphorisms, to which he added, "and you're the easiest person to fool." He was deeply skeptical of his own understanding. He presaged the current replication crisis in psychology, attacking what he perceived as many social scientists fooling themselves into believing they had discovered something they had not. I suspect that part of this insight arose from the fact that he had cultivated such rigorous standards for what he counted as knowing.

The Dunning-Kruger effect occurs when someone with inadequate understanding of a subject nonetheless believes he or she possesses more knowledge about the subject than the people who actually do.¹⁵ This can occur because when you lack knowledge about a subject, you also tend to lack the ability to assess your own abilities. It is true that the more you learn about a subject, the more questions arise. The reverse also seems to be true, in that the fewer questions you ask, the more likely you are to know less about the subject.

One way to avoid this problem of fooling yourself is simply to ask lots of questions. Feynman took this approach himself: "Some people think in the beginning that I'm kind of slow and I don't understand the problem, because I ask a lot of these 'dumb' questions: 'Is a cathode plus or minus? Is an anion this way, or that way?'"¹⁶ How many of us lack the confidence to ask "dumb" questions? Feynman knew he was smart and had no problem asking them. The irony is that by asking questions with seemingly obvious answers, he also noticed the not-so-obvious implications of the things he studied.

The opposite tendency, to avoid asking questions in the vain attempt to appear knowledgeable, has considerable costs. While lecturing in Brazil, Feynman's students would often complain when he asked simple questions that they knew the answers to already, instead of just lecturing. Why waste valuable classroom time on such exercises? The answer, Feynman eventually realized, was that they didn't know the answers but didn't want to admit it in front of everyone else in the class, wrongly assuming that they were the only ones who didn't know it. Explaining things clearly and asking "dumb" questions can keep you from fooling yourself into thinking you know something you don't.

The Feynman Technique

When I first read about Feynman, I was inspired to try to formulate many of these different observations into a concrete method I could apply to my own studies. What resulted was something I named the Feynman Technique and applied extensively during my MIT Challenge. The purpose of using this technique is to help develop intuition about the ideas you are learning. It can be used when you don't understand an idea at all or simply when you understand something a little but really want to turn it into a deep intuition.

The method is quite simple:

1. Write down the concept or problem you want to understand at the top of a piece of paper.

2. In the space below, explain the idea as if you had to teach it to someone else.

1. If it's a concept, ask yourself how you would convey the idea to someone who has never heard of it before.

2. If it's a problem, explain how to solve it and—crucially—why that solution procedure makes sense to you.

3. When you get stuck, meaning your understanding fails to provide a clear answer, go back to your book, notes, teacher, or reference material to find the answer.

The crux of this method is that it tries to dispel the illusion of explanatory depth. Since many of our understandings are never articulated, it's easy to think you understand something you don't. The Feynman Technique bypasses this problem by forcing you to articulate the idea you want to understand in detail. Just as drawing a bicycle quickly confirms whether you have a basic grasp of how it is put together, using this technique will quickly reveal how much you really understand of your subject. Now any gaps in your understanding will become obvious as you struggle to explain key parts of the idea.

The technique itself has some nuances and can be applied in a few different ways that might be helpful, depending on your specific intuitive deficit.

Application 1: For Things You Don't Understand at All

The first way to use this approach is when you don't understand something at all. In this case, the easiest way is to do it with the book in hand and go back and forth between your explanation and the one in the book. This lacks the benefits of retrieval practice, but it can often be essential when the explanation you've been given baffles you. Feynman himself did something similar when presented with what he saw to be philosophical gobbledygook:

I had this uneasy feeling of "I'm not adequate," until finally I said to myself, "I'm going to stop,

and read one sentence slowly, so I can figure out what the hell it means."

So I stopped—at random—and read the next sentence very carefully. I can't remember it precisely, but it was very close to this: "The individual member of the social community often

receives his information via visual, symbolic channels." I went back and forth over it, and translated. You know what it means? "People read."¹⁷

Although Feynman's method was aimed more at illustrating the deliberately confusing nature of the prose rather than trying to understand a nuanced meaning, the same method can help whenever you're learning anything that goes over your head.

I used this technique when taking a class on machine vision during the MIT Challenge. I didn't understand photogrammetry, a technique of determining the 3D shape of an object based on a series of 2D pictures taken under different lighting conditions. It involved some tricky concepts, so I wasn't quite sure how it worked. With my textbook at my side, I wrote a few pages of notes, trying to sketch out the broad strokes of the idea so I could get the general gist of it.¹⁸

Application 2: For Problems You Can't Seem to Solve

A second way to apply this is for solving a difficult problem or mastering a technique. In this instance, it's very important to go through the problem step by step alongside the explanation you generate, rather than simply summarizing it. Summarizing may end up skipping over the core difficulties

of the problem. Going deeper may take time, but it can help you get a strong grasp over a new method in one go, rather than needing numerous repetitions to memorize the steps.

I applied this to a class in computer graphics for a technique I was struggling with called grid acceleration. This is a method of speeding up the performance of ray-traced rendering systems by avoiding analyzing objects that “obviously” won’t be on the part of the screen you’re drawing. To get a better handle on this, I walked through the problem with the technique, drawing a little snowman that I imagined rendering, with lines shooting out of an eyeball representing the camera.¹⁹

Application 3: For Expanding Your Intuition

A final way to apply this method is to ideas that are so important that it would really help if you had a great intuition about them. In this application of the method, instead of focusing on explaining every detail or going along with the source material, you should try to focus on generating illustrative examples, analogies, or visualizations that would make the idea comprehensible to someone who has learned far less than you have. Imagine that instead of trying to teach the idea, you are being paid to write a magazine article explaining the idea. What visual intuitions would you use to pin down the abstractions? Which examples would flesh out a general principle? How could you make something confusing feel obvious?

I applied this to understanding the concept of voltage in an early class on electromagnetism during the MIT Challenge. Though I was comfortable using the concept in problems, I didn’t feel that I had a good intuition of what it was. It’s obviously not energy, electrons, or flows of things. Still, it was hard to get a mental image of an abstract concept on a wire. Going through this technique and comparing the equations to the ones for gravity, it’s clear that voltage is to the electrical force as height is to the gravitational force. Now I could form a visual image. The wires were like troughs of water at different heights. Batteries were like pumps, moving the water up. Resistors were like hoses dropping down, of various widths to impede the flow of water draining down. Although this picture of troughs and hoses wasn’t necessary for solving the equations, it stuck with me and helped me reason my way out of new situations more easily than if voltage had just been an abstract quantity.

Demystifying Intuition

When many people look at a genius like Richard Feynman, they’re inclined to focus on his seemingly effortless intuitive leaps. In his playful style and rebellious impulses, he may seem to defy the stereotype that learning requires hard work. However, as we go beneath the surface, it becomes clear that he shared much in common with the other ultralearners I’ve studied. He worked hard on understanding things, and he put incredible amounts of his spare time into mastering the methods that made his intuition work. In his early days in college, he and a friend went back and forth over the early books on quantum mechanics, racing ahead of their classmates to understand it. He even made a meticulous timetable to allocate hours to his many intellectual pursuits. Even in his trivial obsessions, he displayed a streak for aggressive methods; while learning lock picking, for example, he trained himself to go through all the possible combinations, practicing them repeatedly: “I got it down to an absolute rhythm so I could try the 400 possible back numbers in less than half an hour. That meant I could open a safe in a maximum of eight hours—with an average time of four hours.”²⁰

When people hear about geniuses, especially the iconoclastic ones such as Feynman, there's a tendency to focus on their gifts and not their efforts. I have no doubt that Feynman possessed gifts. But perhaps his greatest one was his ability to merge tenacious practice and play. He approached picking locks with the same enthusiasm for solving puzzles that he did for unraveling the secrets of quantum electrodynamics. It's this spirit of playful exploration that I want to turn to in the final principle of ultralearning: experimentation.

Chapter 12: Principle 9: Experimentation: Explore Outside Your Comfort Zone

If you were to read his story without seeing his art, Vincent van Gogh would be the last person you would expect to become one of the most famous painters of all time. He started at a late age, twenty-six. Art is a field of precocity, and famous masters typically display their gifts early. Pablo Picasso's cubist style, for example, came out of his already being able to paint realistically as a child, allowing him to boldly declare that it had taken him "four years to paint as Rafael, but a lifetime to paint like a child." Leonardo da Vinci was apprenticed as a painter in his teens. One story has him, as a youth, painting a monster on a peasant's shield only to have it resold to the duke of Milan. Salvador Dalí had his first exhibit before his fourteenth birthday, already showcasing the talent that would make him famous. Van Gogh, in contrast, was delayed and did not possess any obvious signs of ability. It was only after failing as an art dealer and minister that he picked up the brush. An art seller and family friend, H. G. Tersteeg, believed his artistic aspirations were put on to mask his laziness. "You started too late," he declared. "Of one thing I am sure, you are no artist. . . . This painting of yours will be like all the other things you started, it will come to nothing."¹

Worse than the fact that he started late, however, was that van Gogh simply wasn't very good at drawing. His drafting was crude and childlike. When he finally convinced models to sit for portraits—no small task in light of the Dutchman's famously difficult personality—it took him many attempts to get anything resembling a likeness. While in a brief stint at a Parisian atelier, he even studied next to future leaders of the Post-Impressionist movement, such as Henri de Toulouse-Lautrec. However, unlike the effortless quality with which Toulouse-Lautrec captured the likeness of a scene with a few flicks of his wrist, van Gogh struggled. "We considered his work too unskillful," one classmate recalled. "His drawings had nothing remarkable about them."² In the end, his inability to fit in with his classmates, lack of talent, and off-putting manners had him leaving the studio after less than three months.

His late start and lack of obvious talent were compounded by his temperament. Nearly everyone who entered his life would eventually reject him, as his manic enthusiasm and fraternal solidarity would inevitably sour into bitter fights with nearly every person he met. Near the end of his life, he was routinely placed in mental asylums, varying diagnosed with disorders from "acute mania with generalized delirium" to "a kind of epilepsy." His outbursts, or "attacks," as he referred to them, alienated him from people who could potentially serve as his peers, mentors, and teachers. As a result, despite having attempted formal schooling, van Gogh was largely self-taught, capturing only brief moments of more traditional education in the moments during which he could hold on to friendships before pushing people away. It was van Gogh's mysterious and untimely death that cut short the artistic career that was so late to begin. At thirty-seven, he died of a bullet wound to the stomach. Although his death was suspected to be a suicide, his biographers Steven Naifeh and Gregory White Smith consider accident or foul play more likely; he may possibly even have been shot by one of the village youths who played pranks on him and called him the *fou roux*, or

“crazed redhead.”

In spite of all this, van Gogh has become one of the most famous painters of all time. The *Starry Night*, *Irises*, and *Vase with Fifteen Sunflowers* have become icons. On four separate occasions, a van Gogh piece has become the most expensive painting ever sold, including his *Portrait of Dr. Gachet*, which was sold for more than \$82 million.³ Van Gogh’s signature swirls of color, thick impasto application, and strong outlines have made many people consider his paintings some of the greatest of all time.

How can we explain these discrepancies? How does someone who starts late, with no obvious talent and many handicaps, nonetheless become one of the world’s greatest artists, with one of the most recognizable and distinctive styles? To understand van Gogh, I want to turn to the ninth and final principle of ultralearning: experimentation.

How van Gogh Learned to Paint

Put yourself in van Gogh’s shoes for a moment. You’ve failed miserably as an art dealer, despite your family connections. You’ve failed as a preacher. Now you’re embarking on a new profession—painting—even though you have difficulties in drawing things accurately. What would you do? Van Gogh’s response to this challenge was a pattern that would repeat throughout his life. First, he would identify a learning resource, method, or style and pursue it with incredible vigor, creating dozens, if not hundreds, of works in that direction. After this burst of intensity, aware of his still-existing deficiencies, he would apply himself to a new resource, method, or style and start again. Although there’s no evidence van Gogh thought of the connection, I see a parallel between this pattern and the one used by successful scientists: hypothesis, experiment, results, repeat. Perhaps inadvertently, van Gogh’s aggressive, experimental strides into painting allowed him to mature into not merely a proficient painter but an unforgettably unique one.

Van Gogh’s experimentation began when he was first trying to become an artist. The normal route to an artistic career in those days was to attend an art school or apprentice in a studio. Van Gogh, due to the fact that others did not see him as possessing much talent and his odd temperament, did not have much luck with those traditional avenues. Therefore he turned to selfeducation, pursuing home-study courses that promised to teach him the basics of drawing. In particular, he made heavy use of Charles Bargue’s *Exercices au fusain* (Charcoal Exercises) and *Cours de dessin* (Drawing Course), as well as Armand Cassagne’s *Guide de l’alphabet du dessin* (Guide to the ABCs of Drawing). They were thick books with graduated exercises on which aspiring artists could work step by step to improve their drawing skill. According to his biographers, van Gogh “devoured these big books . . . page by page, over and over.” Van Gogh himself reported to his brother, Theo, “I have now finished all sixty sheets,” adding “I worked almost a whole fortnight, from early morning until night.”⁴ Copying was another strategy van Gogh employed early on that he would continue late into his artistic career. Jean-François Millet’s *The Sower* was one of his favorite pictures to copy, which he did again and again. He also applied himself to sketching from life early, in particular models for portraits, which he struggled with due to his difficulties with drafting accurately.

Van Gogh studied from other artists, friends, and mentors. Anthon van Rappard convinced him to try out reed pen and ink and adopt the mature artist’s style of short and fast strokes. Another artist, Anton Mauve,

persuaded him to try a variety of different media: charcoal and chalk, watercolor, and Conté crayon. Often those attempts were not successful. During their stay together at the house where van Gogh would later cut off his ear, Paul Gauguin pushed the Dutchman to paint from memory, mute his colors, and adopt new materials for different effects. Those tactics didn't work for van Gogh, whose weaknesses in drafting were exacerbated by not having the scene directly in front of him, and the different materials went against the style that would later make him famous. Experiments, however, needn't always be successful to have value, and van Gogh had many opportunities for trying new techniques.

Van Gogh experimented not just with materials and methods but also with the philosophies that underpinned his art. Although he is most famous for strong, vibrant colors, that wasn't his initial intention. Originally, he leaned toward the profundity of muted, grayer tones, as witnessed in an early work *The Potato Eaters*. "Scarcely any color is not gray," he argued. "In nature one really sees nothing else but those tones or shades."⁵ He was fully convinced of that and based his work on it accordingly. However, he would later switch to the exact opposite: bright, complementary colors, often imposed on a scene rather than being brought out from nature. His stance on contemporary artistic movements flitted about; at first he preferred traditional painting to the new Impressionist style, and later he shifted to the avantgarde, opting for bold forms rather than verisimilitude.

There are two important things to note about van Gogh's experiments in art. The first is the variety of methods, ideas, and resources he applied. Since he struggled with many aspects of painting, I believe that variation was important to his eventually finding a style that would work for him—one that would take advantage of his strengths and diminish the significance of his weaknesses. Although virtuoso talents might be able to latch on to the first style of instruction they are presented with and follow it to completion, others require a great deal of experimentation before the right method sticks. The second important thing to note is his intensity. Like all the ultralearners I've discussed so far, van Gogh was tenacious in his efforts to become an artist. Despite receiving much negative feedback and discouragement, he pursued his art relentlessly, sometimes producing as much as a new painting every day. These two factors, variation and aggressive exploration, enabled him to push through his early obstacles and produce some of the most iconic and brilliant works ever painted.

Experimentation Is the Key to Mastery

When starting to learn a new skill, often it's sufficient simply to follow the example of someone who is further along than you. In discussing the principles of ultralearning, metalearning comes first. Understanding how a subject breaks down into different elements and seeing how others have learned it previously, thus providing an advantageous starting point.

However, as your skill develops, it's often no longer enough to simply follow the examples of others; you need to experiment and find your own path.

Part of the reason for this is that the early part of learning a skill tends to be the best trodden and supported, as everyone begins at the same place. As your skills develop, however, not only are there fewer people who can teach you and fewer students you could have as peers (thus lowering the total market for books, classes, and instructors), but you also start to diverge from those you're learning from. Whereas two complete novices have quite similar knowledge and skills, two experts might have quite different sets of skills that

they've already acquired, thus making improving those skills an increasingly personalized and idiosyncratic adventure.

A second reason for the value of experimentation as you approach mastery is that abilities are more likely to stagnate after you've mastered the basics. Learning in the early phases of a skill is an act of accumulation. You acquire new facts, knowledge, and skills to handle problems you didn't know how to solve before. Getting better, however, increasingly becomes an act of unlearning; not only must you learn to solve problems you couldn't before, you must unlearn stale and ineffective approaches for solving those problems. The difference between a novice programmer and a master isn't usually that the novice cannot solve certain problems. Rather, it's that the master knows the best way to solve a problem, which will be the most efficient and clean and cause the fewest headaches later on. As mastery becomes a process of unlearning over accumulation, experimentation becomes synonymous with learning as you force yourself to go outside your comfort zone and try new things.

A final reason for the increasing importance of experimentation as you approach mastery is that many skills reward not only proficiency but originality. A great mathematician is one who can solve problems others cannot, not merely a person who can solve previously solved problems easily. Successful business leaders are those who can spot opportunities others cannot, not merely those who can copy the style and strategy of those before them. In art, it was not only van Gogh's skill but his originality that made him one of the most celebrated painters to have ever lived. As creativity becomes valuable, experimentation becomes essential.

Three Types of Experimentation

In experimentation you can see different levels play out, both in van Gogh's path as an artist and as a model for your own explorations:

1. Experimenting with Learning Resources

The first place to experiment is with the methods, materials, and resources you use to learn. Van Gogh did this extensively at the beginning of his artistic career, trying out different artistic media, materials, and learning techniques: following home-study courses, watching fellow artists, sketching from life and in the studio, and more. This kind of experimentation is useful in helping you discover the guides and resources that work best for you. It's important, however, that your impulse to experiment be matched with a drive to do the necessary work. Although van Gogh tried many different approaches when he first started teaching himself to draw and paint, he also produced an enormous quantity of work based on each of those methods.

A good strategy to take is to pick a resource (maybe a book, class, or method of learning) and apply it rigorously for a predetermined period of time. Once you apply yourself aggressively to that new method, you can step back and evaluate how well it is working and whether you feel it makes sense to continue with that approach or try another.

2. Experimenting with Technique

In the beginning, experimentation tends to focus on materials. However, in most domains of learning, the options for what to learn next expand faster and faster, so the question becomes not "How can I learn this?" but "What should I learn next?" Languages are a prime example. The same basic set of vocabulary and phrases dominates most beginner resources. As you improve, however, the amount of things you could possibly learn next becomes larger and larger. Should you learn to read literature? Converse fluently on a

professional topic? Read comic books? Have business discussions? The specialized vocabulary, phrases, and cultural knowledge in each field multiply, so it becomes necessary to choose what to master.

Once again, experimentation plays a pivotal role. Pick some subtopic within the skill you're trying to cultivate, spend some time learning it aggressively, and then evaluate your progress. Should you continue in that direction or pick another? There's no "right" answer here, but there are answers that will be more useful to the specific skill you're trying to master.

3. Experimenting with Style

After you've matured in your learning a bit, the difficulty often switches from which resources to learn from or which techniques you'd like to master to the style you'd like to cultivate. Although there are some skills that have one and only one "correct" way of doing things, this is not true of most. Writing, design, leadership, music, art, and research all involve developing certain styles, which have different trade-offs. Once you master the basics, there is no longer one "right" way to do everything but many different possibilities, all of which have different strengths and weaknesses. This affords another opportunity for experimentation. Van Gogh tried out many different styles for producing art, varying from those of traditional painters such as Millet, to Japanese woodblock prints, and studied the techniques used by his artist friends such as Gauguin and Rappard. There is no one correct answer, although, like van Gogh, you may find that certain styles work better than others with your unique combination of strengths and weaknesses.

The key to experimenting with different styles is to be aware of all the different styles that exist. Once again van Gogh provides a good model, as he spent an enormous amount of time studying and discussing the works of other artists. That gave him a large library of possible styles and ideas he could adapt to his own work. Similarly, you might want to identify masters in your own line of study and dissect what makes their styles successful to see what you can emulate or integrate into your own approach.

In each level of experimentation, the choices broaden and the possible options to explore go up exponentially. There's a tension, therefore, between spending time trying out different resources, techniques, and styles, and concentrating your efforts on a single approach long enough to become proficient at it. This tension often resolves itself as you cycle through exploring a new avenue in learning and then buckling down to learn it deeply before moving on to something else. Whatever else his failings, it was this pattern of trying out an idea and working on it aggressively that van Gogh applied brilliantly.

The Mindset of Experimentation

There are parallels between the mindset required to experiment and what the Stanford psychologist Carol Dweck refers to as growth mindset.⁶ In her research, she distinguishes between two different ways of looking at one's own learning and potential. In a fixed mindset, learners believe that their traits are fixed or innate and thus there's no point in trying to improve them. In a growth mindset, in contrast, learners see their own capacity for learning as something that can be actively improved. In some ways, these two types of mindsets become self-fulfilling prophecies. Those who think they can improve and grow, do; those who think they are fixed and immutable remain stuck.

The parallel with the mindset required for experimentation is clear.

Experimenting is based on the belief that improvements are possible in how

you approach your work. If you think your learning styles are fixed or that you have certain immutable strengths and weaknesses that will keep you from trying out different ways to approach your skills, you won't be able to experiment at all.

I see the experimental mindset as an extension of the growth mindset: whereas the growth mindset encourages you to see opportunities and potential for improvement, experimentation enacts a plan to reach those improvements. The experimental mindset doesn't just assume that growth is possible but creates an active strategy for exploring all the possible ways to reach it. To get into the right mental space for experimenting, you need not only to see your abilities as something you can improve but understand that there is a huge number of potential avenues to do this. Exploration, not dogmatism, is the key to realizing that potential.

How to Experiment

Experimenting sounds simple but can be quite tricky to implement in practice. The reason is that a flurry of random activity doesn't usually translate into mastery. In order to work, experimenting requires understanding what learning problems you're facing and coming up with possible ways to resolve them. Here are a few tactics that can help you integrate experimentation into your ultralearning projects.

Tactic 1: Copy, Then Create

This is the first strategy for experimenting, which we can see in van Gogh's work. Though van Gogh is best known for his original pieces, he also spent a lot of time copying drawings and paintings he liked by other artists. Copying simplifies the problem of experimentation somewhat because it gives you a starting point for making decisions. If you're learning to paint, as van Gogh did, the possibilities of what kinds of art you can create and techniques you can apply are so vast that it can be difficult or impossible to decide among them. However, if you start by emulating another artist, you can use that foothold to venture further in your own creative directions.

This strategy has another advantage beyond simplifying the choices available to you. In attempting to emulate or copy an example you appreciate, you must deconstruct it to understand why it works. This can often highlight things that the other person does exceptionally well that weren't obvious from the beginning. It may also dispel illusions you may have had about an aspect of the work you thought was important but upon emulating the other person's work you realize was not.⁷

Tactic 2: Compare Methods Side-by-Side

The scientific method works by carefully controlling conditions so that the difference between two situations is limited to the variable being studied. You can apply this same process to your experiments in learning by trying two different approaches and varying only a single condition to see what the impact is. By applying two different approaches side by side, you can often quickly get information not only about what works best but about which methods are better suited to your personal style.

I applied this to learning French vocabulary. I wasn't sure how effective mnemonics would be so, for a month, I would find a list of fifty new words every day, put together from my regular reading or random encounters with the language, and for half I would simply look them over with their translations I got from the dictionary. With the other half, I made an effort to use a visual mnemonic to link the two meanings. Then I compared how many of the words I remembered from each list on a later test, with words picked

randomly from each side. The result is something you would probably expect after reading the chapters on retrieval and retention: I remembered the words I used mnemonics for at almost twice the rate of those I didn't. That showed that even if creating the mnemonics took a bit more time, they were worth it. There are two advantages to doing split tests. The first is that as in scientific experiments, you will get much better information about which method works best if you limit the variation to only the factor you want to test. The second is that by solving a problem multiple ways or applying multiple solution styles to it, you will increase your breadth of expertise. Forcing yourself to try different approaches encourages experimentation outside your comfort zone.

Tactic 3: Introduce New Constraints

The challenge of learning in the beginning is that you don't know what to do. The challenge of learning in the end is that you think you already know what to do. It's this latter difficulty that causes us to rerun old routines and old ways of solving problems that are encouraged through habit, not always because the old way is actually best. A powerful technique for pushing out of those grooves of routine is by introducing new constraints that make the old methods impossible to use.

It's practically an axiom of design that the best innovations come from working within constraints. Give a designer unlimited freedom, and the solution is usually a mess. On the other hand, creating specific constraints in how you can proceed encourages you to explore options that are less familiar to you and sharpens your underlying skills. How can you add limitations to force yourself to develop new capacities?

Tactic 4: Find Your Superpower in the Hybrid of Unrelated Skills

The traditional path to mastery is to take a well-defined skill and practice it relentlessly until you have become insanely good at it. This is the path taken by many athletes, who train for decades to perfect their shot, jump, kick, or throw. However, for many areas of creative or professional skills, another, more accessible, path is to combine two skills that don't necessarily overlap to bring about a distinct advantage that those who specialize in only one of those skills do not have. For instance, you might be an engineer who becomes really good at public speaking. You may not be the best possible engineer or the best possible presenter, but combining those two skills could make you the best person to present on engineering topics for your company at conferences, thus giving you access to new professional opportunities. Scott Adams, the creator of Dilbert, likened his own success to following this strategy by combining his background as an engineer with an MBA and a cartoonist.⁸

This level of experimentation often plays out over multiple ultralearning projects. After I completed my MIT Challenge, I could apply the programming knowledge I had obtained to write scripts to automatically generate flash cards for learning Chinese. Such synergies become possible once you start exploring how one skill you've already acquired can impact another.

Tactic 5: Explore the Extremes

Van Gogh's art pushed well outside normal conventions along many dimensions. His thick application of paint was far away from the thin layers of glazes used by Renaissance masters. His quick application was far more rapid than the careful brushstrokes of other painters. His colors were bold,

often garish, instead of subtle. If you were to draw a chart that mapped out van Gogh's style compared with those of other painters, you would probably see that he lay along the extreme in many dimensions.

An interesting result from mathematics is that as you get to higher and higher dimensions, most of the volume of a higher-dimensional sphere lies near its surface. For instance, in two dimensions (a circle), just under 20 percent of its mass lies in the outer shell described by a tenth of the radius. In three dimensions (a sphere), that number rises to almost 30 percent. In ten dimensions, almost three-quarters of the mass is in that outermost layer. You can imagine learning a complex subject as akin to trying to find an optimal point in a region of higher-dimensional space—except that instead of length, width, and height, those dimensions might be the qualitative dimensions of work, such as van Gogh's complementarity of colors, application of paint, or some other aspect of skill that can be applied in some varying degree of intensity. What this means is that the more complicated a domain of skill is (i.e., the more dimensions it contains), the more space will be taken up by applications of that skill that are extreme across at least one of those dimensions. This suggests that for many skills, the best option is going to be extreme in some way, since so many more of the possibilities are themselves extreme. Sticking to the middle and playing it safe isn't the correct approach because that allows you to explore only a small subset of the total possibilities for your work.

Pushing out to an extreme in some aspect of the skill you're cultivating, even if you eventually decide to pull it back to something more moderate, is often a good exploration strategy. This allows you to search the space of possibilities more effectively, while also giving you a broader range of experience.

Experimentation and Uncertainty

Learning is a process of experimenting in two ways. First, the act of learning itself is a kind of trial and error. Practicing directly, getting feedback, and trying to summon up the right answers to problems are all ways of adjusting the knowledge and skills you have in your head to the real world. Second, the act of experimenting also lies in the process of trying out your learning methods. Try out different approaches, and use the ones that work best for you. The principles I've tried to articulate in this book should provide good starting points. But they are guidelines, not iron rules; starting points, not destinations. Only by experimenting will you be able to find the right tradeoffs between different principles—for instance, when directness is more important and when you should focus on drills or whether retention or intuition is the main obstacle to learning. Experimenting will also help you decide among small differences in approach that no list of principles could possibly cover exhaustively.

Having a mindset of experimentation will also encourage you to explore beyond what you feel most comfortable doing. Many people stick to the same routines, the same narrow set of methods, they apply to learning everything. As a result, there are a lot of things they struggle to learn because they don't know the best way to do so. Copying exemplars, running tests, and pushing to extremes are all ways to push outside your ingrained habits and try out something different. That process will teach you not just abstract learning principles but concrete tactics that will accommodate your personality, interests, strengths, and weaknesses. Are you better off learning a language through practicing speaking or engaging in lots of input through movies and

books? Are you better off learning programming by building your own game or working on open-source projects? These questions don't have a single correct answer, and people have achieved success using a wide variety of different methods.

My own experience with learning has been one of constant experimentation. In university, I focused a lot on making associations and connections. During the MIT Challenge, I switched to making practice the foundation. In my first experience learning a language, I was sloppy, speaking English most of the time. In the second round, I experimented with going to another extreme, to see if I could avoid that sticking point. While doing projects, I've had to adjust my methods frequently. Even though it was only thirty days long, my portrait-drawing challenge involved a lot of trial and error from starting by doing sketches and, when my progress using that approach slowed, trying to do sketches even faster to get more feedback. When that, too, had reached its limits, I spent some time learning a different technique altogether to achieve greater accuracy.

Embedded in my successes are many failures—times where I thought I could get something to work and it ended up failing miserably. Early on in learning Chinese, I thought I could use some kind of mnemonic system to remember the words, with colors for tones and memorized symbols for the syllables. That was because my normal sounds-like method for visual mnemonics wasn't working with the words, which all sounded so different from English. The result was a total failure, and it didn't work at all! Other times, my experiments with new methods worked out great. Most of the techniques I've shared in this book thus far started as ideas I wasn't sure would pan out.

Experimentation is the principle that ties all the others together. Not only does it make you try new things and think hard about how to solve specific learning challenges, it also encourages you to be ruthless in discarding methods that don't work. Careful experimentation not only brings out your best potential, it also eliminates bad habits and superstitions by putting them to the test of real-world results.

Chapter 13: Your first Ultra-learning Project

Step 1: Do Your Research

The first step in any project is to do the metalearning research required to give you a good starting point. Planning ahead will avoid a lot of problems and prevent you from having to make drastic changes to your learning plan before you've even started making progress. Research is a bit like packing a suitcase for a long voyage. You may not bring the right items, or you may forget something and need to buy it on the road. However, thinking ahead and packing your bags correctly will prevent a lot of fumbling later. Your ultralearning "packing" checklist should include, at a minimum:

1. WHAT TOPIC YOU'RE GOING TO LEARN AND ITS APPROXIMATE SCOPE.

Obviously, no learning project can begin unless you figure out what you want to learn. In some cases, this is obvious. In others, you may need to do further research to identify which skill or knowledge would be most valuable. If your goal is to learn something instrumentally (to start a business, get a promotion, do research for an article), learning what you need to learn is important and will suggest how wide and deep you need to go. I suggest starting with rather a narrow scope, which can expand as you proceed. "Learning enough Mandarin Chinese to hold a fifteenminute conversation on simple topics" is a lot more constrained than "Learn Chinese," which may include reading, writing, studying history, and more.

2. THE PRIMARY RESOURCES YOU'RE GOING TO USE. This includes books, videos, classes, tutorials, guides, and even people who will serve as mentors, coaches, and peers. This is where you decide what your starting point will be. Examples: "I'm going to read and complete the exercises in a book on Python programming for beginners" or "I'm going to learn Spanish through online tutoring via italki.com" or "I'm going to practice drawing by making sketches." In some subjects, static materials will determine how you proceed. In others, they will be supports to back up your practice. In any case, they should be identified, purchased, borrowed, or enrolled in before you begin.

3. A BENCHMARK FOR HOW OTHERS HAVE SUCCESSFULLY LEARNED THIS SKILL OR SUBJECT. Almost any popular skill has online forums where those who have learned the skill previously can share their approaches. You should identify the things other people who have learned the skill have done to learn it. This doesn't mean you need to follow exactly in their footsteps, but it will prevent you from completely missing something important. The Expert Interview Method in [chapter 4](#) provides a good method for following up on this.

4. DIRECT PRACTICE ACTIVITIES. Every skill and subject you're learning will be used somewhere eventually, even if it's as simple as using it to learn something else. Thinking about how you might use the skill can enable you to start finding opportunities to practice it as early as possible. If direct practice is impossible, you should nonetheless identify opportunities for practice that mimic the mental requirements of using the skill.

5. BACKUP MATERIALS AND DRILLS. In addition to the principal materials and methods you'll be using, it's a good idea to look at possible drills and backup materials you may want to use. Backup materials are often

good if you recognize that a certain tool or set of materials might be useful but you don't want to be overwhelmed in the beginning.

Step 2: Schedule Your Time

Your ultralearning project doesn't need to be an intensive, full-time endeavor to succeed. However, it will require some time investment, and it's better to decide on how much time you are willing to devote to learning in advance than simply hope that you'll find the time later. There are two good reasons for planning your schedule ahead of time. The first is that this way you subconsciously prioritize your project by setting it down on your calendar ahead of other things. The second is that learning is often frustrating and it is almost always easier to click over to Facebook, Twitter, or Netflix. If you don't set aside time to learn, it will be a lot harder to summon up the motivation to do so.

The first decision you should make is how much time you're going to commit. This is often dictated by your schedule. You may have a gap in employment that allows intensive learning, but only for a month.

Alternatively, you may have a full schedule that permits you to devote only a few hours per week to learning something new. Whatever time you can commit, decide on it in advance.

The second decision you need to make is when you are going to learn.

During a few hours on Sunday? By waking up an hour earlier and putting in the time before work? In the evening? During lunch breaks? Once again, the best thing is to do whatever makes it easiest based on your schedule. I recommend setting a consistent schedule that is the same every week, rather than trying to fit in learning when you can. Consistency breeds good habits, reducing the effort required to study. If you have absolutely no choice, an ad hoc schedule is better than none, but it will require more discipline to sustain. If you do have some flexibility in your schedule, you may want to optimize it. Shorter, spaced time chunks are better for memory than crammed chunks are. However, some types of tasks, such as writing and programming, have a long warm-up time that may benefit from longer uninterrupted time chunks. The best way to find out what is best for you is to practice; if you find it takes a long time to warm up, opt for longer spaces in your schedule. If you find you can get to work within a few minutes of starting, shorter chunks of time spread out will be helpful for long-term retention.

The third decision you need to make is the length of time for your project.

I generally prefer shorter commitments to longer ones because they are easier to stick with. An intensive project that lasts a month has fewer potential interruptions from life or from your motivation changing and waning. If you have a big goal you want to accomplish that can't be done in a short time frame, I suggest breaking it up into multiple smaller ones of a few months each.

Finally, take all this information and put it into your calendar. Scheduling all the hours of work on the project in advance has important logistical and psychological benefits. Logistically, this will help you spot potential conflicts in your schedule due to vacations, work, or family events. Psychologically, it will help you remember and act on your initial plan better than if it were written on a piece of paper tucked into a desk drawer. What's more, the act of scheduling demonstrates your seriousness about doing the project.

I can clearly remember writing down my hypothetical studying schedule before starting the MIT Challenge. It had me up and studying by 7 a.m. and working until 6 p.m., with only a short break for lunch. Although my actual

schedule, in practice, rarely reached that ideal (even in my most intensive early days, I almost never got in eleven hours straight), the mere act of writing down the schedule helped prepare me psychologically for the project ahead. If you're unwilling to put time into your calendar, you're almost certainly unwilling to put in time to study. If you're waffling at this stage, that's a good sign your heart isn't really in the right place to get started. As a bonus step, for those who are embarking on longer projects of six months or more, I strongly recommend doing a pilot week of your schedule. This is simple: test your schedule for one week before you commit to it. This will give you firsthand knowledge of how difficult it will be and prevents overconfidence. If you already feel burned out after the first week, you may need to make adjustments. There's no shame in going back and retooling your plan to make it fit your life better. Making this kind of adjustment is a lot better than giving up midway because your plan was doomed from the start.

Step 3: Execute Your Plan

Whatever plan you started with, now is the time to do it. No plan is perfect, and you may realize that what you're doing for learning departs from the ideal, as established by the ultralearning principles. You may notice that your plan relies too much on passive reading rather than retrieval practice. You may see that the way you're practicing is a winding detour away from where you will actually want to use it. You may feel as though you're forgetting things or memorizing them without really understanding them. That's okay. In some cases, you won't be able to have the perfect learning approach because the resources to do so don't exist. However, becoming sensitive to how the way you're learning isn't aligned with the principles is a good way to feel out changes you can make to improve it.

Here are some questions to ask yourself to determine whether you're slipping from the ideal:

1. **METALEARNING.** Have I done research into what are the typical ways of learning this subject or skill? Have I interviewed successful learners to see what resources and advice they can recommend? Have I spent about 10 percent of the total time on preparing my project?
2. **FOCUS.** Am I focused when I spend time learning, or am I multitasking and distracted? Am I skipping learning sessions or procrastinating? When I start a session, how long does it take before I'm in a good flow? How long can I sustain that focus before my mind starts to wander? How sharp is my attention? Should it be more concentrated for intensity or more diffuse for creativity?
3. **DIRECTNESS.** Am I learning the skill in the way I'll eventually be using it? If not, what mental processes are missing from my practice that exist in the real environment? How can I practice transferring the knowledge I learn from my book/class/video to real life?
4. **DRILL.** Am I spending time focusing on the weakest points of my performance? What is the rate-limiting step that is holding me back? Does it feel as though my learning is slowing down and that there's too many components of the skill to master? If so, how can I split apart a complex skill to work on smaller, more manageable components of it?
5. **RETRIEVAL.** Am I spending most of my time reading and reviewing, or am I solving problems and recalling things from memory without looking at my notes? Do I have some way of testing myself, or do I just assume I'll remember? Can I successfully explain what I learned

yesterday, last week, a year ago? How do I know if I can?

6. FEEDBACK. Am I getting honest feedback about my performance early on, or am I trying to dodge the punches and avoid criticism? Do I know what I'm learning well and what I'm not? Am I using feedback correctly, or am I overreacting to noisy data?

7. RETENTION. Do I have a plan in place to remember what I'm learning long term? Am I spacing my exposure to information so it will stick longer? Am I turning factual knowledge into procedures that I'll retain? Am I overlearning the most critical aspects of the skill?

8. INTUITION. Do I deeply understand the things I'm learning, or am I just memorizing? Could I teach the ideas and procedures I'm studying to someone else? Is it clear to me why what I'm learning is true, or does it all seem arbitrary and unrelated?

9. EXPERIMENTATION. Am I getting stuck with my current resources and techniques? Do I need to branch out and try new approaches to reach my goal? How can I go beyond mastering the basics and create a unique style to solve problems creatively and do things others haven't explored before?

Together these principles serve as directions, not destinations. In each case, look at how you're currently progressing through your materials, and see what you could do differently. Do you need to switch resources? Do you need to stick to the same resources but spend more time on a different kind of practice? Should you seek out new environments for feedback, directness, or immersion? These are all subtle adjustments you can make along the way.

Step 4: Review Your Results

After your project is finished (or if you end up putting it on pause for some reason), you should spend a little time analyzing it. What went right? What went wrong? What should you do next time to avoid making those same mistakes?

Not all of your projects will be successful. I've had ultralearning projects that I felt good about. I've had others that didn't work out as well as I had hoped. Although the tendency is to blame willpower and motivation, very often the problems with projects can be traced back to their conception. I worked on one project devoted to improving my Korean, after my trip, by investing five hours per week. It wasn't as successful as I had hoped because I didn't invest enough time in focusing on immersive, direct practice from the get-go. Instead, my study method depended a lot on textbook exercises, which were boring and didn't transfer too well to the real world. If I had thought a little more about it, I would have spent a week or two ahead of time trying to find places to practice, instead of trying to pivot midway, when I was already losing some motivation. This struggle illustrates that mastering the principles is a lifelong process. Even after many experiences learning languages, and knowing what works well, I slipped into a less effective approach because I didn't plan my project adequately. In other cases a project might not work out as you had hoped, but that lesson will still be valuable. I started with a project to learn cognitive science more deeply, going from a book list. Eventually, however, a lot of that project morphed into a desire to do research for this book, which put me into contact with a lot of science, now combined with an outlet for a more direct way to apply it.

Even your successful projects are worth analyzing. They can often tell you more than your failures because the reasons a successful project succeeded are the very elements you want to retain and replicate for the future. With

ultralearning, as with all self-education, the goal isn't merely to learn one skill or subject but to hone and enhance your overall learning process. Each successful project can be refined and improved for the next one.

Step 5: Choose to Maintain or Master What You've Learned

After you've learned your skill and analyzed your efforts, you have a choice to make. What do you want to do with the skill? With no plan in place, most knowledge eventually decays. This can be alleviated somewhat by following the principles of ultralearning. However, all knowledge decays without any form of intervention, so the best time to make a choice about how you're going to handle that is right after you learn something.

Option 1: Maintenance

The first option is to invest enough practice to sustain the skill but without any concrete goal of getting it to a new level. This can often be accomplished by setting up a habit of regular practice, even if it is a minimal one. As mentioned in the chapter on retention, one of the worries I had after the year without English project was that learning languages so intensively over a short period of time might lead not just to rapid learning but to rapid forgetting. As a result, I made an effort to continue practice after the trip finished, spending thirty minutes a week on each language in the first year and thirty minutes a month on each language in the year after that.

Another option is to try to integrate the skill into your life. This is how I maintain my programming skills, where I write Python scripts to handle work tasks that would otherwise be cumbersome or annoying. This kind of practice is more sporadic, but it ensures that I will keep it up enough to make it usable. This kind of lightweight usage is far from the deep math and algorithms I learned from my MIT coursework, but it is enough to keep a foot in the door if I want to embark on a bigger project at a later time.

Forgetting, as was discovered by Hermann Ebbinghaus more than a hundred years ago, falls off with an exponentially decaying curve. That means that memories that are retained for longer are less and less likely to be forgotten when you follow up at a later date. This pattern suggests that maintenance practice, too, can fall off on a decaying rate, so that the bulk of the knowledge you've acquired will be preserved. This means you might want to start with a habit of more serious practice but reduce the time spent on it a year or two after your project is finished to still get most of the benefit, as I did with the languages I studied.

Option 2: Relearning

Forgetting isn't ideal, but for many skills the costs of relearning the skill later are smaller than the costs of keeping it continuously sharp. There are a couple reasons for this. First, you may have learned more than you actually need, so if some of that knowledge selectively decays due to disuse, it is automatically going to be the less important knowledge that you acquired. I studied a lot of MIT subjects that I don't think I'll ever use again, although understanding the gist of them might come in handy later. Therefore, keeping my ability to prove theorems of modal logic, for example, up to date has only marginal value. Knowing what modal logic is and where I might apply it in case I want to learn something that requires it is probably enough.

Relearning is generally easier than first-time learning. Although performance on tests drops off dramatically, the knowledge is likely inaccessible rather than completely forgotten. This means that doing a refresher course or practice series can be enough to reactivate most of it in a

fraction of the time it took to learn it initially. This may be the optimal strategy for subjects that you need to use infrequently and for which situations for using them won't pop up without warning. Often, recognizing that a certain domain of knowledge is helpful for a particular problem type is more important than the details of solving the problem, since the latter can be relearned but forgetting the former will cut you off from solving those problems.

Option 3: Mastery

The third option, of course, is to dive deeper into the skill you have learned. This can be done through continued practice at a lighter pace or by following up with another ultralearning project. A common pattern I've noticed in my own learning is that an initial project covers a wider territory and some basics and exposes new avenues for learning that were previously obscured. You might identify a subtopic or branch of skill within the domain you were learning before that you want to follow up. Otherwise, you may decide to transfer a skill learned in one place to a new domain. One of my goals after returning from my trip to China was to learn to read Chinese better, which had been only an incidental goal while I was traveling there.

Mastery is a long road that extends far beyond a single project. Sometimes the barriers you overcome in your initial effort are enough to clear the way for a slow process of accumulation to reach eventual mastery. In many domains, getting started is quite frustrating, so it's difficult to practice without a certain amount of effort. After that threshold is reached, however, the process switches to being one of accumulating huge swaths of knowledge and therefore can proceed at a more patient pace. On the other hand, some projects will get stuck, and you will need to spend time unlearning and push through your frustrations again to get ahead. Those kinds of projects benefit more from the precise and aggressive methods of ultralearning to reach eventual mastery.

Alternatives to Ultralearning: Low-Intensity Habits and Formal Instruction

At the start of this book, I pointed out that ultralearning is a strategy. Being a strategy implies that it is good for solving certain problems. Given that the practice is somewhat uncommon, I wanted to spend the book focused on this strategy, rather than try to give a diffuse description of all possible ways you can learn effectively. However, now that I've done that, I think it's worthwhile to touch on two other strategies that can work with ultralearning, in different contexts.

None of the ultralearners I encountered approaches learning the same way for every kind of learning they do. Benny Lewis, for example, does do intensive learning projects for languages, but he has learned most of his languages over repeat visits to the countries they are spoken in, digging deeper into languages he previously established in intense bursts. Roger Craig did learn aggressively to win at Jeopardy!, but he also engaged in more leisurely acquisition of trivia when his appearance on the game show wasn't imminent. Being an ultralearner doesn't imply that everything one learns has to be done in the most aggressive and dramatic fashion possible. I want to briefly consider the two main alternative strategies to ultralearning to see how they fit into a bigger picture of lifelong learning.

Alternative Strategy 1: Low-Intensity Habits

Low-intensity habits work well when engaging in learning is spontaneous, your frustration level is low, and learning is automatically rewarding. In these

cases, when the barriers to learning are fairly low, all you need to do is show up. No fancy project, principles, or effort is required. Once you reach a conversational level in a language, for instance, it's often fairly easy to travel and live in a country where it is spoken, accumulating more and more vocabulary and knowledge over a longer period of time. Similarly, once you become good enough at programming to use it for your job, the job itself will push you to learn new things at a regular pace. If you've mastered the basics of a subject so that you can read denser books about it, reading books on the topic is mostly a matter of putting in time, not developing ingenious learning strategies.

Of course, there's a spectrum of habits, from zero-effort, spontaneous engagement to the high-effort, rapid skill acquisition of ultralearning. Most habits are somewhere in between, necessitating a bit of effort but perhaps not the full-scale intensity of an ultralearning project. You may have learned enough Excel to create your own spreadsheet macros, but you don't always find opportunities or time to use it, so you need to push yourself a little to practice. You may have learned public speaking well, but it still takes some guts to go onstage. The decision of whether the right step forward is to set up long-term habits or to create a concentrated ultralearning project is often not crystal clear and may depend more on your personality and life constraints than a hard-and-fast rule.

Habits tend to work best when the act of learning is mostly a process of accumulation, adding new skills and knowledge. Ultralearning and more deliberate efforts are better suited to when improvement in a field requires unlearning ineffective behaviors or skills. Increasing your vocabulary in a foreign language is often a slow process of accumulation; you are learning words you didn't know before. Improving your pronunciation, on the other hand, is an act of unlearning. You're training yourself to use different muscular movements that aren't natural to you. Ultralearning also tends to be better for areas in which learning has greater frustration barriers and psychological obstacles that make any form of practice too great an effort to be an easily established habit.

Throughout this book, we've explored the trade-off that occurs between doing what's effective for learning and what's easy and enjoyable.

Sometimes what's the most fun isn't very effective, and what's effective isn't easy. This trade-off may push you to opt for easier, more enjoyable forms of learning that sacrifice some effectiveness. However, in my own experience, I've noticed that enjoyment tends to come from being good at things. Once you feel competent in a skill, it starts to get a lot more fun. Therefore, although a tension between the two can exist in the short term, I think pursuing aggressive ultralearning projects is often the surer way to enjoy learning more, as you're more likely to reach a level where learning automatically becomes fun.

Alternative Strategy 2: Formal, Structured Education

In the beginning of this book, I explained that ultralearning is self-directed, although not necessarily solitary. Being self-directed is about who is making decisions, not about whether other people are involved. Therefore, there is no contradiction in pursuing ultralearning within a school or university. That might be the best way to learn the skills you want to acquire. Just treat it like any other resource.

That distinction notwithstanding, I think it's worth talking about other reasons you might want to pursue formal education rather than ultralearning.

The most obvious is to acquire credentials. If those are necessary or recommended for your chosen line of work, you might need to be satisfied with making sacrifices for your learning in order to acquire them. The message of this book isn't that you should drop out of school to learn on your own but that you should take control over your own learning, wherever that may be. Another reason to pursue formal education is that it creates a learning environment that may be beneficial. Although many aspects of school are woefully indirect and ineffective, others fare much better. Design and art schools often function like apprenticeships. Some programs allow for team projects that are difficult to start on your own. Finally, the postgraduate levels of academia create communities where immersion is possible, so that you acquire not only the ideas that are written down in books and papers but those that are communicated indirectly between experts in their fields.

Ultralearning isn't a rejection of those opportunities, and I would be disappointed if I were to be misread as arguing that they don't exist or are better replaced with a solitary learning effort. The correct mindset to cultivate isn't a rejection of anything slower or standardized but a recognition that the possibilities for learning anything are considerably broader than they might first appear.

Lifelong Learning

The goal of ultralearning is to expand the opportunities available to you, not narrow them. It is to create new avenues for learning and to push yourself to pursue them aggressively rather than timidly waiting by the sidelines. This is not going to be a method suitable for everyone, but for those who feel inspired to use it, I hope it provides a start.

Chapter 14: An Unconventional Education

Judit Polgár is widely considered to be the best female chess player of all time. At age seven, she won her first game against a chess master while blindfolded. At twelve, she was ranked fifty-fifth of all chess players in the world by the Fédération Internationale des échecs (FIDE) (World Chess Federation). By fifteen, she had become the youngest-ever grand master, beating the illustrious Bobby Fischer's previous record by one month. At her peak, Polgár was ranked eighth in the world and competed in the World Chess Championship, the only woman ever to have done so.

Chess is a game dominated by adult men. Thus a young girl competing was bound to arouse both the curiosity and the prejudice of her competitors. Grand master Edmar Mednis, facing off against the young Polgár, noted that he was very careful to play his best against the young prodigy, noting that "Grandmasters don't like to lose to 10-year-old girls, because then we make the front page of all the papers."¹ Some of her competitors celebrated the obvious genius of Polgár's play. Grand master Nigel Short said Polgár might be one of the "three or four great chess prodigies in history."² Mikhail Tal, a former world champion, suggested when Polgár was still twelve that she might eventually be a contender for world champion.

Garry Kasparov was less convinced. The former world champion has been considered by many to be the best chess player of all time. He is most famous for his matches against IBM's Deep Blue chess computer, winning against the machine in 1996 and losing in 1997, marking the transition to machine dominance in a game that had historically been considered one of the highest expressions of human creativity and intelligence. Kasparov was less than enthusiastic about the young Polgár's chances. "She has fantastic chess talent, but she is, after all, a woman. It all comes down to the imperfections of the feminine psyche. No woman can sustain a prolonged battle."³

That casual prejudice erupted into a full-blown controversy during their first match. Polgár, then only seventeen, sat across from the chess legend and former world champion, playing in a tournament in Linares, Spain. Although chess is often viewed as being coldly rational, as both players calculate moves with precision to reach their final outcome, the psychological effect of sitting opposite the dominant Russian can't be understated. Given that incredible tension, it was almost unbelievable when Kasparov, on move thirty-four, placed his knight and, after briefly lifting his fingers from the piece, changed his mind and moved it to a better square. Polgár was stunned. According to chess rules, once a player stops touching a piece, the move is done; no changes are allowed. Half in disbelief, she glanced at the referee, expecting him to indicate that Kasparov had cheated. Yet the referee didn't challenge the grand master. Reeling from the move, Polgár lost the game.

Asked why she hadn't challenged the illegal move herself, Polgár explained, "I was playing the World Champion and didn't want to cause unpleasantness during my first invitation to such an important event. I was also afraid that if my complaint was overruled I would be penalized on the clock when we were in time pressure."⁴ Still, after the game had concluded, she was incensed. She confronted Kasparov later in the hotel bar, demanding "How could you do this to me?"⁵ "She publicly accused me of cheating," Kasparov said when defending himself against the accusation. "I think a girl of her age should be taught some good manners."⁶ It would be years before

the two spoke again, but whereas Kasparov was already well established in the chess world, Polg r was just getting started.

Polg r is singular, not only for her prowess in the male-dominated game but also for how she learned to play. Unlike other famous players, such as Bobby Fischer, who spontaneously developed an obsession for the game, Polg r's chess genius was no accident. Instead, it started with one man's mission to raise genius children.

The Making of a Genius

Years before Judit faced down the legendary grand master, before her meteoric rise in chess or even her first game, her father, L szl Polg r, had made a decision: he was going to raise a genius. While studying intelligence in college, he had begun contemplating his project before having children or even a wife. "A genius is not born but educated and trained," he maintained. ⁷ Studying the biographies of hundreds of great intellectuals, he was convinced that genius could be manufactured. "[W]hen I looked at the stories of geniuses," he later remarked, "I found the same thing. . . . They all started at a young age and studied intensively." ⁸

But first, he had to find a partner for his pedagogical experiment. He found it in Kl ra, a Ukrainian foreign-language teacher. Far from your normal love letters, he first corresponded to her by explaining his idea to raise genius children. After agreeing to his proposal, the two met and were married in the Soviet Union before moving back to his native Hungary. Together the couple had three children, Zsuzsa, Zs fia, and Judit. Although Judit ended up becoming the most intensely competitive and famous, all three became world-class chess players, with Zsuzsa also becoming a grand master and Zs fia reaching the status of international master.

Living modestly in a cramped apartment, L szl and his wife decided to devote themselves full-time to their project of raising genius children. Their strategy was to begin the girls' educations early, at age three, and move on to specialization in one domain no later than six. They would start by introducing the girls to that subject slowly, in short bursts, and turn it into play so that they would actively want to practice rather than feel coerced into doing so. That strategy, however, didn't specify a topic. L szl and Kl ra considered many different possible study topics for their daughters, from foreign languages to mathematics. Eventually they settled on chess, because it was objective and progress in it was easy to measure. No doubt the preeminence of chess intellectually in the socialist countries in those years added weight to their decision to focus on the game.

Despite the emphasis on chess, L szl did not believe that such specialization needed to come at the sacrifice of the broader education of his girls. All three learned foreign languages (Zsuzsa, the eldest, learned eight), as well as mathematics, table tennis, swimming, and other subjects. The decision to focus on chess with all three girls was made for a practical reason: given the intense devotion both parents would need to have, in both resources and time, spreading their effort over three different disciplines would have been more than their budget or schedule could bear.

Zsuzsa was first to start. She began playing at age four. Six months later, she was going with her father to the smoke-filled chess clubs of Budapest, playing against elderly men—and winning. By the time it was Judit's turn, she was already motivated to begin her training. Zsuzsa and Zs fia played chess in a small room L szl had devoted to the game, and she didn't want to be left out.

Soon the three girls were a team, traveling around to compete against much older, usually male players. Their shared mission created camaraderie rather than jealousy in playing a game that very often pushed back against their unusual status. The Hungarian Chess Federation's policy was for women to compete in women-only chess events. However, L szl was strongly against the idea. "Women are able to achieve results similar, in fields of intellectual activities, to that of men," he felt. "Chess is a form of intellectual activity, so this applies to chess. Accordingly, we reject any kind of discrimination in this respect."⁹ Discrimination had already prevented Zsuzsa from obtaining the grand master title at fifteen. As the youngest, by the time Judit approached some of these barriers, her elder sisters had already broken them down a bit, allowing her to forgo competing in the women-only tournaments.

Although their education was the same and all three reached impressive heights in chess, the girls' prowess was not identical. Zs fia was the weakest of the three; although reaching the impressive grade of international master, she later decided to retire from chess to focus on art and her family. Zsuzsa had specialized a little less in chess from an early age, learning eight languages, which her father admits might have distracted her from reaching her maximum chess potential. Judit started more slowly, according to Zsuzsa, but she had the strongest work ethic, being "obsessed" with chess to a degree unusual even for her family.

Rematch with Kasparov

Eight years after her controversial defeat by Kasparov, Judit had another opportunity to face down the legendary grand master. In the 2002 Russia Versus the Rest of the World match in Moscow, Judit faced off against Kasparov in a game of rapid chess, with only twenty-five minutes allocated to each player. Judit played the Ruy Lopez, or Spanish game, named after the sixteenth-century Spanish bishop and chess strategist. This uses one of the most common openings in chess, moving the knight and bishop out to good squares on the second and third moves. Kasparov countered with the Berlin Defense, moving a second knight to the board while ignoring the potential danger created by his opponent's bishop; this was known to be a solid counter, often leading to draws. Kasparov wasn't taking any chances. After a flurry of exchanged pieces, both positions were quite close. Judit, as white, had castled her king into safety. Kasparov, as black, in losing the opportunity for the same safety had retained both the light-square and dark-square bishop pair, a powerful combination that can often be decisive in winning a game. Judit calmly pushed forward, cornering one of Kasparov's bishops and neutralizing his advantage. Slowly but surely, her moves continued to improve her position while Kasparov's looked increasingly questionable. Eventually, the small positional advantages Judit had accumulated over the midgame were threatening to win. Two pawns down and facing looming threats of checkmate, Kasparov resigned.

Following his defeat, Kasparov revised his earlier assessment of Judit's ability and indeed the idea of women competing against men at the highest levels of the game. "The Polg rs showed that there are no inherent limitations to their aptitude—an idea that many male players refused to accept until they had unceremoniously been crushed by a twelve-year-old with a ponytail."¹⁰

The Aftermath of an Experiment

L szl Polg r's conviction that he could turn any healthy child into a genius is the kind of assertion that would make him seem like a crackpot if he hadn't actually been successful. Nonetheless, a careful reader will note that, as far as

experiments go, L szl 's has plenty of holes that keep it from becoming a model of scientific purity. There was no control group, for starters. All three of the Polg r sisters received the same education. There was no fourth sister who went to school the normal way and missed L szl 's special training. There was no randomization. L szl didn't adopt a random child to raise in his unusual system but taught his own. This also means that the influence of genetics can't be ignored. The success of all three children may be owing to hereditary, rather than acquired, talents. There was also no blinding. All the Polg rs knew they were part of something special, a unique mission that set them apart from other families. Therefore, in the ongoing debate between nature and nurture, the success of the Polg r sisters might be suggestive of the role that unorthodox education can play, but it is far from definitive. Despite its failings as a purely scientific experiment, the Polg rs' work is certainly a window into what might be possible. All three girls achieved enormous results in chess. Although we cannot know for certain, it seems likely that they could have succeeded in any number of other domains as well. Similarly, although L szl 's methods were strange, it does not seem as though the girls suffered, either in their broader education or in their emotional well-being. They were self-confident and happy and grew up to be successful, emotionally stable adults with loving families of their own. When asked whether his strange pedagogical methods had robbed his girls of a normal childhood, L szl argued the opposite, that it is a normal, mediocre education that often leads to unhappiness. Interviewer Endre Farkas, who worked with Polg r on his book *Raise a Genius!*, asked, "Have they been educated too narrowly, deprived of a carefree childhood? I was able to observe the Polg rs. . . . One can clearly see that they are happy."¹¹

Educating Ultralearners?

Prior to doing the research for this book, all of the ultralearners I had met were ambitious self-starters. I was convinced that ultralearning was something that held great potential for the individual. However, owing to the intensity and commitment required by the learners themselves, I was skeptical that ultralearning would have any direct implications for the educational system at large. Children already struggle against onerous studying conditions, and it seemed to me that increasing the intensity of study would only increase their stress and anxiety.

Psychologists recognize a large difference between goals that people pursue intrinsically, based on their own interests, decisions, and targets, and goals that they pursue extrinsically, pushed by overbearing parents, punishing curricula, or demanding employers. The latter type, because the motivation for conforming to them comes primarily from outside social pressures, are the cause of much misery. Tales of depression, anxiety, and even suicide are distressingly common in environments where the pressure to perform on standardized tests is ratcheted up to an uncomfortable degree. Ultralearning, because it is a self-driven quest, not an externally imposed obligation, doesn't need to be this way. However, because of its very nature, it was unclear to me whether it was something that could be taught.

The Polg r sisters are an unusual case, then, because although they were trained from a very early age and worked incredibly hard, they don't seem to have been harmed psychologically by the pressure. In contrast to the stereotypical "tiger" parent, their parents encouraged their unusual specialization through play and positive feedback, not authority and punishment. The Polg r sisters all continued to play chess well into

adulthood at the competitive level. The obsession into chess, therefore, was clearly something fostered, rather than imposed. At the same time, their participation in the experiment wasn't exactly voluntary. L szl had dreamed up his goal of raising geniuses before knowing whether his children would consent to the program, so it was not a case of each daughter discovering for herself that she wanted to devote herself to an intense regimen of chess practice. That feature of the Polg r experiment interested me the most, because it seemed as if L szl and Kl ra had found a loophole in the normal expectation that pushing others to study intensely necessarily leads to misery.

How to Raise an Ultralearner

L szl Polg r wrote a book entitled *Raise a Genius!*, documenting his unorthodox approach to education.* In the book, he outlined his strategy for turning any normal, healthy child into a genius, provided the parents are willing to go to the extremes he and his wife dedicated to the task.

The first step is to start early. The child's education should begin no later than three, and specialization should begin no later than six. Although the exact extent to which learning becomes harder as we age is unclear, there is evidence from fields such as music and languages that children's brains are more plastic and flexible when younger. L szl took this idea to the extreme, encouraging training far earlier than is typical for early-childhood education.

The second step is to specialize. Although the Polg r sisters did learn languages, mathematics, sports, and other subjects, their focus was always on chess. L szl noted that "starting from 4–5 they played chess 5 or 6 hours a day."¹² That specialization seems to have had two roles in his strategy for raising geniuses. The first is that it took advantage of any hypothetical flexibility that younger children possess to learn new subjects easily. The second is that by specializing in one subject, the children could reach proficiency at a much younger age. Winning against older and more experienced opponents in chess built their confidence and competitive spirit, so that they actively wanted to practice more to improve themselves. Had the girls spread their intellectual appetites too broadly, they might not have developed the self-confidence that leads to intense practice.

The third step was to make practice into play. Chess, being a game, is naturally suited to play. However, L szl was insistent on introducing all subjects to the girls as forms of play. When the girls would become distracted or get up and wander around while playing a game, they weren't punished but encouraged to let their minds wander as they sought a solution. Keeping the game fun and light, especially when the children were young, was a key stepping-stone to developing the drive and self-confidence that would support more serious efforts later. However, it is important to keep in mind as L szl insisted that "play is not the opposite of work" and "a child does not need play separate from work, but meaningful action," adding "learning presents them with more enjoyment than a sterile game."¹³ Play and work combined in the Polg rs' approach to learning, with no rigid boundary between them.

Fourth, L szl was careful to create positive reinforcement to make chess a pleasant, rather than frustrating, experience. "Failure, suffering, and fearfulness decrease achievement. Following a number of successive failures, even a damaging inhibitory complex can be created," he explained.¹⁴ Starting with the behaviorists, psychologists have known in detail that having a positive experience, such as winning a game, can create a desire to repeat the behaviors that led to the experience. Negative experiences, from losing, becoming confused, or experiencing frustration against a stronger opponent

to facing an opponent who is too easy and robs the player of the satisfaction of pulling off an impressive victory, reduce enthusiasm. L szl carefully established the cycles of positive feedback early on. In the beginning, when he was still a stronger player than the girls, he would adjust his play so that they would be challenged but still win enough of the time to find the game enjoyable. “We should make sure not to always win against the child; we should let them win sometimes so that they feel they are also capable of thinking,” he wrote, adding “At the start it is most important to awake interest. . . . We should get the child to love what they do—to such a degree that they do it almost obsessively.”¹⁵

Finally, L szl was entirely against coercing learning. Self-discipline, motivation, and commitment, he felt, must come from the girls themselves. He explained, “One thing is certain: one can never achieve serious pedagogical results, especially at a high level, through coercion.”¹⁶ He also felt that “one of the most important educational tasks is to teach selfeducation.”

¹⁷ This final step of his process was particularly important for his daughters, as they quickly outpaced their father’s ability. Had they not been encouraged to develop their own abilities to teach themselves and adjust their learning, they might have become decent chess players but certainly not grand masters.

In addition to these basic principles, L szl and Kl ra devoted themselves intensely to providing every opportunity for the advancement of their daughters, cultivating a database of more than two hundred thousand matches, buying every chess textbook they could find, and recruiting chess tutors for their daughters. The girls lacked no opportunity to study and improve at the game. The Polg r house, with diagrams of chess positions hanging on the walls, became a temple devoted to the practice of the ancient game. For L szl and Kl ra, raising their children was more than a full-time job as they fostered the girls’ talents by both assembling resources and schooling them at home.

Ultralearning Principles in Action

In addition to Polg r’s principles of raising genius children, I found it interesting that all of the principles of ultralearning I’ve discussed this far were present in their approach to learning.

1. Metalearning

Polg r devoted himself full-time to understanding how people learn chess and under what conditions his daughters would thrive. He created a huge library of chess positions, strategies, and lists of games, which, in the days before widespread internet, was no small feat. He also articulated a plan for coaching the girls in the game when they were still very young, starting by teaching them first to name the squares on the board and later to know how the pieces moved. That slow progression allowed the girls to pick up the game even before their other cognitive abilities had developed.

2. Focus

L szl considered “the ability to handle monotony, the capability to sustain interest and persistent attention” as key traits he aimed to instill in his daughters. The girls twice took part in twenty-four-hour chess marathons when they were fifteen, nine, and eight years old, respectively, needing to complete one hundred matches in the time period. Chess is a game not merely of flickers of brilliance but of endurance and stamina. Training focus was a large part of L szl ’s system for his daughters, as he encouraged them to focus their minds on the problem and not get distracted.

3. Directness

L szl took his daughters to games with men when they were as young as four, showing them how the game was to be played against opponents who would really offer a challenge. The girls played many, many games of chess, which formed the backbone of their abilities. That allowed them to learn not only how to play the game well but also to deal with variables such as time pressure and the psychological insecurities of playing against older, more intimidating opponents. By using chess timers even for casual games, the girls practiced in an environment that more closely matched the one they would face in tournaments.

4. Drill

L szl varied the approaches to studying the game, starting his daughters off with memorizing first the names of the squares, then the movements of key pieces. Chess puzzles, hanging from the walls of the house, became the girls' homework, as they had to solve the different tactical positions and come up with creative solutions. Blitz and blindfolded games allowed the girls to get better at thinking more quickly and mentally simulating the game.

5. Retrieval

For retrieval, L szl explained, "We should not tell them everything; we should try to get the child to say something!" Using what he described as the "Socratic method" for chess, posing questions his girls must answer instead of telling them to remember a presolved solution, he was using the right method to encourage the expansion of their memory and understanding. Blindfolded games, once again, formed a powerful component of the girls' strategy. By practicing without looking at the board, it forced them to cultivate the ability to follow positions in their head, which was useful not only for retaining key chess patterns long term but also for honing the ability to simulate moves on the board that an opponent might play.

6. Feedback

L szl encouraged considerable play with real opponents but was careful to select "suitable partners, who have a generally similar playing ability." Interestingly, the feedback here was carefully controlled, not only to provide the girls with enough challenge (the Polg rs' insistence on playing in men's tournaments in order to face such a challenge was an example of this) but also to avoid too great a challenge when their abilities were still nascent. Cultivating positive feedback was important early on, and L szl was ever ready to adjust the flow of the game to make sure it was at a level that would stimulate further play.

7. Retention

L szl focused on having the girls recall chess patterns from memory and increased the speed of games to make elements of their play more automatic and less susceptible to forgetting. Memorizing chess patterns is a large part of playing the game successfully, and this was aided both by spaced practice and through specialized drills such as blitz and blindfolded games.

8. Intuition

Mirroring the Feynman Technique, L szl encouraged his girls to write articles about chess, explaining, "If one writes an article, one considers a matter more deeply than without a goal, thinking alone or speaking with someone about it." The girls were also encouraged to come up with creative solutions to problems. Play, not merely in the sense of chess being a game but also in the sense of an unconstructed, goalless activity, was part of the teaching strategy. Coming up with interesting solutions and challenging the

girls to think of tricks and new insights allowed them to explore outside what could be offered by memorizing past results.

9. Experimentation

As the Polg r sisters eclipsed their father in chess ability, their impetus to continue mastering the game increasingly had to come from within themselves. Each of the girls had to cultivate her own unique style and approach. Judit chose to focus on tricks and tactics, writing that “opening preparation was not at all important at that time. This may be a reason why, even today, my strongest area remains the middlegame.”¹⁸ The girls’ varying choices show that chess, like any creative skill, involves not merely a mastery of patterns but also choices about what skills and styles to cultivate within a vast range of possibilities.

Finally, the Polg rs embodied the idea of ultralearning at its broadest, with L szl arguing, “In my opinion, we should disseminate the idea of intensive learning in every field.” The success of the Polg rs follows the same pattern as that of most of the ultralearners I have met: aggressive, enthusiastic selfeducation following the key principles of learning.

Fostering Ultralearning in the Home, School, and Workplace

How can you foster ultralearning as a parent or educator or in an organization? Is it possible to help others self-confidently tackle difficult learning projects of their own design? Can you teach students not just the material they need to study but how to learn on their own, so they will be self-sufficient outside the classroom? Can you lead the individuals in your organization to learn more aggressively, filling gaps in their competency and achieving their full potential? These are all intriguing questions to which we don’t yet have definitive answers.

In reading the scientific literature on learning and following up with the ultralearners’ stories, I was struck not only by how much is known about learning already but by how many open questions exist for which researchers and autodidacts are still hazarding hypotheses. The complications expand exponentially once you introduce the social environment as well. Now it’s no longer a question simply of individual cognition but of the emotions, culture, and relationships that start to influence learning in complex and unexpected ways. From this perspective, therefore, I’d like to cautiously suggest some starting points for fostering an environment that will support ultralearning, at home, in the school, or in the workplace. These suggestions aren’t rules, but they can be seen as starting points for enabling others to capture the ultralearning spirit.

Suggestion 1: Create an Inspiring Goal

Better yet, allow people to design their own learning goals that inspire them. Inspiration is an essential starting point in the process of ultralearning. There must be something very compelling for a person to summon up the energy and self-discipline needed to learn. Sometimes that is the promise of a new skill bringing career opportunities. Coding boot camps, which have sprung up in the wake of high-paying programming jobs, push students through at a brutal pace, sometimes approaching eighty hours a week. The goal, however, is compelling enough to justify this investment: complete a rigorous program over the course of a few weeks, and you can rise up the ladder of high-salaried tech jobs in Silicon Valley and elsewhere. The process is intense, but the motive is compelling.

In other cases, the motivation for ultralearning comes from an intrinsic

interest that becomes amplified. My own MIT Challenge started with feeling I had missed out by not studying computer science in school. Normally, that wouldn't have led to any large, structured effort to learn a lot of computer science. It was only when the idea of doing an entire degree in a shortened period of time, along with the research that made me think it might be possible, that my initial interest become a passionate commitment. Roger Craig, with his Jeopardy! exploits, was always interested in trivia competitions. It was only when he recognized that there might be a chance to appear on the famous television show that his interest became an obsession. Eric Barone took his love of a childhood video game and expanded it into an effort to create a better version. Seeking out people's natural interests for ultralearning means encouraging the sparks that already exist, rather than merely imposing on them the topics you feel would be most beneficial. Once people see the structure of an ultralearning project, they can start thinking for themselves what would be most interesting, exciting, and useful for them to work on. Tristan de Montebello started with the idea of ultralearning and only later chose to craft a public speaking project around it.

Suggestion 2: Be Careful with Competition

The Polg rs' example clearly indicates that early self-confidence can create an enthusiasm that leads to continued investment. You don't need to feel as though you're good at something to invest energy into learning. After all, becoming good at something is what learning is. However, you need to feel that you could be good at it. People tend to make their perceptions of inadequacy into immutable destinies: "I'm no good at math," "I can't draw anything but stick figures," "I don't have the language gene." Although there likely do exist real differences in innate ability, so that these pronouncements aren't completely false, they tend to ignore an important factor: motivation. When you see yourself as lacking the potential to be good at something or believe that you'll always be behind everyone else no matter how hard you work, it robs you of the motivation to work hard. Thus, although there are differences in ability among all of us, they can often be exacerbated by the affective dimension they create in how we feel about learning. Feel as though you're lousy at doing something, and you're robbed of the motivation to change.

The reference group you compare yourself to can have a powerful influence. I find it interesting that many, but not all, ultralearners aimed at projects that were so unusual that they made it hard to compare them to a normal reference group. De Montebello's public speaking competition certainly pitted himself against excellent public speakers. That might have created a feeling of inferiority, except that de Montebello could always explain to himself any perceived deficits as coming from trying such an ambitious project with so little prior experience. Had it been the case that instead of an individual ultralearning project, he had been pitted against a dozen other competitors with exactly the same prior experience, he might instead have rationalized any perceived inadequacy as his simply not being good enough. This suggests that the competitiveness of the project cuts both ways: When you have a natural talent and thus perform much better than the easily identifiable reference group, you'll have more motivation to practice and learn with intensity. However, if you come up short, it may rob you of the motivation to practice. The Polg rs used competition to their advantage. Because the girls' training started unusually young, they were always seen as precocious and the competitive environment enhanced their motivation. Had

they started late or been put into a school where they weren't guaranteed to be star performers, their motivation might have been sapped.

To me, such motivational effects, coming from implicit comparison to a reference group, suggest adopting a twofold approach. If a person in whom you want to encourage an ultralearning spirit has a natural aptitude, competition is probably good. Seeing him- or herself do well in direct comparison with others may encourage a commitment to further improvement. For a person who either is of moderate ability or is behind other people, such as learning a skill in a domain in which he or she has no experience, or who is starting to learn a new skill later in life, you should make an effort to make the project unique. This will encourage the person to frame his or her progress by comparing to his or her past self, not due to competition with others. Sometimes a project can start out being unique, thus sheltered from the harsh light of unfavorable comparison, and move to a more competitive environment once confidence has been established. For example, you might start learning programming by creating a game that is hard to compare to others but enter coding competitions as you begin to feel more competent.

Suggestion 3: Make Learning a Priority

Outside school, learning is usually seen as a by-product of doing a job, not the core goal. Though organizations often give lip service to ongoing training and education, it's usually in the form of workshops or seminars that one sits through passively before getting back to the real job at hand. Ultralearning, by encouraging direct, intensive practice, provides the opportunity for a kind of fusion project—one that accomplishes real objectives but is also designed to teach something new.

The normal protocol for assigning a project is to find the best person for the job and give them the task. A learning-driven approach would suggest instead that people who are not yet capable of doing the task might be assigned to the project. An ultralearning-driven work environment might consist of employees' spending a majority of their time on projects that are within or near their competency levels but devoting a specific fraction of their time to working on projects that are a leap above their current abilities.

Although this is purely hypothetical, I imagine two benefits of this approach. First, it will create a culture of learning within an organization where people are always willing to try to solve problems they don't yet know how to solve, instead of expecting someone else to know the answer already. Second, it will help reveal talent by giving people challenges they can rise to. If mentorship opportunities and difficult projects are assigned only on a whim by managers, they will likely miss a lot of people who may have the ability to succeed in difficult positions but are never given the opportunity to do so.

At the highest levels, an ultralearning-driven culture also allows learning to go into areas where perhaps nobody else has a particular skill. Although going between established levels of skill is important, it is when one learns to do something that nobody else can do that learning becomes truly valuable.

Conclusion

In many ways, writing this book has been an ultralearning project. Although a writer researching for a book is hardly unique, not all ultralearning projects need to be one of a kind to matter to the person doing them. Sitting in my den at home are stacks of binders filled with thousands of pages of printed journal articles. My bookshelf now has dozens of obscure, out-of-print monographs on thin slices of the question of how people learn. Recordings of calls with

various researchers helped me realize how much nuance there is to even simple questions such as “Is feedback helpful?” and “Why do people forget?” I’ve poured over numerous biographies of famous intellectuals, entrepreneurs, and scientists to try to arrive at an understanding of how they approached learning. In many ways, the process of writing this book was a reflection of its subject—an ultralearning project to write a book about ultralearning. Although I had a strong interest in the subject of learning and had browsed textbooks, articles, and biographies before I began research into this book, it was only after I started this structured project that I really began to dig deep.

Beyond research, this book was a challenge for me as a writer. My writing experience comes from blogging, not authoring books. Striking the right tone in a book is hard, and it’s quite different from the casual daily missives in a blog. I knew from the start that I wanted to share the stories of others and their exploits, not just recount my own experiences. That was initially quite challenging. Most biographies and published stories don’t focus on learning methods. Even when learning is the central theme of the story, most biographers are satisfied to be in awe of talent, rather than dig into the specific details of how a person did a particular thing. My research efforts frequently involved scouring a five-hundred-page biography for the several paragraphs in which concrete details about learning methods were mentioned in passing. Although this created challenges, it also forced me to develop new skills as a writer. I had to improve my research and writing skills in ways that more than a decade of penning blog articles never had. Even the style of the book created a skill-challenging project for myself. I’ll leave it to you, the reader, to judge whether I was successful.

The metaproject of ultralearning to write a book about ultralearning also illustrates some important ideas. For one, although I’ve made enormous improvements in my writing ability and knowledge of cognitive science and stories of famous learning exploits, there is still far more to learn. Digging into the science, for instance, one can quickly develop a sense of vertigo standing atop the mountain of papers, theories, ideas, and experiments, all loosely connected to the topic of learning. Similarly, for every biography I read, there were hundreds I could not. For every ultralearning story I encountered, there were likely dozens more my searches didn’t reveal. It is a profound error to claim that learning is about replacing ignorance with understanding. Knowledge expands, but so does ignorance, as with a greater understanding of a subject also comes a greater appreciation for all the questions that remain unanswered.

In the face of this, one must simultaneously have confidence and deep humility. Without the belief that progress in one’s own knowledge and skill is possible, one cannot undertake the project required to generate it. This kind of confidence may be mistaken for arrogance by outsiders, as it can seem that an effort to learn something quickly and intensely is somehow an assertion that the subject is trivial or that, having learned something, one has learned everything. Instead, this confidence must be paired with deep humility. In every project I’ve undertaken, including this one, my thoughts upon concluding it were not to think I had finished but to suddenly become aware of how much further I could have gone. Before I started my MIT Challenge, I imagined that covering an undergraduate degree’s worth of computer science concepts would be plenty. After I had finished, I could see how each topic I had learned could be multiplied into a doctorate’s worth of research or a

lifetime spent coding to fully understand it. My experience in learning languages to a level where I could hold conversations made me realize how many more words, expressions, nuances of culture, and difficult communication situations were left to explore. Finishing a project, therefore, isn't usually accompanied by a sense of finishing learning but by the creation of a feeling of possibility as one's eyes are opened to all the things left to learn.

It's this aspect of learning that I find most interesting. Many pursuits in life have a kind of saturation point, after which the longing for more of a thing eventually diminishes as you get more of it. A hungry person can eat only so much food. A lonely person can have only so much companionship. Curiosity doesn't work this way. The more one learns, the greater the craving to learn more. The better one gets, the more one recognizes how much better one could become. If you finish reading this book and have been encouraged to try your own project, this would be my greatest hope—not that you'd be successful at your project but that your ending would be a beginning. That by opening a small crack in all the possibly knowable things there are in the world, you might peer through and find there is far, far more than you had ever imagined.

Step 194 - How To Become Straight A Student

Efficiency. The simple truth is that the brute force techniques used by most students are incredibly inefficient. When it comes to exam preparation, passive review is not an effective way to learn complicated concepts. It's also mentally draining, which further diminishes the rate at which you can absorb and internalize information. For paper writing, this same problem holds. When you approach the task without proper preparation, it becomes incredibly tiring and you can end up spinning your wheels. After a while, even the formation of coherent sentences becomes difficult and time intensive. In contrast, the techniques I came up with were so streamlined that I could learn more material than my classmates and actually spend less time studying. By eliminating stupid habits and wasted effort, I transformed exam prep and paper writing from a dreaded chore to a targeted activity. You will learn how to:

- Manage your time and deal with the urge to procrastinate.
- Take targeted notes in class.
- Handle reading assignments and problem sets with ease.
- Prepare efficiently for exams.
- Master the art of exam-taking.
- Write incisive critical analysis essays.
- Conduct thorough research.
- Write standout term papers.

A big part of the solution is timing—they gain efficiency by compressing work into focused bursts. To understand the power of this approach, consider the following simple formula:

work accomplished = time spent x intensity of focus

With this formula in mind, you can begin to understand why many straight-A students actually study less than their classmates: They replace long, low-intensity stretches of work with a small number of short, high intensity sessions. Of course, this is not the whole story behind their success; what straight-A students actually do in these short bursts is also crucial—technique is just as important as timing. Part Two (Quizzes and Exams) and Part Three (Essays and Papers) of this book are dedicated to these technical details. But learning how to follow an efficient schedule, and banishing pseudo-work from your college experience for good, is a crucial first step toward your academic overhaul.

Quizzes vs. Exams

If the test is worth less than 15 percent of your final grade, it's a quiz; otherwise, it's an exam. If the test is worth only 5 percent or less of your grade, designate this a tiny quiz. Don't spend too much time on tiny quizzes. Even if you fail one, it still probably won't change your final letter grade. And if you're attending classes and keeping up with your reading, you should be able to score above average with little to no preparation.

Step 1

Take Smart Notes

Gather the Right Materials When I was a freshman, less than half of my class brought a laptop to campus. The year I graduated, over 95 percent of incoming freshmen brought laptops. By the time you read this, laptops will more or less be the de facto standard for undergraduates across the country, and this is a great advancement for the cause of collegiate note-taking. Why? I think David, another Dartmouth student, put it best: "Use your laptop. Seriously! You will be overwhelmed by the quality and legibility of your notes... it's really a no-brainer."

Take Smart Notes in Nontechnical Courses (What's the Big Idea?)

The key to doing well in these courses is straightforward: Identify the big ideas. That's what it all comes down to. Exams in nontechnical courses focus entirely on big ideas—they require you to explain them, contrast them, and reevaluate them in the light of new evidence. If you are aware of, and understand, all of the big ideas presented in the course, these tasks are not so difficult, and strong grades will follow. As you would expect, lectures are a major source of these big ideas. Identifying them, however, is not a trivial task.

Professors ramble. And they rarely start a class by clearly identifying the big ideas that will be explored. Instead, they tend to dive right in, leaving the poor student to separate on his own the interesting conclusions from the digressions.

Format Your Notes Aggressively

When it comes to formatting the text itself, the basic rule to follow is that anything that makes the information easier to read is fair game. You don't need a consistent scheme. Don't be afraid to use aggressive text formatting to help emphasize important points. On a computer, smart students often make use of bold fonts and lists to help organize their thoughts. Capture Big Ideas by Using the Question/Evidence/Conclusion Structure Keep in mind that professors don't always state the question. Often they jump right into the evidence and leave it to you to deduce the question being discussed. Don't be afraid to jot down "QUESTION:" and then leave the rest of the line blank as you begin recording evidence. Once you figure out what the professor's talking about, you can go back and fill in this blank.

The same holds true for conclusions. Professors will sometimes hint at a conclusion but not come right out and present a neat endpoint for the current discussion. In this case, it will be up to you to synthesize the question, evidence, and professor's hints into a conclusion of your own. This is the important part. When you formulate a conclusion, you are cementing a big idea. If you can't finalize a conclusion before the professor moves on to the next question, simply jot down "CONCLUSION:" and plan to come back later during a lull in the lecture, or immediately following class, to fill in the blank.

Step 2

Demote Your Assignments

Work Constantly

Most college students depend on “day-before” assignment planning, meaning they never start an assignment until the day before it’s due. This might be the simplest scheduling decision, but it creates many problems. Large assignments will quickly transform from potentially interesting to tedious to painful when tackled in one monolithic, last-minute chunk of time. And, if two or more assignments happen to be due on the same day (which will happen often), you will be forced into a frenzied work marathon that will produce lackluster results at best. Smart students avoid these issues by working constantly on assignments, in small chunks, every day. “I try to sit down every Sunday night and plan out the week,” explains Simon, a straight-A student from Brown. “My goal is to make sure that I don’t have too much work on busy days and that I do at least a little bit each day.” For example, if you have a problem set due every week, complete one problem a day, one hour at a time. Don’t spend five hours the night before. The same goes for reading assignments—knock off a chapter a day, and you’ll never find yourself spending a lonely night with a textbook and a six-pack of Red Bull.

Bear in mind that even if you get caught up on all of your assignments for a given class, you should continue to work. For example, if it’s Sunday morning and you have already finished your reading for Monday’s history class, and you have time to spare, break out a book and do a little of the reading for Wednesday’s history class. This doesn’t mean that you should study like crazy twenty-four hours a day. Don’t stay up until 2 A.M. Sunday night trying to finish the entire week’s load. But on days where you happen to be ahead of schedule, and you have already put aside time to work on a certain class, take advantage of this fortuitous situation to get ahead. Once you get used to working a little bit every day, you’ll be surprised by how often this situation might arise.

Don't Read Everything

For example, in most college courses there are one or two sources that show up on the reading list for almost every lecture. We will call these favored sources— they're usually a textbook or a course reader, and they provide the basic structure for the course by outlining key facts and arguments in a condensed form. Always read the assignments from favored sources.

Professors usually augment these favored sources with a variety of supplemental readings that provide context or analyze certain arguments and events in more detail. These supplemental readings are often academic papers, transcripts of speeches, or chapters from books —and they are typically fascinating. But they are also typically expendable, and you should not plan on reading them all. Instead, if your time is limited during a particular week, then your strategy should be to select only the most important supplemental readings for review. So how do you decide which supplemental readings to review, which to skim, and which to skip? Straight-A students follow this simple hierarchy: Readings that make an argument are more important than readings that describe an event or person, which are more important than readings that only provide context (i.e., speech transcripts, press clippings).

Confirming Your Decisions

You should always use the lecture itself to confirm your choice about what to read and what to skip. If the professor emphasizes the importance of a work that you dismissed (which will happen occasionally—this system isn't perfect), then make a note that you will need to go back and cover this reading in more detail before the next exam. A smart technique is to simply write these skipped readings right onto your syllabus as an assignment for a later class. Choose a day with a light reading load, and treat the assignment as if it was given to you by your professor. If you don't explicitly schedule a time to cover this material, you will invariably procrastinate and then find yourself with a huge reading list to cover right before the exam.

Take Smart Notes on Your Favored

Reading Assignments

We've discussed which readings to ignore or skim. But the logical next question is what to do with the favored sources that you decide to read carefully. In this situation, how you take notes on the reading makes a big difference. If you write down very little, the assignment can be completed fast, but the time will be wasted because you won't have bothered to extract the big ideas in a way that makes them accessible when it comes time to study. If, on the other hand, you take detailed notes on every paragraph, your assignments will take way too long to complete. The best compromise is to use a strategy similar to the one outlined earlier for taking lecture notes. To refresh your memory, the core of this strategy is that all big ideas can be reduced to a question, evidence, and conclusion. This approach can work wonderfully for reading assignments as well. Apply it as follows:

First, as with lectures, try to take notes on your computer. They will be more organized and easier to computer. They will be more organized and easier to follow later on, when you use them for review. In addition, typing makes it easier to record more and finish faster. Next, carefully read the beginning of the assignment. Look for the question being answered by the author. Note that this is different than a thesis statement. For example, "Why did the Clinton health care plan fail?" is a question. "The Clinton health care plan failed because of resistance from commercial health care providers" is a thesis. In a reading assignment, the question can usually be found in the title or perhaps explained in the first few sentences. Record this in your notes, and label it clearly. Next, look for the

author's conclusion (the thesis statement). This is perhaps the most difficult part, since academics are known to propose complicated answers to their questions, especially when writing. So it may take some serious consideration to figure out what's being suggested. Search the first few paragraphs; this is typically where the conclusion is hidden. Also check the final few paragraphs. Often a thesis is proposed at the beginning of an article but then refined slightly at the end once all of the supporting evidence has been presented. When you feel confident in your understanding of the conclusion, record it carefully in your notes. Don't worry if it takes several sentences to capture the point—err on the side of being thorough. Now comes the easy part: Skim the entire reading. Now comes the easy part: Skim the entire reading. Don't take notes yet. Instead, use a pencil to make checkmarks next to important paragraphs that jump out at you. Because you are reading fast, you may miss some points—don't worry. "Just get the gist of the author's message and how he is supporting that message with evidence, then move on," explains Jason, a straight-A student from the University of Pennsylvania. You don't need to capture everything. Your goal is simply to mark a few solid examples that justify the conclusion as the answer to the question. Once you have skimmed through the entire reading, go back and find your check marks. For each mark, record in your notes a concise summary of the corresponding point. Label each point in your notes with the page number where you found it. This shouldn't take long. Don't worry about being formal or grammatically correct. Just dump these pieces of evidence into your notes. When you're done, your notes should contain a clearly labeled question followed by a half-dozen or so bullet-pointed pieces of evidence, then a clearly labeled conclusion.

Don't Work Alone on Problem Sets

Perhaps the most important rule for taming the problem sets assigned in technical courses is to follow our earlier rule and work on them constantly. As Ryan, a straight-A student from Dartmouth, explains: "You can work on problem sets in small pieces while you're between classes or activities." Concentrating on only one or two problems a day will help you avoid mental fatigue. Once your brain gets tired, it's easy to stall—but if you spread out your work, you will end up spending fewer hours on the assignment than if you tried to do it all at once.

Even with a smart schedule, however, you will probably still get stuck occasionally. When this happens, use all the available resources to help you get unstuck. If you're allowed to collaborate with your classmates, which is often the case in technical courses, definitely take advantage of this opportunity. As Greta from Dartmouth explains, working in groups "can drastically cut the time required to finish a really hard problem set." Identify one or two students who share a similar skill level. Identify one or two students who share a similar skill level as you and then construct a regular schedule for working together on the class assignments. Set your meeting dates for two or three days before the deadlines; this gives you time to first try the problems on your own and identify the ones that give you the most trouble. Then, when you meet with your problem set group, your energy will be focused where it's needed most. However, don't meet the day before your deadline. It's important to have at least one day before handing in the assignment so you can review all of your answers and fix any small mistakes. You should also take advantage of office hours. Most technical courses hold office hours once a week, usually run by a teaching assistant (TA). These meetings are meant to clarify complicated concepts from class and to be a source of help on hard problems. Always go to office hours, if you have time, and arrive knowing which homework problems pose the biggest challenge to you. Don't be afraid to ask for help. You will learn a lot during these weekly sessions, since the TAs will be able to walk you through the more difficult concepts—which will ultimately save you a lot of time and frustration.

Solve Problems on the Go

First, set aside a little block of time to familiarize yourself with a couple of problems, and make sure you understand exactly what is being asked. You may need to review your notes to refamiliarize yourself with the relevant concepts. Next, try to solve the problem in the most obvious way possible. This, of course, probably won't work, because most difficult problems are tricky by nature. By failing in this initial approach, however, you will have at least this initial approach, however, you will have at least identified what makes this problem hard. Now you are ready to try to come up with a real solution. The next step is counterintuitive. After you've primed the problem, put away your notes and move on to something else. Instead of trying to force a solution, think about the problem in between other activities. As you walk across campus, wait in line at the dining hall, or take a shower, bring up the problem in your head and start thinking through solutions. You might even want to go on a quiet hike or long car ride dedicated entirely to mulling over the question at hand.

Write Solutions Right the First Time

Another important time-saving tip for problem set work is to record solutions formally the first time you write them down. Many students first jot down their answers informally and then return later to reformat them into something neat enough for submission. There is no reason to include both steps. You are, for no good reason, adding a lot of extra time to the process. Instead, go slowly and deliberately the first time. Write your answer carefully, and clean it up immediately until it is of submission quality. Then you can cross the assignment off your list and it will be one less thing to worry about.

Step 3

Marshal Your Resources

Smart students understand that if you're studying hard, then you've done something wrong. Preparing for a test should not be painful. And it should not require a lot of time. If you have been putting Steps #1 and #2 into practice, taking smart notes and handling assignments effectively, studying should not be a big deal for you either. In fact, when faced with a looming quiz or exam, you have to do only two things. First, organize your material intelligently. Second, perform a targeted review of this material. This section will teach you how to accomplish the former. Don't worry—organizing your material properly is not a difficult task, but it is important that you do it right. Many students neglect this step, eager to dive right into the review, but by doing so they condemn themselves to hours of unnecessary work. You don't want to be like these students. Pay attention to the advice that follows and you will experience a significant reduction to the difficulty of your study experience.

Define the Challenge

Before you can conduct any meaningful studying, you must first define the scope of the exam. As Simon from Brown puts it: "You need to know what kind of information the professor wants you to know." To accomplish this goal, answer the following questions:

- Which lectures and reading assignments (or problem sets) are fair game?
- What type of questions will there be, and how many of each? As Christine from Harvard explains: "It's helpful to know in advance what kind of knowledge will be asked for on the exam—IDs, dates, broad syntheses of the texts' major arguments?"
- Is the exam open note or open book?
- For a technical class, will formulas be provided or do they need to be memorized?
- How much time will be available? Does the professor expect the exam to be easy to complete during the test period or a challenge?

Some professors offer answers to these questions without being prompted. Many, however, do not. If it's two weeks before the exam, and the professor hasn't mentioned any details yet, you should ask. If you're shy, ask after class. But get the information as early as possible—it's crucial to your success. Build a Study Guide (Organizing Nontechnical Course Material) "I have always been a big fan of making a study guide," admits Ryan from Dartmouth. This is a technique that popped up again and again in my

straight-A interviews. Each student, of course, had his or her own variation on study guide creation, but they all followed, more or less, this same general approach:

For a nontechnical course, once you find out which lectures and reading assignments are fair game for the exam, print out the corresponding notes that you've typed up or gather the pages you've written on (don't be afraid to deconstruct your notebook). Cluster these pages into piles, separated by general topic. Clearly label each of these piles with its topic and fasten them together with a paper clip so you can easily transport them without mixing up the pages. This final step is important, since you will be moving to and from your various isolated study spaces once you begin your review. For simplicity, we will refer to these topic-themed piles as "chapters." Your final study guide, therefore, should contain a chapter, consisting of reading and lecture notes, for each general topic that might be covered on the exam.

Construct a Mega-Problem Set (Organizing Technical Course Material)

For a technical course, many students follow a variant of the study guide approach that focuses on sample problems. It works as follows: Your problem set assignments are the key to your review process. Start a pile for each problem set that covers material that might appear on the exam. Next, you'll need to supplement each problem set with sample problems from your lecture notes. For each lecture relevant to the upcoming exam, do the following:

1. Match the lecture to the problem set that covers the same material.
2. Copy sample problems from these lecture notes onto a blank sheet of paper. You don't have to copy the steps or the answers, just the questions.
3. Label the blank sheet of paper with the date of the lecture. This will help you later figure out where these problems came from (and more important, where their answers can be found).
4. Fasten this sheet with a paper clip to the problem set you matched it to in step one. In other words, this process transforms your problem sets into mega-problem sets by adding extra problems drawn from your lecture notes. Pretty simple.

Finally, you must augment your mega-problem sets with technical explanation questions. What are these?

For every major topic covered in a particular megaproblem set, jot down a question that asks you to explain the basics of the topic. For example, as Greta from Dartmouth recounts, in an “economics course, I would make study sheets and then add a general question such as: what happens when a government increases spending and lowers interest rates?” Or, for a chemistry class, you might have a problem set containing many questions that require you to draw the molecular structure of specific chemical compounds. In this case, you could add a technical explanation question along the lines of: “Explain the general procedure for drawing a molecular structure, why this is useful, and what special cases must be kept in mind.” It’s important that you add these technical explanation questions in addition to your regular sample problems, since they will reveal whether or not you understand the underlying concepts or if you’ve just memorized the steps for some particular problems. One last note: If your professor makes a practice exam available, then print out a copy of it and store it with your mega-problem sets. For technical courses, sample exams are a great review tool, and you will definitely want to have them handy when it comes time to study.

Prepare Memorization Aids

Both technical and nontechnical courses sometimes require you to do some memorization—formulas, chemical equations, artwork, dates, or chronologies—and the most efficient way to memorize this information is by using flash cards. Almost every straight-A student interviewed for this book used flash cards to help with rote memorization. Fortunately, this technique is easy. Buy a stack of index cards, put the prompt on one side and the answer on the other. Constructing these flash cards, however, can take longer than you might imagine, so start early. If possible, start writing up your cards at least a week before the first day you plan to actually study. The activity is mindless—you can write flash cards while watching TV—so it shouldn’t be too hard to get them done, in advance, bit by bit.

Schedule Your Organization Wisely

Don't try to organize and study in the same day. This is a crucial tactic used by many straight-A students. When you review, you want your brain at full power. If you organize your materials the same day that you review them, your brain will be too tired to accomplish both effectively. So keep these two tasks separate and you'll end up working more effectively, which reduces the total time spent and produces better results.

Step 4 Conquer the Material

This is the step students most commonly identify with exam preparation. It's also the step that most students misguidedly spend the majority of their time on. You're not most students—at least not anymore. All of the work you put in up to this point was meant to make this one step as small and painless and insignificant as possible. So don't worry. There are no all-nighters in your future. What follows are powerful techniques for taking your imposing piles of study material and imprinting the key ideas on your mind as efficiently as possible. These techniques are quick but ruthlessly effective. Use them with confidence. They get the job done, and they get it done fast.

1. James March: The Ambiguities of Experience

How do our experiences help us learn? We're often told that experience is the best way to learn. We might see this play out when someone gives us advice which we ignore, until experience teaches us the same lesson.

In his book, The Ambiguities of Experience, James March explores the role of experience in creating intelligence.

Our attitudes to experience can be mixed. On the one hand, we often describe it as the ultimate teacher. On the other hand, we assume those who need to learn from it, instead of the wisdom of others, are not the smartest. After all, why learn everything yourself when you can just listen to others?

It's clear that there's a disconnect between our different attitudes to learning from experience.

"Since experience in organizations often suffers from weak signals, substantial noise, and small samples, it is quite likely that realized history will deviate considerably from underlying reality."

— James March

Individuals and organizations are often eager to learn from their experiences. But the inferences they make are often misguided. The properties of experience confound learning. 'Experience,' March concludes, 'may possibly be the best teacher, but it is not a particularly good teacher.'

Here are some of my notes from the book:

- Intelligence normally entails two interrelated but somewhat different components. The first involves effective adaptation to an environment. The second: the elegance of interpretations of the experiences of life.
- Since experience in organizations often suffers from weak signals, substantial noise, and small samples, it is quite likely that realized history will deviate considerably from the underlying reality.
- Agencies write standards because experience can be a poor teacher.
- Constant exposure to danger without its realization leaves human beings less concerned about what once terrified them, and therefore experience can have the paradoxical effect of having people learn to feel more immune than they should to the unlikely dangers that surround them.
- Generating an explanation of history involves transforming the ambiguities and complexities of experience into a form that is elaborate enough to elicit interest, simple enough to be understood, and credible enough to be accepted. The art of storytelling involves a delicate balancing of those three criteria
- Humans have limited capabilities to store and recall history. They are sensitive to reconstructed memories that serve current beliefs and desires. They conserve belief by being less critical of evidence that seems to confirm prior beliefs than of evidence that seems to disconfirm them. They destroy both observations and beliefs in order to make them consistent. They prefer simple causalities, ideas that place causes and effects close to one another and that match big effects with big causes.
- The key effort is to link experience with a pre-existent accepted storyline so as to achieve a subjective sense of the understanding.
- Experience is rooted in a complicated causal system that can be described adequately only by a description that is too complex for the human mind. The more accurately reality is reflected, the less comprehensible the story, and the more comprehensible the story, the less realistic it is.

- Storytellers have their individual sources and biases, but they have to gain acceptance of their stories by catering to their audiences.
- Despite the complications in extracting reality from experience, or perhaps because of them, there is a tendency for the themes of stories of management to converge over time.
- Organizational stories and models are built particularly around four main mythic themes: rationality (the idea that the human spirit finds definitive expression through taking and justifying action in terms of its future consequences for prior values); hierarchy (the ideas that problems and actions can be decomposed into nested sets of subproblems and sub-actions such that interactions among them can be organized within a hierarchy); individual leader significance (the idea that any story of history must be related to a human project in order to be meaningful and that organizational human history is produced by the intentions of specific human leaders); and historical efficiency (the idea that history follows a path leading to a unique equilibrium defined by antecedent conditions and produced by competition).
- Underlying many of these myths is a grand myth of human significance: the idea that humans can, through their individual and collective intelligence actions, influence the course of history to their advantage.
- The myth of human significance produces the cruelties and generosityes stemming from the human inclination to assign credit and blame for events to human intention.
- There is an overwhelming tendency in American life to lionize or pillory the people who stand at the helms of our large institutions -to offer praise or level blame for outcomes over which they may have little control.
- An experienced scholar is less inclined to claim originality than is a beginner.
- ...processes of adaptation can eliminate sources of error but are inefficient in doing so.
- Knowledge is lost through turnover, forgetting, and misfiling, which assure that at any point there is considerable ignorance. Something that was once known is no longer known. In addition, knowledge is lost through its incomplete accessibility.
- A history of success leads managers to a systematic overestimation of the prospects for success in novel endeavors. If managers attribute their success to talent when they are, in fact, a joint consequence of talent and good fortune, successful managers will come to believe that they have capabilities for beating the odds in the future as they apparently have had in the past.
- In a competitive world of promises, winning projects are systematically projects in which hopes exceed reality
- The history of organizations cycling between centralization and decentralization is a tribute, in part, to the engineering difficulty of finding an enduring balance between the short-run and local costs and the long-run and more global benefits of boundaries.
- The vividness of direct experience leads learners to exaggerate the information content of personal experience relative to other information.
- The ambiguities of experience take many forms but can be summarized in terms of five attributes: 1) the causal structure of experience is complex; 2) experience is noisy; 3) history includes numerous examples of endogeneity, causes in which the properties of the world are affected by actions adapting to it; 4) history as it is known is constructed by participants and observers; 5) history is miserly in providing experience. It offers only small samples and thus large sampling error in the inferences formed.
- Experience often appears to increase significantly the confidence of successful managers in their capabilities without greatly expanding their understanding.

2. Donald Norman on the Two Types of Knowledge

An interesting excerpt from Donald Norman's book The Design of Everyday Things on two types of knowledge.

People function through their use of two kinds of knowledge: knowledge of and knowledge how.

...Knowledge how [is] what psychologists call procedural knowledge.

...Procedural knowledge is difficult or impossible to write down and difficult to teach. It is best taught by demonstration and best learned through practice. Even the best teachers cannot usually describe what they are doing. Procedural knowledge is largely subconscious.

In a way, Norman's quote reminds me of this excerpt from Matthew Crawford's Shop Class as Soulcraft: An Inquiry into the Value of Work on thinking by doing.

The current educational regime is based on a certain view about what kind of knowledge is important: "knowing that," as opposed to "knowing how." This corresponds roughly to universal knowledge versus the kind that comes from individual experience. If you know that something is the case, then this proposition can be stated from anywhere. In fact such knowledge aspires to a view from nowhere. That is, it aspires to a view that gets at the true nature of things because it isn't conditioned by the circumstances of the viewer. It can be transmitted through speech or writing without loss of meaning, and expounded by a generic self that need not have any prerequisite experiences. Occupations based on universal, propositional knowledge are more prestigious, but they are also the kind that face competition from the whole world as book learning becomes more widely disseminated in the global economy. Practical know-how, on the other hand, is always tied to the experience of a particular person. It can't be downloaded, it can only be lived.

Some incomplete thoughts:

Knowledge of is knowing some fact. The world is full of people who 'know' stuff. These are the people that can recite facts. They know what something is called. They know the ten ways to write. They know calculus. But they often have difficulty understanding these things at a deeper level. Often, they are domain dependent. That is, they know something only in the context in which they learned it and experience difficulty applying it outside of that context.

We often end up knowing what something is called without really understanding. This is the illusion of knowledge.

The famous physicist Richard Feynman expands on the difference between knowing the name of something and knowing something.

As Charlie Munger says "You may have noticed students who just try to remember and pound back what is remembered. Well, they fail in school and in life. You've got to hang experience on a latticework of models in your head."

3. Alignment: The Key to Success Nobody Ever Taught You

I spend a lot of time thinking about this simple idea: The person who aligns themselves with the general principles of the world goes further and faster than the person who doesn't.

What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson.

— Joseph Tussman

The way to align yourself with the world is to take simple ideas seriously.

Consider compounding.

We know that spending less than we make, investing the difference in index funds, and waiting for a long time creates financial independence. Yet how many people follow this principle? Not many. Most of us know what works but fail to align ourselves with it.

Compounding applies to relationships too. Not just with your partner, but with your colleagues, friends, and even your customers. For relationships to compound, they must be win-win. But how many people take a consistent win-win approach? Not many. Again, we know what works, but fail to align ourselves with it.

Outcome over Ego

Here's the trick to seeing things differently: put your energy into *being* right, not *feeling* right. While that sounds simple, it's far from easy.

If you want to be right, you have to change your mind. When the evidence indicates the approach isn't working, change the approach. This is easy with something like math, where the answers are black and white, but harder with more subjective things.

Often the hardest things to change our minds about are the things that require us to understand that just because we can't see the results immediately doesn't mean they are not moving us closer or further from the outcome we want. For instance, eating a full pizza once won't make you unhealthy, but repeating that choice daily for years certainly will.

Feeling right, on the other hand, often requires you to believe you are an exception. You know the path to financial independence, but that takes too long. It's boring. Instead, you'd rather try the latest incarnation of a get-rich-quicker scheme that promises the outcome sooner. When it inevitably fails to produce the desired results, rather than tell yourself you made a mistake you chalk it up to the world not working as it should. It's as if that little voice in your head says, "You're not wrong; the world is."

Most of us would rather bargain with how the world works than accept how it does work, cooperate with it, and move forward. This happens in a lot of areas of life. Consider the general concept of health.

A lot of people think they don't have to take care of their health. They get too little sleep. They drink too much. They eat incredible amounts of processed food. They get little to no exercise. While they know health is important, at some level they think they are the exception. Acceptance is knowing you must care for your health because it is the foundation for everything else. Without health, everything else multiplies by zero.

We are tempted to believe we're the exception because it's the easy path.

Aligning with the world often requires you to pre-pay now for a result later. A little bit of pain today for gain tomorrow. And we don't like the sounds of that.

However, if you can align yourself with the world despite what those around you do, you'll quickly discover that it tends to do most of the work for you. It just won't take the first step for you. You have to take that one for yourself.

4. Learning Effectively From Experience: Distinguishing High from Low Performers

High performers learn from both success and failure making small adjustments.

Conversely, low performers learned more from success.

Learning effectively from experience is a daunting task for any organism. For every good or bad outcome, there are an immense number of potential causes and associations to be considered. For many decisions, it can be nearly impossible to pick out the few relevant factors from the many irrelevant factors, even with extensive experience. A major stumbling block for learning in these multi-dimensional environments is the tendency to form spurious beliefs: i.e., to attribute a causal role to factors that have no actual bearing on the outcome.

The formation of spurious beliefs is universal, from Skinner's observations of superstitious pigeons [1] to an athlete's belief in a lucky hat. In some situations, these beliefs are essentially harmless; by-products of learning mechanisms, but in other settings their impact can be severe. For example, spurious associations can have literal life-or-death consequences when they affect the complex decisions made by physicians. These expert decision-makers must extract and distill relevant features from a myriad of tests, symptoms, and personal histories, and employ these features to make critical medical decisions. Consequently, it is important to understand how spurious associations form and how they can bias subsequent decisions.

Spurious learning and false belief formation happens when the dorsolateral prefrontal cortex fails to distinguish correctly between important and unimportant associations.

The authors conclude:

High performers learned from both successes and failures, and made smaller rule adjustments after feedback. Conversely, low performers learned disproportionately from successes, and made larger rule adjustments ...

Taken together, the behavioral and neuroimaging results suggest that success-chasing and confirmation bias may underlie the relative pervasiveness of premature, asymmetric learning and the resultant poor performance of the majority of physician subjects in the present study. The general human bias towards confirmation over disconfirmation in hypothesis-testing has been extensively documented in a variety of non-medical contexts, such as the Wason Card Task. Conversely, the necessity for disconfirmation learning in empirical investigations is a key principle identified by the philosopher of science, Karl Popper [28]. Conceivably, providing medical professionals with formal training in disconfirmation learning could improve their ability to learn effectively from clinical experience in real-world settings. Exploring this possibility would be an important area for future research.

In conclusion, the results of this study show distinct patterns of learning, both behaviorally and neurally, between effective and ineffective learners among physicians making decisions in a medically framed learning task. The tendency to chase successes and ignore failures provides a simple computational model of how spurious beliefs might be formed, and how different individuals seeing similar data might learn very different sets of associations. The neural differences observed could conceivably be developed into useful biomarkers for essential differences in individual learning styles. These may in turn prove useful in identifying those individuals who can resist the impulse to chase successes, and hence learn most effectively from experience. Finally, we note that although this study focused upon the specific case of medical decision-making, the findings may be also be relevant to many other fields in which experts must make high-stakes decisions by drawing upon personal experience.

Abstract:

Accurate associative learning is often hindered by confirmation bias and success-chasing, which together can conspire to produce or solidify false beliefs in the decision-maker. We performed functional magnetic resonance imaging in 35 experienced physicians, while they learned to choose between two treatments in a series of virtual patient encounters. We estimated a learning model for each subject based on their observed behavior and this model divided clearly into high performers and low performers. The high performers showed small, but equal learning rates for both successes (positive outcomes) and failures (no response to the drug). In contrast, low performers showed very large and asymmetric learning rates, learning significantly more from successes than failures; a tendency that led to sub-optimal treatment choices. Consistently with these behavioral findings, high performers showed larger, more sustained BOLD responses to failed vs. successful outcomes in the dorsolateral prefrontal cortex and inferior parietal lobule while low performers displayed the opposite response profile. Furthermore, participants' learning asymmetry correlated with anticipatory activation in the nucleus accumbens at trial onset, well before outcome presentation. Subjects with anticipatory activation in the nucleus accumbens showed more success-chasing during learning. These results suggest that high performers' brains achieve better outcomes by attending to informative failures during training, rather than chasing the reward value of successes. The differential brain activations between high and low performers could potentially be developed into biomarkers to identify efficient learners on novel decision tasks, in medical or other contexts.

5. Does Experience Make You an Expert?

In Experience and validity of clinical judgment: The illusory correlation, Robyn Dawes explores the relationship between experience and accuracy.

There is research about the relationship between experience and diagnostic and predictive accuracy, and about the validity of interviewing people to find out what they are like. Garb has recently summarized the research on experience and accuracy. There is no relationship between years of clinical experience and accuracy of judgment. A report of a task force of the American Psychological Association convened in the early 1980s noted that there was no evidence that professional competence is related to years of professional experience.

And yet we seek experienced people to be our teachers, executives, and political leaders. Ben Franklin is oft quoted as saying “experience is the best teacher,” the second clause reads “and fools will learn from no other.” Only Franklin didn’t say “the best teacher” he said “dear teacher,” which was clearly intended to mean expensive.

The 10,000-hour rule, popularized by Malcolm Gladwell and based on Anders Ericsson’s study, *The Role of Deliberate Practice in the Acquisition of Expert Performance*, states that in order to become an expert, one must have 10,000 hours of deliberate practice under their belts. This has been highly disputed by many, including Ericsson himself. There’s no question that practice is necessary for improvement, but 10,000 hours isn’t a magic number that wields the power of universal application.

Something else to ponder: why is it that we often forget to account for the length of time that an expert has been out of practice in their field?

So does experience really make you an expert? What does it actually mean to be one? It turns out, we don’t learn from experience in many contexts.

The analysis of what we learn and why we learn it, however, quickly yields sobriety about embracing generalizations about the effect of experience on learning across all contexts. For example, learning to sit in a chair, become a chess grandmaster, make a correct medical diagnosis, or avoid a war are quite different processes. The word “learning” is, of course, common to all, but close examination reveals that it means little more than that someone with no experience whatsoever could not accomplish any of these tasks.

Dawes illuminates this highly contrarian idea through quite unremarkable human behaviours like sitting in a chair and driving.

What then are the differences? First, consider sitting in a chair. It is a motor skill. It is done automatically. It does not involve any conscious hypotheses. It is clearly learned through early experience that provides immediate feedback about failure. Finally, it is not taught in the sense that one person conveys a verbal or mathematical description to another about how to do it. (In fact an amusing exercise is to attempt to write such a description, convince somebody else to follow your instructions explicitly—and then watch the person fail.) Driving a car has many similar characteristics. For example, steering it in a straight line is accomplished by very tiny discrete adjustments of the steering wheel that are not accomplished consciously (Ehrlich, 1966). (The “weaving” behavior of drunk drivers is often due to the impairment of these movements, rather than to any visual problem.) The skills needed to perform these slight movements are attained only through experience driving; in fact, most complete novices on the first driving lesson alternate between going toward the ditch and almost crossing the center line—much to the surprise and consternation of their novice teachers, who themselves may be unaware of their own “tremorous” movements of the steering wheel. As with sitting in a chair, explicit verbal instructions to someone else about exactly how to drive a car could result in disaster for the person who follows them rigidly.

Consider the curious thing that happened during the Paris Wine Tasting of 1976, alternatively known as the Judgement of Paris (its name was inspired by a story in Greek mythology). During this blind taste competition, French wine experts judged ten different reds and ten different whites. Contrary to the strongly held belief that France produced the finest wines, it was the California wines that received the highest scores. Not only did the shocking results of the competition call into question the supposed superiority of French wine, but it served as a reason for people to wonder what authority an expert had over a casual wine drinker.

Abstract of Experience and validity of clinical judgment: The illusory correlation
Mental health experts often justify diagnostic and predictive judgments on the basis of "years of experience" with a particular type of person. Justification by experience is common in legal settings, and can have profound consequences for the person about whom such judgments are made. However, research shows that the validity of clinical judgment and amount of clinical experience are unrelated. The role of experience in learning varies as a function of what is to be learned. Experiments show that learning conceptual categories depends upon: (1) the learner's having clear hypotheses about the possible rule for category membership prior to receiving feedback about which instances belong to the category, and, (2) the systematic nature of such feedback, especially about erroneous categorizations. Since neither of these conditions is satisfied in clinical contexts in psychology, the subsequent failure of experience per se to enhance diagnostic or predictive validity is unsurprising. Claims that "I can tell on the basis of my experience with people of a particular type (e.g., child abusers) that this person is of that type (e.g., a child abuser)" are simply invalid.

6. Become A Learning Machine

When successful people from different fields offer the same advice, I listen. Often they have different vocabulary around an idea, but when you break it down you realize they're talking about the same thing.

Below is an example of Charlie Munger, Carol Dweck, and Susan Cain, offering the same core advice: Become a Learning Machine.

If you want to go to bed smarter than you woke up, you need to learn something new each day. It doesn't matter how smart you are today; what matters it that you learn something new and useful. If you can simply repeat that day after day, you will find that you outperform others.

It can be hard to grasp this concept because the differences at first are small. Only as the days turn into weeks, the weeks into months, the months into years, and the years into decades will you look back and wonder how it happened.

Charlie Munger:

I constantly see people rise in life who are not the smartest, sometimes not even the most diligent, but they are learning machines. They go to bed every night a little wiser than they were when they got up and boy does that help, particularly when you have a long run ahead of you.

Carol Dweck says:

You have to apply yourself each day to becoming a little better. By applying yourself to the task of becoming a little better each and every day over a period of time, you will become a lot better.

And this tidbit from Susan Cain, also fits:

...identify the tasks or knowledge that are just out of your reach, strive to upgrade your performance, monitor your progress, and revise accordingly.

7. The Feynman Technique: Master the Art of Learning

The Feynman Technique is the most effective method to unlock your potential and develop a deep understanding.

Richard Feynman was not only a Nobel laureate in Physics but also a master of demystifying complex topics. His key learning insight: complexity and jargon often mask a lack of understanding.

Feynman's learning technique comprises four key steps:

1. Select a concept to learn.
2. Teach it to a child.
3. Review and refine your understanding.
4. Organize your notes and revisit them regularly.

Let's delve deeper into these steps.

Feynman's secret lay in understanding the true essence of a concept rather than merely knowing its name, leading to his remarkable achievements. This learning technique can be applied universally, irrespective of the subject.



The person who says he knows what he thinks but cannot express it usually does not know what he thinks.

Mortimer Adler

Step 1: Select a concept to learn.

What topic are you curious about?

Take out a blank sheet of paper. Write out everything you already know about the subject you want to understand deeper. As you learn more about the topic, add it to your sheet. If you use a different color pen as you learn new things, you can literally watch your knowledge grow.

Once you think you understand the topic well enough, move on to step 2.

Step 2: Teach it to a child.

Can you explain your chosen concept to a 12-year-old? Test your understanding by simplifying your notes. Banish jargon and complexity, using only words a child would

comprehend. Simplicity reveals a depth of understanding, while jargon often conceals ignorance.

Anyone can make a subject complicated but only someone who understands can make it simple.

Step 3: Review and Refine

Write down your simplified explanation. The act of writing aids reflection and learning. In fact, reflection is the most important part of the learning process. Reflection is how we learn what we know and what we need to learn.

Simple is beautiful.

Clear writing gives poor thinking nowhere to hide.

Ensure your notes are free of any jargon or something that sounds confusing. Ensure your notes are free from jargon or any glossed-over complexities. If something sounds confusing, it needs more refinement.

Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.

Go back to the source material, reviewing the parts you don't quite understand yet.

Repeat until you have a simple explanation.

Step 4: Organize and Review.

To test your understanding in the real world, present your explanation to someone else.

How effective was your explanation? What questions did they ask? What parts did they get confused about?

When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

Simplicity is the hallmark of true understanding. Challenge others who use jargon to explain concepts in simple terms, and their reactions may reveal their comprehension (or lack thereof).

The Feynman Technique is the foundation for our 'blank sheet' approach to supercharging your reading and retention.

8. The Learning Paradox: Why Struggling to Learn is a Good Thing

The more you struggle to master new information, the better you'll understand and apply it later.

Annie Murphy Paul explores in Time:

The learning paradox is at the heart of “productive failure,” a phenomenon identified by Manu Kapur, a researcher at the Learning Sciences Lab at the National Institute of Education of Singapore. Kapur points out that while the model adopted by many teachers and employers when introducing others to new knowledge — providing lots of structure and guidance early on, until the students or workers show that they can do it on their own — makes intuitive sense, it may not be the best way to promote learning. Rather, it’s better to let the neophytes wrestle with the material on their own for a while, refraining from giving them any assistance at the start

Earlier this year, in a paper published in the Journal of the Learning Sciences, Kapur applied the principle of productive failure to mathematical problem-solving.

With one group of students, the teacher provided strong “scaffolding” — instructional support — and feedback. With the teacher’s help, these pupils were able to find the answers to their set of problems. Meanwhile, a second group was directed to solve the same problems by collaborating with one another, absent any prompts from their instructor. These students weren’t able to complete the problems correctly. But in the course of trying to do so, they generated a lot of ideas about the nature of the problems and about what potential solutions would look like. And when the two groups were tested on what they’d learned, the second group “significantly outperformed” the first.

The apparent struggles of the floundering group have what Kapur calls a “hidden efficacy”: they lead people to understand the deep structure of problems, not simply their correct solutions. When these students encounter a new problem of the same type on a test, they’re able to transfer the knowledge they’ve gathered more effectively than those who were the passive recipients of someone else’s expertise.

Kapur argues we need to “design for productive failure” by building it into the learning process.

In the process of his work he’s identified three conditions that promote a beneficial struggle:

1. Choose problems that “challenge but do not frustrate.”
2. Allow students to explain and elaborate on what they’re doing.
3. Compare and contrast both good and bad solutions to the problems.

9. Ten Commandments For Living From Philosopher Bertrand Russell

Philosopher Bertrand Russell:

The Ten Commandments that, as a teacher, I should wish to promulgate, might be set forth as follows:

1. Do not feel absolutely certain of anything.
2. Do not think it worthwhile to proceed by concealing evidence, for the evidence is sure to come to light.
3. Never try to discourage thinking for you are sure to succeed.
4. When you meet with opposition, even if it should be from your husband or your children, endeavor to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory.
5. Have no respect for the authority of others, for there are always contrary authorities to be found.
6. Do not use power to suppress opinions you think pernicious, for if you do the opinions will suppress you.
7. Do not fear to be eccentric in opinion, for every opinion now accepted was once eccentric.
8. Find more pleasure in intelligent dissent than in passive agreement, for, if you value intelligence as you should, the former implies a deeper agreement than the latter.
9. Be scrupulously truthful, even if the truth is inconvenient, for it is more inconvenient when you try to conceal it.
10. Do not feel envious of the happiness of those who live in a fool's paradise, for only a fool will think that it is happiness.

10. An Algorithm for Solving Problems

“He (Richard Feynman) was always searching for patterns, for connections, for a new way of looking at something, but I suspect his motivation was not so much to understand the world as it was to find new ideas to explain. The act of discovery was not complete for him until he had taught it to someone else.”— Daniel Hillis

The Feynman Algorithm, which is a simplification of Richard Feynman’s technique to learn anything, is a good all purpose algorithm for solving problems. Cal Newport explains:

1. *Simplify the problem down to an “essential puzzle.” Here’s how Danny Hillis explained Feynman’s use of simplicity: “He always started by asking very basic questions like, ‘What is the simplest example?’ or ‘How can you tell if the answer is right?’ He asked questions until he reduced the problem to some essential puzzle that he thought he would be able to solve. Then he would set to work.”*
2. *Continually master new techniques and then apply them to your library of unsolved puzzles to see if they help. As mathematician Gian Carlo-Rota explained when describing Feynman’s use of this strategy: “Every once in a while there will be a hit, and people will say: ‘How did he do it? He must be a genius!’”*

11. Why Can't Someone Be Taught Until They're Ready To Learn?

Clay Christensen is best known as the author of The Innovator's Dilemma. He's also the author of a new book, How Will You Measure Your Life?, which has some wonderful insights (see excerpts [here](#) and [here](#)).

The founder of 37Signals, Jason Fried, recently spent some time with Christensen and gained a key insight into why we can't be taught until we're ready to learn. Simply put, if you stop asking questions, you'll stop learning.

Spending time with Clay leads to lots of interesting insights, but for me, there was one that stood out among all the others.

You've probably heard it said that someone can't be taught until they're ready to learn. I've heard it said that way too. It makes sense, and my experience tells me it's mostly true.

Why though? Why can't someone be taught until they're ready to learn?

Clay explained it in a way that I've never heard before and I'll never forget again.

Paraphrased slightly, he said: "Questions are places in your mind where answers fit. If you haven't asked the question, the answer has nowhere to go. It hits your mind and bounces right off. You have to ask the question – you have to want to know – in order to open up the space for the answer to fit."

12. The Feynman Learning Technique

The Feynman Technique is the best way to supercharge your learning. And it works no matter the subject. Devised by Nobel Prize-winning physicist Richard Feynman, it leverages the power of teaching for better learning.

Learning doesn't happen from skimming through a book or remembering enough to pass a test.

Information is learned when you can explain it and use it in a wide variety of situations.

The Feynman Technique gets more mileage from the ideas you encounter instead of rendering anything new into isolated, useless factoids.

When you really learn something, you give yourself a tool to use for the rest of your life.

The more you know, the fewer surprises you will encounter because most new things will connect to something you already understand.

Ultimately, the point of learning is to understand the world. But most of us don't bother to deliberately learn anything.

We memorize what we need to as we move through school, then forget most of it. As we continue through life, we don't extrapolate from our experiences to broaden the applicability of our knowledge. Consequently, life kicks us in the ass time and again.

To avoid the pain of being bewildered by the unexpected, the Feynman Technique helps you turn information into knowledge that you can access as easily as reaching for a chair.

*

The Feynman Technique

"Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius—and a lot of courage—to move in the opposite direction."

E.F. Schumacher

There are four steps to the Feynman Learning Technique, based on the method Richard Feynman originally used. We have adapted it slightly after reflecting on our own experiences using this process to learn. The steps are as follows:

1. Pretend to teach a concept you want to learn about to a student in the sixth grade.
2. Identify gaps in your explanation. Go back to the source material to better understand it.
3. Organize and simplify.
4. Transmit (optional).

Step 1: Pretend to teach it to a child

Take out a blank sheet of paper. At the top, write the subject you want to master. Now write out everything you know about the subject as if you were teaching it to a child or a rubber duck sitting on your desk.

It's important to remember that you are not teaching to your smart adult friend, but rather a child who has just enough vocabulary and attention span to understand basic concepts and relationships. It has to be simple and clear. There is nowhere to hide in obfuscation.

Or, for a different angle on the Feynman Technique, you could place a rubber duck on your desk and try explaining the concept to it. Software engineers sometimes tackle debugging by explaining their code, line by line, to a rubber duck. It sounds silly, but it's a forcing function to make you walk through your thinking as simply as possible.

It turns out that one of the ways we mask our lack of understanding is by using complicated vocabulary and jargon. The truth is, if you can't clearly and simply define the words and terms you are using, you don't really know what you're talking about.

If you look at a painting and describe it as "abstract" because that's what you heard in art class, you demonstrate no understanding. You're just mimicking what you've heard. You haven't learned anything.

When you write out an idea from start to finish in simple language that a child can understand, you force yourself to understand the concept at a deeper level and simplify relationships and connections between ideas. You can better explain the why behind your description of the what.

Writing helps you think because it gives you nowhere to hide.

Looking at the painting again, you will be able to say that the painting doesn't display buildings like the ones we look at every day. Instead, it uses certain shapes and colors to depict a city landscape. You will be able to point out what these are. You will be able to engage in speculation about why the artist chose those shapes and those colors. You will be able to explain why artists sometimes do this, and you will be able to communicate what you think of the piece considering all of this.

Chances are, after capturing a full explanation of the painting in the simplest possible terms that would be easily understood by a sixth-grader, you will have learned a lot about that painting and abstract art in general.

Some of capturing what you would teach will be easy. These are the places where you have a clear understanding of the subject. But you will find many places where things are much foggier.

Step 2: Identify gaps in your explanation

Areas, where you struggle in Step 1, are the points where you have some gaps in your understanding.

Identifying gaps in your knowledge—where you forget something important, aren't able to explain it, or simply have trouble thinking of how variables interact—is a critical part of the learning process.

Filling those gaps is when you really make the learning stick.

Now that you know where you have gaps in your understanding go back to the source material. Augment it with other sources. Look up definitions. Keep going until you can explain everything you need to in basic terms.

Only when you can explain your understanding without jargon and in simple terms can you demonstrate understanding. Think about it this way. If you require complicated terminology to explain what you know, you have no flexibility. When someone asks you a question, you can only repeat what you've already said.

Simple terms can be rearranged and easily combined with other words to communicate your point. When you can say something in multiple ways using different words, you understand it really well.

Being able to explain something in a simple, accessible way shows you've done the work required to learn. Skipping it leads to the illusion of knowledge—an illusion that can be quickly shattered when challenged.

Identifying the boundaries of your understanding is also a way of defining your circle of competence. When you know what you know (and are honest about what you don't know), you limit the mistakes you're liable to make and increase your chance of success when applying knowledge.

Step 3. Organize and simplify

Now you have a set of hand-crafted notes containing a simple explanation. Organize them into a narrative that you can tell from beginning to end. Read it out loud. If the explanation sounds confusing at any point, go back to Step 2. Keep iterating until you have a story that you can tell to anyone who will listen.

If you follow this approach over and over, you will end up with a binder full of pages on different subjects. If you take some time twice a year to go through this binder, you will find just how much you retain.

Step 4: Transmit (optional)

This part is optional, but it's the logical result of everything you've just done.

If you really want to be sure of your understanding, run it past someone (ideally someone who knows little of the subject).

The ultimate test of your knowledge is your capacity to convey it to another. You can read out directly what you've written. You can present the material like a lecture. You can ask your friends for a few minutes of their time while you're buying them dinner. You can volunteer as a guest speaker in your child's classroom or your parents' retirement residence. All that really matters is that you attempt to transmit the material to at least one person who isn't that familiar with it.

The questions you get and the feedback you receive are invaluable for further developing your understanding.

Hearing what your audience is curious about will likely pique your own curiosity and set you on a path for further learning. After all, it's only when you begin to learn a few things really well do you appreciate how much there is to know.

The Feynman Technique is not only a wonderful recipe for learning but also a window into a different way of thinking that allows you to tear ideas apart and reconstruct them from the ground up. It also allows you to supercharge your learning from others.

Too often, we want to seem smart rather than learn. We nod along even when we don't understand what someone is talking about. This is a missed opportunity for learning. If you're having a conversation with someone and they start using jargon that you don't understand, ask them to explain it to you like you're twelve. Not only will you supercharge your own learning, but you'll also supercharge theirs.

Feynman's approach intuitively believes that intelligence is a process of growth, which dovetails nicely with the work of Carol Dweck, who describes the difference between a fixed and growth mindset.

"If you can't reduce a difficult engineering problem to just one 8-1/2 x 11-inch sheet of paper, you will probably never understand it."

—Ralph Peck

What does it mean to "know?"

Richard Feynman believed that *"the world is much more interesting than any one discipline."* He understood the difference between knowing something and knowing the name of something, as well as how, when you truly know something, you can use that knowledge broadly.

When you only know what something is called, you have no real sense of what it is.

You can't take it apart and play with it or use it to make new connections and generate new insights. When you know something, the labels are unimportant because it's not necessary to keep it in the box it came in.

"The person who says he knows what he thinks but cannot express it usually does not know what he thinks."

—Mortimer Adler

Feynman's explanations—on why questions, why trains stay on the tracks as they go around a curve, how we look for new laws of science, or how rubber bands work—are simple and powerful. He doesn't hide behind abstraction or jargon.

Here he articulates the difference between knowing the name of something and understanding it.

"See that bird? It's a brown-throated thrush, but in Germany it's called a halzenfugel, and in Chinese they call it a chung ling, and even if you know all those names for it, you still know nothing about the bird. You only know something about people: what they call the bird. Now that thrush sings, and teaches its young to fly, and flies so many miles away during the summer across the country, and nobody knows how it finds its way."

13. A Simple Tool to Help You Learn Better

Learning something new shouldn't be easy. If it feels effortless, you're probably not actually learning anything. In order to get better, you have to reach. It needs to be a little bit difficult.

From The Little Book of Talent: 52 Tips for Improving Your Skills:

Research shows that people who follow strategy B [read ten pages at once, then close the book and write a one page summary] remember 50 percent more material over the long term than people who follow strategy A [read ten pages four times in a row and try to memorize them]. This is because of one of deep practice's most fundamental rules: Learning is reaching. Passively reading a book—a relatively effortless process, letting the words wash over you like a warm bath—doesn't put you in the sweet spot. Less reaching equals less learning.

On the other hand, closing the book and writing a summary forces you to figure out the key points (one set of reaches), process and organize those ideas so they make sense (more reaches), and write them on the page (still more reaches, along with repetition). The equation is always the same: More reaching equals more learning.

You don't have to write a summary in paragraph format either. You can simply write bullet points. And while you can use the author's terminology, it's much better to use your own. This is part of the idea behind our blank sheet approach to instantly improve your ability to retain, connect, and use the information you're reading.

14. Stretching yourself to learn new things

Carol Dweck, Daniel Coyle, and Noel Tichy all point out that you need to stretch to learn new things.

First, this from Carol Dweck ...

My colleagues and I have conducted interventions with adolescents in which they learn that their brains and intellect are malleable. They discover that when they stretch themselves to learn new things, their neurons form new connections and they can, over time, enhance their intellectual skills. Compared to a control group that learned only study skills, these students showed marked improvements in motivation, and their declining grades were sharply reversed. Researchers Catherine Good and Joshua Aronson have found similar effects. In studies led by David Yeager, high school students who were taught a malleable view of their intellectual and social skills showed positive changes in their grades, stress level, conduct (including aggression), and health that lasted over the course of the school year.

Second, this passage from The Little Book of Talent: 52 Tips for Improving Your Skills:

There is a place, right on the edge of your ability, where you learn best and fastest. It's called the sweet spot. ... the underlying pattern is the same: Seek out ways to stretch yourself. Play on the edges of your competence. As Albert Einstein said, "One must develop an instinct for what one can just barely achieve through one's greatest efforts." The key word is "barely."

Finally, this passage from Deliberate Practice:

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time we're practicing we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of reach.

Update: This passage from The Art of Learning fits as well:

Usually, growth comes at the expense of previous comfort or safety. The hermit crab is a colorful example of a creature that lives by this aspect of the growth process (albeit without our psychological baggage). As the crab gets bigger, it needs to find a more spacious shell. So the slow, lumbering creature goes on a quest for a new home. If an appropriate new shell is not found quickly, a terribly delicate moment of truth arises. A soft creature that is used to the protection of built-in armor must now go out into the world, exposed to predators in all its mushy vulnerability. That learning phase in between shells is where our growth can come from.

15. The Art of Learning

Josh Waitzkin has mastered the game of Chess — winning his first National Championship at the age of nine — and the physical challenge of martial arts, becoming a World Champion of Tai Chi Chuan. One thing Josh is good at is learning to master new skills. I want to highlight two passages from his book, The Art of Learning: An Inner Journey to Optimal Performance, for readers.

The first one speaks to why Josh could come into a new sport, Tai Chi Chuan, and advance faster than others who had been practicing for years longer than he had. He was willing to lose to win.

It seemed that many other students were frozen in place, repeating their errors over and over, unable to improve because of a fear of releasing old habits. When Chen (the master teaching the students) made suggestions, they would explain their thinking in an attempt to justify themselves. They were locked in a need to be correct.

Waitzkin's philosophy was that if you could maximize the learning from your mistakes and avoid repeating them you would skyrocket to the top of any field. While it's impossible to avoid repeating every mistake, Waitzkin tried to minimize repetition of them by not letting his ego get in the way.

The second passage I want to share with you is on learning. The theme is depth over breadth.

The learning principle is to plunge into the detailed mystery of the micro in order to understand what makes the macro tick. Our obstacle is that we live in an attention-deficit culture. We are bombarded with more and more information on television, radio, cell phones, video games, the Internet. The constant supply of stimulus has the potential to turn us into addicts, always hungering for something new and prefabricated to keep us entertained. When nothing exciting is going on, we might get bored, distracted, separated from the moment. So we look for new entertainment, surf channels, flip through magazines. If caught in these rhythms, we are like tiny current-bound surface fish, floating along a two-dimensional world without any sense for the gorgeous abyss below. When these societally induced tendencies translate into the learning process, they have devastating effect.

... Many "Kung Fu" schools fuel this problem by teaching numerous flowery forms, choreographed sets of movement, and students are rated by how many forms they know. Everyone races to learn more and more, but nothing is done deeply. Things look pretty but they are superficial, without a sound body mechanic or principled foundation. Nothing is learned at a high level and what results are form collectors with fancy kicks and twirls that have absolutely no martial value.

16. Josh Waitzkin on Mastering the Fundamentals

Some excerpts from Josh Waitzkin's The Art of Learning: An Inner Journey to Optimal Performance.

The best way to launch into the learning process is by breaking down what you are learning into its fundamental building blocks. Mastering these builds your foundation.

Learning Chess

Bruce (his teacher) began our study with a barren chessboard. We took on positions of reduced complexity and clear principles. Our first focus was king and pawn against king—just three pieces on the table....Layer by layer we built up my knowledge and my understanding of how to transform axioms into fuel for creative insight....This method of study gave me a feeling for the beautiful subtleties of each chess piece, because in relatively clear-cut positions I could focus on what was essential. I was also gradually internalizing a marvelous methodology of learning—the play between knowledge, intuition, and creativity. From both educational and technical perspectives, I learned from the foundation up.

“Most of my rivals, on the other hand, began by studying opening variations ... Once you start with openings, there is no way out ... It is a little like developing the habit of stealing the test from your teacher’s desk instead of learning how to do the math. You may pass the test, but you learn absolutely nothing—and most critically, you don’t gain an appreciation for the value or beauty of learning itself.”

Tai Chi Chuan

From very early on, I felt that the moving meditation of Tai Chi Chuan has the primary martial purpose of allowing practitioners to refine certain fundamental principles. Many of them can be explored by standing up, taking a stance, and incrementally refining the simplest of movements—for example pushing your hands six inches through the air ... I practiced the Tai Chi meditative form diligently, many hours a day. At times I repeated segments of the form over and over, honing certain techniques while refining my body mechanics and deepening my sense of relaxation. I focused on small movements, sometimes spending hours moving my hand out a few inches, then releasing it back, energizing outwards, connecting my feet to my fingertips with less and less obstruction ... the key was to recognize that the principles making one simple technique tick were the same fundamentals that fueled the whole expansive system of Tai Chi Chuan.

17. Value Process Before Results

More insight from The Art of Learning: An Inner Journey to Optimal Performance:

The issue is fundamental to the pursuit of excellence in all fields. If a young basketball player is taught that winning is the only thing that winners do, then he will crumble when he misses his first big shot. If a gymnast or ballet dancer is taught that her self-worth is entirely wrapped up in a perfectly skinny body that is always ready for performance, then how can she handle injuries or life after an inevitably short career? If a businessperson cultivates a perfectionist self-image, then how can she learn from her mistakes?

And this quote based on research by Dr. Carol Dweck.

Children who are “entity theorists” ... are prone to use language like ‘I am smart at this.’ And to attribute their success or failure to an ingrained and unalterable level of ability. They see their overall intelligence or skill level at a certain discipline to be a fixed entity, a thing that cannot evolve. Incremental theorists, who have picked up a different modality of learning, are more prone to describe their results with sentences like ‘I got it because I worked very hard at it’ or ‘I should have tried harder.’ A child with a learning theory of intelligence tends to sense that with hard work, difficult material can be grasped- step-by-step, incrementally, the novice can become the master.

18. The Seductive Path of Good Enough

The ability to learn new skills is the entry ticket for being a knowledge worker. If you can't learn and adapt, you fall flat on your face. But not all of us learn at the same pace, and not all of us reach the same level of mastery. Some of us get better with experience, and some of us seem to keep making the same mistakes over and over. Why?

When we learn any new skill, we usually learn just enough to become competent, and then our brains switch to autopilot. They're lazy that way.

The brain tries to conserve as much energy as it can. And while practice is easy, deliberate practice is not.

So much of success is just showing up day after day and grinding away at the hard parts in a deep and focused way. However simple that sounds, it's not easy. And that's why most of us struggle to get better.

Perhaps an example will help illustrate what I'm talking about. Consider driving. Most of us can drive. It's a skill we learned. At first, we were terrible and nervous. Through deliberate practice and coaching, we got better and better. We reached some level of competence and verified this through a test. I don't know about you, but despite having spent thousands of hours behind the wheel since then, I've probably gotten only marginally better at driving.

Why?

There are many reasons. One is that I lack feedback. There is no expert coaching me and telling me where to improve. Another reason is that I don't even know what I want to improve. What does it mean to become a better driver? Getting better sounds like a lot of work. And that's the rub.

We're hard-wired to avoid pain. This tendency includes reflecting on our decisions as well as practicing skills. Once we reach some base level of competence, we practice that part over and over and shy away from the parts that might make us better. In short, I've been driving the same way for thousands of hours, practicing skills I already had instead of trying new things.

“By nature, we humans shrink from anything that seems possibly painful or overtly difficult.”

— Robert Greene

However, a base level of competence doesn't get us ahead of anyone or set us apart. The base-level comprises the most easily acquired aspects of any particular skill and the bare minimum we need to do to claim that skill. And most of the time, we've learned the conventional way of doing things — it's a form of social proof where we just mimic what other people have done. Because we acquire the most easily accessible parts of any skill, we also over-estimate our competence. (I think this is why we all rate ourselves as above average at very basic things like driving.)

Stopping here is a hallmark of amateurs.

The only way to get better at a task is through deliberate practice. The idea is simple: instead of avoiding pain, you dive in. How?

First, use the mental model of Galilean Relativity to switch perspectives and see yourself through the eyes of others. This will allow you to recognize the areas that you need to improve. Recognizing these areas is necessary if you want to improve.

Second, set aside time for dedicated focus on the specific area you want to improve. A lot of people don't understand this, but when you're really focused on something, you can rapidly get better at it. At any given time, most of us are only half-focused on what we're doing. (How many browser tabs are open right now? What's on your grocery list?) You really need to immerse yourself in the task at hand.

You also need feedback. Sometimes the task itself can give you feedback, sometimes you'll want a coach, and sometimes you can have both. When I was learning to drive, the car was giving me instant feedback, but my learning was accelerated by having a coach tell me what was happening, why, and how I could handle it.

Third, push the limits of what you can do so you understand your boundaries. This also helps you stay calm if things don't go as planned. Driving in the snow is not easy, and it's often dangerous. I remember one day when my instructor took me to an empty parking lot covered in snow. He looked at me and said, "I want you to go as fast as you can and lose control of the car."

I was shocked.

"You're going to lose control of a car in the snow at some point. Might as well be here where no one is around."

And that day probably saved my life. I knew what it felt like to lose control of the car. And because I knew what to expect, I wasn't panicked when it happened. More important, through practicing over and over for hours, I knew the best strategies to regain control of the car.

Finally, rinse and repeat over and over again.

You don't want to do this level of work with every skill. But if you can identify the ones that give you leverage, doing this work is how you get better.

19. Charlie Munger: How to Teach Business School

Everyone has an opinion on what to teach at business school. Few are as informed or timeless as Charlie Munger, the billionaire business partner of Warren Buffett at Berkshire Hathaway. Here's what he had to say on the subject at the 2011 annual meeting for Berkshire Hathaway Shareholders:

Costco of course is a business that became the best in the world in its category. And it did it with an extreme meritocracy, and an extreme ethical duty—self-imposed to take all its cost advantages as fast as it could accumulate them and pass them on to the customers. And of course they've created ferocious customer loyalty. It's been a wonderful business to watch—and of course strange things happen when you do that and when you do that long enough. Costco has one store in Korea that will do over \$400 million in sales this year. These are figures that can't exist in retail, but of course they do. So that's an example of somebody having the right managerial system, the right personnel solution, the right ethics, the right diligence, etcetera, etcetera. And that is quite rare. If once or twice in your lifetime you're associated with such a business you're a very lucky person.

The more normal business is a business like, say, General Motors, which became the most successful business of its kind in the world and wiped out its common shareholders... what, last year? That is a very interesting story—and if I were teaching business school I would have Value-Line-type figures that took me through the entire history of General Motors and I would try to relate the changes in the graph and data to what happened in the business. To some extent, they faced a really difficult problem—heavily unionized business, combined with great success, and very tough competitors that came up from Asia and elsewhere in Europe. That is a real problem which of course... to prevent wealth from killing people—your success turning into a disadvantage—is a big problem in business.

And so there are all these wonderful lessons in those graphs. I don't know why people don't do it. The graphs don't even exist that I would use to teach. I can't imagine anybody being dumb enough not to have the kind of graphs I yearn for. [Laughter] But so far as I know there's no business school in the country that's yearning for these graphs. Partly the reason they don't want it is if you taught a history of business this way, you'd be trampling on the territories of all the professors and sub-disciplines—you'd be stealing some of their best cases. And in bureaucracies, even academic bureaucracies, people protect their own turf. And of course a lot of that happened at General Motors. [Applause]

I really think the world ... that's the way it should be taught. Harvard Business School once taught it much that way—and they stopped. And I'd like to make a case study as to why they stopped. [Laughter] I think I can successfully guess. It's that the course of history of business trampled on the territory of barons of other disciplines like the baron of marketing, the baron of finance, the baron of whatever.

IBM is an interesting case. There's just one after another that are just utterly fascinating. I don't think they're properly taught at all because nobody wants to do the full sweep.

20. Kathryn Schulz on why Knowledge Collapses as often as it Accretes

Kathryn Schulz comments on the fantasy that knowledge is static in [This Will Make You Smarter: New Scientific Concepts to Improve Your Thinking](#).

Because so many scientific theories from bygone eras have turned out to be wrong, we must assume that most of today's theories will eventually prove incorrect as well. And what goes for science goes in general. Politics, economics, technology, law, religion, medicine, child-rearing, education: no matter the domain of life, one generation's verities so often become the next generation's falsehoods that we might as well have a Pessimistic Meta-Induction from the History of Everything.

Good scientists understand this. They recognize that they are part of a long process of approximation. They know that they are constructing models rather than revealing reality... The rest of us, by contrast, often engage in a kind of tacit chronological exceptionalism. Unlike all those suckers who fell for the flat earth or the geocentric universe or cold fusion or the cosmological constant, we ourselves have the great good luck to be alive during the very apex of accurate human thought. The literary critic Harry Levin put this nicely: "The habit of equating one's age with the apogee of civilization, one's town with the hub of the universe, one's horizons with the limits of human awareness, is paradoxically widespread." At best, we nurture the fantasy that knowledge is always cumulative, and therefore concede that future eras will know more than we do. But we ignore or resist the fact that knowledge collapses as often as it accretes, that our own most cherished beliefs might appear patently false to posterity.

That fact is the essence of the meta-induction — and yet, despite its name, this idea is not pessimistic. Or rather, it is only pessimistic if you hate being wrong. If, by contrast, you think that uncovering your mistakes is one of the best ways to revise and improve your understanding of the world, then this is actually a highly optimistic insight.

21. Robert Greene explains the Process to Attain Mastery

The relationship between people and their craft is such that you can tell by the path they have followed whether they are a master or an amateur.

Robert Greene, most famous for his exposure of power, The 48 Laws of Power, is out with a new book: Mastery.

There exists a form of power and intelligence that represents the high point of human potential. It is the source of the greatest achievements and discoveries in history. It is an intelligence that is not taught in our schools nor analyzed by professors, but almost all of us, at some point, have had glimpses of it in our own experience.

At its core, Mastery is a simple process accessible to all of us. But before you start down the path, you need to bring two traits to the table: the relentless ability to focus deeply on a subject and a strong desire to learn.

The process can be illustrated in the following way:

Let us say we are learning the piano, or entering a new job where we must acquire certain skills. In the beginning, we are outsiders. Our initial impressions of the piano or the work environment are based on prejudgments, and often contain an element of fear. When we first study the piano, the keyboard looks rather intimidating—we don't understand the relationships between the keys, the chords, the pedals, and everything else that goes into creating music. In a new job situation, we are ignorant of the power relationships between people, the psychology of our boss, the rules and procedures that are considered critical for success. We are confused—the knowledge we need in both cases is over our heads. Although we might enter these situations with excitement about what we can learn or do with our new skills, we quickly realize how much hard work there is ahead of us. The great danger is that we give in to feelings of boredom, impatience, fear, and confusion. We stop observing and learning. The process comes to a halt.

If, on the other hand, we manage these emotions and allow time to take its course, something remarkable begins to take shape. As we continue to observe and follow the lead of others, we gain clarity, learning the rules and seeing how things work and fit together. If we keep practicing, we gain fluency; basic skills are mastered, allowing us to take on newer and more exciting challenges. We begin to see connections that were invisible to us before. We slowly gain confidence in our ability to solve problems or overcome weaknesses through sheer persistence.

At a certain point, we move from student to practitioner. We try out our own ideas, gaining valuable feedback in the process. We use our expanding knowledge in ways that are increasingly creative. Instead of just learning how others do things, we bring our own style and individuality into play.

As years go by and we remain faithful to this process, yet another leap takes place—to mastery. The keyboard is no longer something outside of us; it is internalized and becomes part of our nervous system, our fingertips. In our career, we now have a feel for the group dynamic, the current state of business. We can apply this feel to social situations, seeing deeper into other people and anticipating their reactions. We can make decisions that are rapid and highly creative. Ideas come to us. We have learned the rules so well that we can now be the ones to break or rewrite them.

Greene argues that we can all be Masters but we must follow three phases:

apprenticeship, creative-active, and mastery. The problem is over-coming our hunger for magical shortcuts. We want the easy route.

To the extent that we believe we can skip steps, avoid the process, magically gain power through political connections or easy formulas, or depend on our natural talents, we move against this grain and reverse our natural powers. We become slaves to time—as it passes, we grow weaker, less capable, trapped in some dead-end career. We become captive to the opinions and fears of others. Rather than the mind connecting us to reality,

we become disconnected and locked in a narrow chamber of thought. The human that depended on focused attention for its survival now becomes the distracted scanning animal, unable to think in depth, yet unable to depend on instincts.

It is the height of stupidity to believe that in the course of your short life, your few decades of consciousness, you can somehow rewire the configurations of your brain through technology and wishful thinking, over-coming the effect of six million years of development. To go against the grain might bring temporary distraction, but time will mercilessly expose your weakness and impatience.

The difference between Masters and amateurs is simpler than you may think. One of the keys is tenacity.

Whenever we learn a skill, we frequently reach a point of frustration—what we are learning seems beyond our capabilities. Giving in to these feelings, we unconsciously quit on ourselves before we actually give up.

It's in our nature to shy away from anything that seems difficult or painful. In doing so, we take the path of the amateur.

“Do not talk about giftedness, inborn talents! One can name great men of all kinds who were very little gifted. They acquired greatness, became ‘geniuses’ (as we put it), through qualities the lack of which no one who knew what they were would boast of: they all possessed that seriousness of the efficient workman which first learns to construct the parts properly before it ventures to fashion a great whole; they allowed themselves time for it, because they took more pleasure in making the little, secondary things well than in the effect of a dazzling whole.”

— Friedrich Nietzsche

More than just some tails of historical figures, Greene offers some penetrating insights into human behavior.

We feel, rightly so, that no one should be admired or worshipped merely for the position they occupy, particularly if it comes from connections or a privileged background. But this attitude carries over to people who have reached their position mostly through their own accomplishments. We live in a culture that likes to criticize and debunk any form of authority, to point out the weaknesses of those in power. If we feel any aura, it is in the presence of celebrities and their seductive personalities. Some of this skeptical spirit toward authority is healthy, particularly in relation to politics, but when it comes to learning and the Apprenticeship Phase, it presents a problem.

To learn requires a sense of humility

We must admit that there are people out there who know our field much more deeply than we do. Their superiority is not a function of natural talent or privilege, but rather of time and experience. Their authority in the field is not based on politics or trickery. It is very real. But if we are not comfortable with this fact, if we feel in general mistrustful of any kind of authority, we will succumb to the belief that we can just as easily learn something on our own, that being self-taught is more authentic. We might justify this attitude as a sign of our independence, but in fact it stems from basic insecurity. We feel, perhaps unconsciously, that learning from Masters and submitting to their authority is somehow an indictment of our own natural ability. Even if we have teachers in our lives, we tend not to pay full attention to their advice, often preferring to do things our own way. In fact, we come to believe that being critical of Masters or teachers is somehow a sign of our intelligence, and that being a submissive pupil is a sign of weakness.

Why do we need a mentor?

Life is short; you have only so much time and so much energy to expend. Your most creative years are generally in your late twenties and on into your forties. You can learn what you need through books, your own practice, and occasional advice from others, but the process is hit-and-miss. The information in books is not tailored to your circumstances and individuality; it tends to be somewhat abstract. When you are young and have less

experience of the world, this abstract knowledge is hard to put into practice. You can learn from your experiences, but it can often take years to fully understand the meaning of what has happened. It is always possible to practice on your own, but you will not receive enough focused feedback. You can often gain a self-directed apprenticeship in many fields, but this could take ten years, maybe more.

Mentors do not give you a shortcut, but they streamline the process. They invariably had their own great mentors, giving them a richer and deeper knowledge of their field. Their ensuing years of experience taught them invaluable lessons and strategies for learning. Their knowledge and experience become yours; they can direct you away from unnecessary side paths or errors. They observe you at work and provide real-time feedback, making your practice more time efficient. Their advice is tailored to your circumstances and your needs. Working closely with them, you absorb the essence of their creative spirit, which you can now adapt in your own way. What took you ten years on your own could have been done in five with proper direction.

There is more to this than just time saved. When we learn something in a concentrated manner it has added value. We experience fewer distractions. What we learn is internalized more deeply because of the intensity of our focus and practice. Our own ideas and development flourish more naturally in this shortened time frame. Having an efficient apprenticeship, we can make the most of our youthful energy and our creative potential.

The career of Warren Buffett very much fit Greene's arc: Buffett apprenticed with Benjamin Graham in New York, honed his skills and evolved his process running the Buffett Partnership and the early years of Berkshire Hathaway, and is now widely considered a master investor.

I found Greene's book engaging despite the fact that I'm not normally a fan of anecdotal accounts. No doubt a lot of people have followed the same path yet never achieved the success necessary to be recognized as Masters. An assured way to success, this book is not.

Contrary to Greene, I'd argue that we all can't be Masters. Yet that doesn't mean we can't benefit from Greene's book.

22. The Secret Ingredient for Success: The Brutal Discipline Necessary for Self-Assessment

Camille Sweeney and Josh Gosfield, authors of The Art of Doing: How Superachievers Do What They Do and How They Do It So Well, came out with an op-ed in the New York Times.

The interesting argument, one that is echoed by Charles Darwin, is that the to success is a brutal self-assessment.

“Discipline is the attitude that helps us discern right from wrong ... Discipline is what makes us responsible toward ourselves [and] toward the society in which we live.”

— Massimo Vignelli

What happens to organizations and people when they find obstacles in their paths?

Professor Argyris called the most common response single loop learning — an insular mental process in which we consider possible external or technical reasons for obstacles. LESS common but vastly more effective is the cognitive approach that Professor Argyris called double-loop learning. In this mode we — like Mr. Chang — question every aspect of our approach, including our methodology, biases and deeply held assumptions. This more psychologically nuanced self-examination requires that we honestly challenge our beliefs and summon the courage to act on that information, which may lead to fresh ways of thinking about our lives and our goals.

In interviews we did with high achievers... we expected to hear that talent, persistence, dedication and luck played crucial roles in their success. Surprisingly, however, self-awareness played an equally strong role.

The successful people we spoke with — in business, entertainment, sports and the arts — all had similar responses when faced with obstacles: they subjected themselves to fairly merciless self-examination that prompted reinvention of their goals and the methods by which they endeavoured to achieve them.

In part, an accurate self-assessment allows for the feedback necessary to grow. It's the evidence you need to move forward. It doesn't matter if it comes from nobodies or somebodies, a coach or anyone else, which is precisely the point of being open to what others have to say if you are really interested in improving your own skills.

The discipline of self-assessment is only the start. It produces knowledge that allows us to understand the edge of our competency, which is the key to learning. What you do with that knowledge matters and there is a difference between the good and the great.

Average performers believe their errors are caused by things they don't control — a fixed mindset if there ever was one. Top performers, however, as Geoff Colvin writes in his book, Talent is Overrated, “believe they are responsible for their errors.”

Note that this is not just a difference of personality or attitude. Recall that the best performers have set highly specific, technique-based goals and strategies for themselves; they have thought through exactly how they intend to achieve what they want. So when something doesn't work, they can relate the failure to specific elements of their performance that may have misfired. (more)

It's precisely the combination of a brutal self-assessment and a growth mindset that tilts that increases the odds we become better. And these skills come down to discipline.

As Anna Deavere Smith wrote in Letters to a Young Artist: Straight-up Advice on Making a Life in the Arts for Actors, Performers, Writers, and Artists of Every Kind, *Discipline — both mental and physical — is crucial.*

23. Gossip

Nobody is untouched by gossip. We dish it. We listen to it. Or, least desirably, we are the subject of it.

One definition of gossip is “bits of news about the personal affairs of others.” We gossip about many things from appearances to habits. The best gossip, however, is usually found in the intimate secrets of others.

In Joseph Epstein’s book, *Gossip: The Untrivial Pursuit*, he explores the ever expanding roll gossip plays in our lives—from trivial pursuit to political weapon—and how the internet has, once again, changed everything.

The most enticing gossip is that which is highly feasible, often uncheckable, and deeply damning of the person who is its subject.

Gossip requires “two or more people telling things about a third that the latter would prefer not to be know.” In case you’re wondering, it matters not whether the gossip is true – if it is, so much the better.

The Uses of Gossip

Gossip does have its uses. Sociologists, for instances, have found much meaning in gossip.

In certain settings—the workplace, in large corporate offices, in government, in universities—gossip, as a source of funneling rumors recounting what is happening in the inner sanctum of an institution, may be the only way that workers have of finding out beforehand decisions that might have momentous effects on their future. Gossip can also be a relatively efficient way in which to acquire knowledge of the character of colleagues.

Gossip gives us a sense of what’s happening and allows us to feel integrated into the organization. According to Sloan Wilson, a professor of biology and anthropology at Binghamton University, “gossip appears to be a very sophisticated, multifunction interaction which is important in policing behaviour in a group and defining group membership.”

It also helps educate us to our cultural and social world. Sarah Wert, a psychologist at the University of Colorado adds: “We all know people who are not calibrated to the social world at all, who if they participated in gossip sessions would learn a whole lot of stuff they need to know and can’t learn anywhere else, like how reliable people are, how trustworthy. Not participating in gossip at some level can be unhealthy, and abnormal.”

*Gossip can enforce community norms and discourage bad behavior. “Although this is rarely its motive, gossip can act as a potential barrier to bad behavior, and in this sense can be a useful deterrent to such behavior. Some people will be restrained from acting badly if only because they fear that their conduct will be talked about behind their backs. Everything here depends, of course, on the quality of the community’s norms. If these norms are far from admirable, gossip of this kind turns naturally ugly. Illustrations of the effects of this kind of gossip are available in Nathaniel Hawthorne’s *The Scarlet Letter* and, much later, in Sinclair Lewis’s novels *Babbitt* and *Main Street*, where conformity to a community’s norms is crucial to one’s adjustment to adult life, though often, as both Hawthorne and Lewis make clear, at the exorbitant price of the loss of one’s true spirit and authentic personality.*

Alternatively, gossip can work the other way, and work to loosen community norms.

Reading about the behavior of the famous in gossip columns, people begin to think that their behavior, though it goes beyond established boundaries, perhaps isn’t so terrible after all.

Gossip can also be used to calibrate and elevate your status within the social circle. In 1944, C.S. Lewis delivered a lecture called “*The Inner Ring*.” In it, he describes that we can tell gossip for social approval:

I don't believe that the economic motive and the erotic motive account for everything that goes on in what we moralists call the World. Even if you add Ambition I think the picture is still incomplete. The lust for the esoteric, the longing to be inside, take many forms which are not easily recognizable as Ambition. We hope, no doubt, for tangible profits from every Inner Ring we penetrate: power, money, liberty to break rules, avoidance of routine duties, evasion of discipline. But all these would not satisfy us if we did not get in addition the delicious sense of secret intimacy. It is no doubt a great convenience to know that we need fear no official reprimands from our official senior because he is old Percy, a fellow-member of our ring. But we don't value the intimacy only for the sake of convenience; quite equally we value the convenience as a proof of the intimacy.

Rules

But Epstein argues there are rules to gossip. For instance, "No matter how deep his delight in gossip, the originator of it must never seem as if he worked hard at acquiring the information he is passing on. ... Were he to do so, he would come across as the most miserable of creatures, a damned busybody."

The best gossip, for Epstein, is "That which confirms my own views of the essential fraudulence of certain people, especially people who present themselves as a touch — and usually more than a touch — more moral than the rest of us."

We All Have Secrets

While we might prefer to hear about gossip concerning those in power or celebrities, we all have secrets. The English writer William Donaldson wrote in his diary:

The version of ourselves we present to the world bears no resemblance to the truth. If we knew the truth about each other we could take no-one seriously. There isn't one of us who could afford to be caught. That's all life is. Trying not to be found out.

Literature

Gossip, of course, is everywhere in literature.

Elizabeth Gaskell, the Brontes, Edith Wharton, and Henry James, novelists who had a strong interest in gossip and made good use of it in their fiction, understood both gossip's attractions and its literary value.

Commenting on having made an appearance in a novel, with a different name, Isaiah Berlin wrote to a colleague "To appear in a novel of this kind is rather like appearing in other people's dreams: and one cannot exactly avoid doing so, nor is one responsible for the shape one takes, and yet the results inevitably offend one. I wish people left one alone.

The Internet is Changing Gossip

A character in *The Last Puritan*, a novel by George Santayana, who was accused of a crime, and later acquitted, says "Being acquitted is nothing in this world. Being accused is what makes all the difference."

"The Internet," writes Daniel Solove, a legal scholar interested in the questions, problems, and issues of privacy, "is transforming the nature and effect of gossip."

In his book The Future of Reputation: Gossip, Rumor, and Privacy on the Internet, Solove recounts the story of an insensitive remark that appeared online, supposedly spoken by the clothing designer Tommy Hilfiger: "If I had known that African Americans, Hispanics, and Asians would buy my clothes, I would not have made them so nice." Hilfiger is also supposed to have confirmed that he made this most impolitic remark on Oprah, causing Ms. Winfrey to throw him off her show and tell her audience not to buy his clothes. The effect of this caused Hilfiger's business to slump drastically. The problem is that Tommy Hilfiger never made the remark, nor had he ever appeared on Oprah. But the story was out there in cyberspace; you will find it is still out there today.

The internet has given us splendid freedom to express opinions and thoughts. This is part of its tremendous benefit. But there is another side to that freedom, "the freedom to libel, to invade privacy, to wreck lives—that has got so little, though greatly needed, attention."

Professor Solove remarks that the Internet is, historically, in its adolescence — and it is precisely as an adolescent that it now tends to act: wildly, thoughtlessly, destructively. Lars Nelson, of the New York Daily News, has called the Internet, in this aspect of its young career, “a vanity press for the demented,” and this is more than an amusing phrase.

“Gossip has its good qualities,” writes Epstein, “in supplying important information not available in any other form. ... But on the harmful side, the Internet has quickened, and much intensified, the harm that gossip can do to its victims.”

The combination of malice with the Internet’s speed and permanency creates a nuclear weapon.

In the end, Epstein concludes, “Once a secret vice, gossip threatens to become the chief way we obtain our information, and there doesn’t appear much we can do about it.”

24. Become A Learning Machine

When successful people from different fields offer the same advice, I listen. Often they have different vocabulary around an idea, but when you break it down you realize they're talking about the same thing.

Below is an example of Charlie Munger, Carol Dweck, and Susan Cain, offering the same core advice: Become a Learning Machine.

If you want to go to bed smarter than you woke up, you need to learn something new each day. It doesn't matter how smart you are today; what matters it that you learn something new and useful. If you can simply repeat that day after day, you will find that you outperform others.

It can be hard to grasp this concept because the differences at first are small. Only as the days turn into weeks, the weeks into months, the months into years, and the years into decades will you look back and wonder how it happened.

Charlie Munger:

I constantly see people rise in life who are not the smartest, sometimes not even the most diligent, but they are learning machines. They go to bed every night a little wiser than they were when they got up and boy does that help, particularly when you have a long run ahead of you.

Carol Dweck says:

You have to apply yourself each day to becoming a little better. By applying yourself to the task of becoming a little better each and every day over a period of time, you will become a lot better.

And this tidbit from Susan Cain, also fits:

...identify the tasks or knowledge that are just out of your reach, strive to upgrade your performance, monitor your progress, and revise accordingly.

25. The Science of High Performance

Research shows that knowing what you want to accomplish is more important than performance ... at least at the start. But once you know where you're going, you can accelerate progress by religiously implementing these steps.

1. Routines

The first tip comes from Tony Schwartz author of The Power of Full Engagement and Be Excellent at Anything. In his contribution to Maximize Your Potential, he recommends harnessing the power of a ritual.

A ritual is a highly precise behavior you do at a specific time so that it becomes automatic over time and no longer requires much conscious intention or energy.

Willpower and discipline are over-rated. Systems matter more.

In his book, Willpower: Rediscovering the Greatest Human Strength, Roy Baumeister contends that the most successful people don't make better decisions because of their willpower. Rather, they develop routines and scripts.

These routines become automatic and reduce the number of decisions we need to make (as well as reducing stress). Our brain doesn't have unlimited resources so the more we can offload to routines and scripts the more we can put our limited energy to other things. Developing these routines are key. In Michael Lewis' profile of President Obama, he writes:

You also need to remove from your life the day-to-day problems that absorb most people for meaningful parts of their day. "You'll see I wear only gray or blue suits," (Obama) said. "I'm trying to pare down decisions. I don't want to make decisions about what I'm eating or wearing. Because I have too many other decisions to make." He mentioned research that shows the simple act of making decisions degrades one's ability to make further decisions. It's why shopping is so exhausting. "You need to focus your decision-making energy. You need to routinize yourself. You can't be going through the day distracted by trivia."

If we spend energy making too many little decisions, we'll have less to make the more important decisions. Some companies are cluing into this.

"I think that the leadership at Google has an intuitive understanding of human nature and the way attention is a limited resource," says David Rock author of Your Brain at Work.

Google organizes their environment to make allow their employees to make fewer decisions.

The formula at Club Med is to include pretty much everything in the price, activities, food, even drinks, giving you fewer decisions to make. Now I know the research on decision making, and how making any conscious decision uses a measurable amount of glucose, but I wasn't prepared for how relaxing it was not having to think anywhere near as much, even about simple things. It turned out to be a remarkably restful holiday.

When you work at google, you get to save your limited mental resources for the most important decisions. As Google's CEO Eric Schmidt said, "Let's face it: programmers want to program, they don't want to do their laundry. So we make it easy for them to do both."

...Other companies could do well to do the same, noticing what their employees end up wasting their attention on, and doing something about it. It's sure making me rethink my own company's benefits policies.

... as well as minimizing distractions and respecting attention, Google does other things to help its people be more productive, in particular being more productive at complex problem solving.

2. Focus

Your routines should be geared towards helping you focus.

In Your Brain at Work, David Rock writes:

One of the most effective distraction-management techniques is simple: switch off all communication devices during any thinking work. Your brain prefers to focus on things

right in front of you. It takes less effort. If you are trying to focus on a subtle mental thread, allowing yourself to be distracted is like stopping pain to enjoy a mild pleasure: it's too hard to resist! Blocking out external distractions altogether, especially if you get a lot of them, seems to be one of the best strategies for improving mental performance

Combining routine and focus is the sweet spot. Here are two examples you can put into practice today.

First, Mark McGuinness argues in Manage Your Day-to-Day that you should put your most important work first. It's much easier to deal with less taxing things, like email, later.

The single most important change you can make in your working habits is to switch to creative work first, reactive work second. This means blocking off a large chunk of time every day for creative work on your own priorities, with the phone and e-mail off.

Another way to think of this is to pay yourself first: you are your own most valuable client. That's what Warren Buffett and Charlie Munger do.

Another useful *routine* is to deal with email in batches, say from 10-11 and 3-4 each day. The rest of the day, turn the email client off so you're not constantly interrupted with 'new mail.'

Consider the wise counsel of Herbert Simon:

What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention, and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.

3. Practice

Experience doesn't always make you better.

In Talent Is Overrated, Geoff Colvin writes:

In field after field, when it comes to centrally important skills—stockbrokers recommending stocks, parole officers predicting recidivism, college admissions officials judging applicants—people with lots of experience were no better at their jobs than those with less experience.

Wait. What? That doesn't make sense.

We typically operate in the OK Plateau.

The bestselling author of Moonwalking with Einstein and USA Memory Champion in 2005, Joshua Foer explains:

In the 1960s, psychologists identified three stages that we pass through in the acquisition of new skills. We start in the "cognitive phase," during which we're intellectualizing the task, discovering new strategies to perform better, and making lots of mistakes. We're consciously focusing on what we're doing. Then we enter the "associative stage," when we're making fewer errors, and gradually getting better. Finally, we arrive at the "autonomous stage," when we turn on autopilot and move the skill to the back of our proverbial mental filing cabinet and stop paying conscious attention. ... The OK Plateau is that point when we reach the autonomous stage and consciously or unconsciously stay to ourselves, "I am OK at how good I have gotten at this task," and stop paying attention to our improvement. We all reach OK Plateaus in almost everything we do. We learn to drive when we're teenagers, and at first we improve rapidly, but eventually we are no longer a threat to old ladies crossing the street, and we stop getting appreciably better.

If we want to perform better beyond some basic competence researchers say we must engage in deliberate practice. These are designed, mindful efforts, to master even the smallest detail of success. To get better you have to get out of the autonomous stage.

One way to stay out of the autonomous stage is deliberate practice. Expert musicians, for example, focus on the hardest parts not the easy ones that would allow them to sink into autopilot. The way to get better is to push your limits.

Unfortunately, deliberate practice isn't something that most of us understand, let alone engage in on a daily basis. This helps explain why we can work at something for decades without really improving our performance.

Colvin continues:

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

Consider a coach.

In his fascinating [New Yorker article](#), Doctor Atul Gawande writes "In theory, people can do this themselves."

But most people do not know where to start or how to proceed. Expertise, as the formula goes, requires going from unconscious incompetence to conscious incompetence to conscious competence and finally to unconscious competence. The coach provides the outside eyes and ears, and makes you aware of where you're falling short.

In other words, the coach provides objective feedback and structure.

Commenting on what it's like to have a surgical coach, Gawande offers:

Osteen (Gawande's coach) watched, silent and blank-faced the entire time, taking notes. My cheeks burned; I was mortified. I wished I'd never asked him along. I tried to be rational about the situation—the patient did fine. But I had let Osteen see my judgment fail; I'd let him see that I may not be who I want to be.

This is why it will never be easy to submit to coaching, especially for those who are well along in their career. I'm ostensibly an expert. I'd finished long ago with the days of being tested and observed. I am supposed to be past needing such things. Why should I expose myself to scrutiny and fault-finding?

It takes a special person to bring in a coach mid-career and subject themselves to "scrutiny and fault-finding."

Maybe you're thinking, I don't need a coach because "I'm my own worst critic." That may be the case, however, it is really hard, but not impossible, to be your own (objective) coach. You need structure and *objective* feedback.

(I don't want to get into too much nuance, but you also have to think about feedback systems. Part of deliberate practice is immediate and constant feedback. This enables course correction. The time-to-feedback can derail deliberate practice if it's too long.)

4. Exercise

In [Brain Rules](#), John Medina [explores the relationship between exercise and mental alertness](#):

Just about every mental test possible was tried. No matter how it was measured, the answer was consistently yes: A lifetime of exercise can result in a sometimes astonishing elevation in cognitive performance, compared with those who are sedentary. Exercisers outperform couch potatoes in tests that measure long-term memory, reasoning, attention, problem-solving, even so-called fluid-intelligence tasks. These tasks test the ability to reason quickly and think abstractly, improvising off previously learned material in order to solve a new problem. Essentially, exercise improves a whole host of abilities prized in the classroom and at work.

5. Rest

Taking time to rest won't make you a slacker. While the corporate culture of "back-to-back" meetings from 9-5 may seem "cool" it is actually crazy. Rest is a critical component of creating and sustaining excellence.

26. The Impoverishment of Attention

"While the link between attention and excellence remains hidden most of the time, it ripples through almost everything we seek to accomplish."

Focus matters enormously for success in life and yet we seem to give it little attention. Daniel Goleman's book, *Focus: The Hidden Driver of Excellence*, explores the power of attention. "Attention works much like a muscle," he writes, "use it poorly and it can wither; work it well and it grows."

To get the results we want in life, Goleman argues we need three kinds of focus: inner, other, and outer.

Inner focus attunes us to our intuitions, guiding values, and better decisions. Other focus smooths our connections to the people in our lives. And outer focus lets us navigate in the larger world. A (person) tuned out of his internal world will be rudderless; one blind to the world of others will be clueless; those indifferent to the larger systems within which they operate will be blindsided.

How we deploy attention shapes what we see. Or as Yoda says, "Your focus is your reality."

Goleman argues that, despite the advantages of everything being only a click away, our attention span is suffering.

An eighth-grade teacher tells me that for many years she has had successive classes of students read the same book, Edith Hamilton's Mythology. Her students have loved it—until five years or so ago. "I started to see kids not so excited— even high-achieving groups could not get engaged with it," she told me. "They say the reading is too hard; the sentences are too complicated; it takes a long time to read a page."

She wonders if perhaps her students' ability to read has been somehow compromised by the short, choppy messages they get in texts. One student confessed he'd spent two thousand hours in the last year playing video games. She adds, "It's hard to teach comma rules when you are competing with World of WarCraft."

Here is a telling story. I was in a coffee shop just the other day and I noticed that when two people were having a conversation they couldn't go more than a few minutes without picking up their phone. Our inability to resist checking email, Facebook, and Twitter rather than focus on the here and now leads to a real-life out-of-office. Sociologist Erving Goffman, calls this "away," which tells other people "I'm not interested" in you right now. We continually fight distractions. From televisions on during supper, text messages, emails, phone calls ... you get the picture. This is one reason I've changed my media consumption habits.

It feels like we're going through life in a state of "continuous partial attention." We're there but not really there. Unaware of where we place our attention. Unconscious about how we live.

I once worked with the CEO of a private organization. We often discussed board meetings, agendas, and other areas of time allocation. I sensed a disconnect between where he wanted to spend his time and what he actually spent time on.

To verify, I went back over the last year of board meetings and categorized each scheduled agenda item. I found a substantial mismatch; he was spending a great deal of time on issues he thought were not important. In fact, the 'scheduled time' was almost the complete inverse of what he wanted to focus on.

Goleman also points to some of the implications of our modern world.

The onslaught of incoming data leads to sloppy shortcuts, like triaging email by heading, skipping much of voice mails, skimming messages and memos. It's not just that we've developed habits of attention that make us less effective, but that the weight of messages leaves us too little time simply to reflect on what they really mean.

In 1977, foreseeing what was going to happen, the Nobel-winning economist Herbert Simon wrote:

What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention, and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.

William James, a pioneer of modern psychology, defined attention as “the sudden taking possession by the mind, in clear and vivid form, of one of what seems several simultaneously possible objects or trains of thought.”

We naturally focus when we're lost. Imagine for a second the last time you were driving in your car without your GPS and you got lost. Think back to the first thing you did in response. I bet you turned off the radio so you could increase your focus.

Goleman, paraphrasing research, argues there are two main varieties of distractions: sensory and emotional.

The sensory distractors are easy: as you read these words you're tuning out (our sponsor and all of the text on the right). Or notice for a moment the feeling of your tongue against your upper palate—just one of an endless wave of incoming stimuli your brain weeds out from the continuous wash of background sounds, shapes and colors, tastes, smells, sensations, and on and on.

More daunting is the second variety of lures: emotionally loaded signals. While you might find it easy to concentrate on answering your email in the hubbub of your local coffee shop, if you should overhear someone mention your name (potent emotional bait, that) it's almost impossible to tune out the voice that carries it—your attention reflexively alerts to hear what's being said about you. Forget that email. The dividing line between fruitless rumination and productive reflection lies in whether or not we come up with some tentative solution or insight and then can let those distressing thoughts go—or if, on the other hand, we just keep obsessing over the same loop of worry.

The more our focus gets disrupted, the worse we do.

To focus we must tune out emotional distractions. But not at all costs. The power to disengage focus is also important.

That means those who focus best are relatively immune to emotional turbulence, more able to stay unflappable in a crisis and to keep on an even keel despite life's emotional waves.

Failure to drop one focus and move on to others can, for example, leave the mind lost in repeating loops of chronic anxiety. At clinical extremes it means being lost in helplessness, hopelessness, and self-pity in depression; or panic and catastrophizing in anxiety disorders; or countless repetitions of ritualistic thoughts or acts (touch the door fifty times before leaving) in obsessive-compulsive disorder. The power to disengage our attention from one thing and move it to another is essential for well-being.

We've all seen what a strong selective focus looks like. It's the couple in the coffee shop mentioned above, eyes locked, who fail to realize they are not alone.

It should come as no surprise that we learn best with focused attention.

As we focus on what we are learning, the brain maps that information on what we already know, making new neural connections. If you and a small toddler share attention toward something as you name it, the toddler learns that name; if her focus wanders as you say it, she won't.

When our mind wanders off, our brain activates a host of brain circuits that chatter about things that have nothing to do with what we're trying to learn. Lacking focus, we store no crisp memory of what we're learning.

Goleman goes on to discuss how we connect what we read to our mental models, which is the heart of learning.

As we read a book, a blog, or any narrative, our mind constructs a mental model that lets us make sense of what we are reading and connects it to the universe of such models we already hold that bear on the same topic.

If we can't focus we'll have more holes in our understanding. (To find holes in your understanding, try the Feynman Technique, which was actually an invention of George Eliot's but I'll save that for another day.)

When we read a book, our brain constructs a network of pathways that embodies that set of ideas and experiences. Contrast that deep comprehension with the interruptions and distractions that typify the ever-seductive Internet.

The continuous onslaught of texts, meetings, videos, music, email, Twitter, Facebook, and more is the enemy of understanding. The key, argues Nicolas Carr, author of *The Shallows: What the Internet Is Doing to Our Brains*, is "deep reading." And the internet is making this nearly impossible.

There is, however, perhaps no skill better than deep and focused thought. "The more information that's out there," says Tyler Cowen, author of *Average Is Over: Powering America Beyond the Age of the Great Stagnation*, "the greater the returns to just being willing to sit down and apply yourself. Information isn't what's scarce; it's the willingness to do something with it." Deep thought must be learned. In order to do that, however, we must tune out most of the distractions and focus.

Goleman reminds us that some of this too was foreseen.

Way back in the 1950s the philosopher Martin Heidegger warned against a looming "tide of technological revolution" that might "so captivate, bewitch, dazzle, and beguile man that calculative thinking may someday come to be ... the only way of thinking." That would come at the loss of "meditative thinking," a mode of reflection he saw as the essence of our humanity.

I hear Heidegger's warning in terms of the erosion of an ability at the core of reflection, the capacity to sustain attention to an ongoing narrative. Deep thinking demands sustaining a focused mind. The more distracted we are, the more shallow our reflections; likewise, the shorter our reflections, the more trivial they are likely to be. Heidegger, were he alive today, would be horrified if asked to tweet.

29. Learning by Thinking: How Reflection Aids Performance

“By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third, by experience, which is the bitterest.”

— Confucius

It's been a while since I covered an academic paper. But one by Giada Di Stefano, Francesca Gino, Gary Pisano, and Bradley Staats on the role reflection plays in learning is fascinating.

Learning plays an important role in everything. This is why the concept of learning has gotten a lot of attention from scholars. You can argue that today's "Knowledge economy" further accelerates the pace of learning; things are changing and we need to keep up. This, the authors argue, makes our experience more productive and builds our confidence "in the ability to achieve a goal," which further translates into "higher rates of learning."

What is learning?

"Learning," they write, "is defined as a lasting change in knowledge generated by experience."

(There are) two types of learning, which are based on the source of such experience: direct learning from one's own experience and indirect learning from the experience of others.

Most research tends to focus on "learning by doing" whereas Farnam Street is more oriented towards indirect learning.

In Learning by Thinking: How Reflection Aids Performance the authors "take a less traveled road and focus on how individual learning can be augmented when individuals can not only "do" but also "think" about what they have been doing." That is, we learn better when we couple learning by doing with reflection — "that is, the intentional attempt to synthesize, abstract, and articulate the key lessons taught by experience."

This, the authors argue, makes our experience more productive and builds our confidence "in the ability to achieve a goal," which further translates into "higher rates of learning."

Dual Process Theory

The argument is based on the dual-process theory, which suggests:

"... the existence of two systems of thought that underlie intuitive and reflective processing, often referred to as type 1 and type 2, respectively ... We propose a dual-process learning model in which the automatic, unconscious process of learning generated from experience is coupled with the controlled, conscious attempt at learning."

Findings

Our findings suggest that reflection is a powerful mechanism by which experience is translated into learning. In particular, we find that individuals perform significantly better on subsequent tasks when they think about what they learned from the task they completed. Interestingly, we do not observe an additional boost in performance when individuals share the insights from their reflection efforts with others. Results of mediation analyses further show that the improvement in performance observed when individuals are learning by thinking is explained by increased self-efficacy generated by reflection.

Interesting, my system for remembering what I read has intuitive roots built around reflection.

General Discussion

Though some organizations are increasingly relying on some group reflection (e.g., "after-action reports"), there has been almost no effort to encourage individuals to reflect, and people often fail to engage in self-reflection themselves. Though reflection entails the high opportunity cost of one's time, we argue and show that reflecting after completing tasks is no idle pursuit: it can powerfully enhance the learning process. Learning, we find, can be augmented if one deliberately focuses on thinking about what one has been doing. In

addition to showing a significant performance differential when comparing learning-by-doing alone to learning-by-doing coupled with reflection, we also demonstrate that the effect of reflection on learning is mediated by greater self-efficacy.

This part was also interesting. What matters is reflection, not why you are reflecting. Across our studies, we also included a condition in which people shared their reflections with others. Interestingly, our results show that while sharing one's learning improves one's subsequent performance, the value of sharing is no different than that of reflecting and keeping one's thoughts to oneself.

Implications

The implications here support much that we've already covered on Farnam Street.

"... taking time away from training and reallocating that time to reflection actually improved individual performance."

Learning and decision journals encourage reflection and thus knowledge.

Companies often use tools such as learning journals as a way to encourage reflection in training and regular operations.

It's all about smarter, not harder.

"Our personal experience is that individuals of all ages may not treat these exercises with much seriousness."

So if you want a leg up, pay attention and take this seriously.

30. To Learn, Retrieve

Mike Ebersold is a neurosurgeon. In neurosurgery and indeed life there is an essential kind of learning that only comes from reflection on personal experience.

In the book Make It Stick: The Science of Successful Learning, the authors capture Ebersold's description:

A lot of times something would come up in surgery that I had difficulty with, and then I'd go home that night thinking about what happened and what could I do, for example, to improve the way a suturing went. How can I take a bigger bite with my needle, or a smaller bite, or should the stitches be closer together? What if I modified it this way or that way? Then the next day back, I'd try that and see if it worked better. Or even if it wasn't the next day, at least I've thought through this, and in so doing I've not only revisited things that I learned from lectures or from watching others performing surgery but also I've complemented that by adding something of my own to it that I missed during the teaching process.

"Reflection," Ebersold says, "can involve several cognitive activities that lead to stronger learning: retrieving knowledge and earlier training from memory, connecting these to new experiences, and visualizing and mentally rehearsing what you might do differently next time."

The authors of Make It Stick continue:

To make sure the new learning is available when it's needed, Ebersold points out, "you memorize the list of things that you need to worry about in a given situation: steps A, B, C, and D," and you drill on them. Then there comes a time when you get into a tight situation and it's no longer a matter of thinking through the steps, it's a matter of reflexively taking the correct action.

"Unless you keep recalling this maneuver," Ebersold notes, "it will not become a reflex. Like a race car driver in a tight situation or a quarterback dodging a tackle, you've got to act out of reflex before you've even had time to think. Recalling it over and over, practicing it over and over. That's just so important."

The Testing Effect

The power of retrieval as a learning tool is known among psychologists as the testing effect. In its most common form, testing is used to measure learning and assign grades in school, but we've long known that the act of retrieving knowledge from memory has the effect of making that knowledge easier to call up again in the future.

Francis Bacon and William James also wrote about this phenomenon. Retrieval makes things stick better than re-exposure to the original material. This is the testing effect.

To be most effective, retrieval must be repeated again and again, in spaced out sessions so that the recall, rather than becoming a mindless recitation, requires some cognitive effort. Repeated recall appears to help memory consolidate into a cohesive representation in the brain and to strengthen and multiply the neural routes by which the knowledge can later be retrieved. In recent decades, studies have confirmed what Mike Ebersold and every seasoned quarterback, jet pilot, and teenaged texter knows from experience—that repeated retrieval can so embed knowledge and skills that they become reflexive: the brain acts before the mind has time to think.

Learning or Just Recalling Information?

In 2010 the New York Times reported on a scientific study that showed that students who read a passage of text and then took a test asking them to recall what they had read retained an astonishing 50 percent more of the information a week later than students who had not been tested.

This would seem like good news, but here's how it was greeted in many online comments:

- "Once again, another author confuses learning with recalling information."

- *“I personally would like to avoid as many tests as possible, especially with my grade on the line. Trying to learn in a stressful environment is no way to help retain information.”*
- *“Nobody should care whether memorization is enhanced by practice testing or not. Our children cannot do much of anything anymore.”*

Forget memorization, many commenters argued; education should be about high-order skills. Hmmm. If memorization is irrelevant to complex problem solving, don't tell your neurosurgeon. The frustration many people feel toward standardized, “dipstick” tests given for the sole purpose of measuring learning is understandable, but it steers us away from appreciating one of the most potent learning tools available to us. Pitting the learning of basic knowledge against the development of creative thinking is a false choice. Both need to be cultivated. The stronger one's knowledge about the subject at hand, the more nuanced one's creativity can be in addressing a new problem. Just as knowledge amounts to little without the exercise of ingenuity and imagination, creativity absent a sturdy foundation of knowledge builds a shaky house.

The Takeaway

Practice at retrieving new knowledge or skill from memory is a potent tool for learning and durable retention. This is true for anything the brain is asked to remember and call up again in the future—facts, complex concepts, problem-solving techniques, motor skills. Effortful retrieval makes for stronger learning and retention. We're easily seduced into believing that learning is better when it's easier, but the research shows the opposite: when the mind has to work, learning sticks better. The greater the effort to retrieve learning, provided that you succeed, the more that learning is strengthened by retrieval. After an initial test, delaying subsequent retrieval practice is more potent for reinforcing retention than immediate practice, because delayed retrieval requires more effort. Repeated retrieval not only makes memories more durable but produces knowledge that can be retrieved more readily, in more varied settings, and applied to a wider variety of problems.

While cramming can produce better scores on an immediate exam, the advantage quickly fades because there is much greater forgetting after rereading than after retrieval practice. The benefits of retrieval practice are long-term.

Simply including one test (retrieval practice) in a class yields a large improvement in final exam scores, and gains continue to increase as the frequency of classroom testing increases.

Testing doesn't need to be initiated by the instructor. Students can practice retrieval anywhere; no quizzes in the classroom are necessary. Think flashcards—the way second graders learn the multiplication tables can work just as well for learners at any age to quiz themselves on anatomy, mathematics, or law. Self-testing may be unappealing because it takes more effort than rereading, but as noted already, the greater the effort at retrieval, the more will be retained.

Students who take practice tests have a better grasp of their progress than those who simply reread the material. Similarly, such testing enables an instructor to spot gaps and misconceptions and adapt instruction to correct them.

Giving students corrective feedback after tests keeps them from incorrectly retaining material they have misunderstood and produces better learning of the correct answers. Students in classes that incorporate low-stakes quizzing come to embrace the practice. Students who are tested frequently rate their classes more favorable.

31. The Simplest Way to Achieve Simplicity is Through Thoughtful Reduction

A close friend of mine argues that while we love the first part of Einstein's quote, "Everything should be made as simple as possible," we ignore the second part "but not simpler," which is the essence of Occam's Razor. This article is about how we can achieve simplicity through thoughtful reduction.

"Everything should be made as simple as possible, but not simpler."

— Einstein

After a bit of reflection, on twitter, I wrote: *"You don't fully understand something until you can simplify it. But if all you do is simplify it, you don't understand it."*

The complexity of "but not simpler" is where we struggle.

This is where our brain struggles and tries to avoid work. The struggle is where the real learning comes from.

We are pattern matching creatures — once we find a solution that works, we close our minds to alternative ideas.

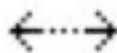
A key element of simplicity and understanding is the thoughtful reduction of the unnecessary.

An inversion if you will. And yet one I wish more organizations would consider. While it's counter-intuitive, subtraction is often more powerful than addition.

In The Laws of Simplicity, John Maeda writes:

The easiest way to simplify a system is to remove functionality. Today's DVD, for instance, has too many buttons if all you want to do is play a movie. A solution could be to remove the buttons for Rewind, Forward, Eject, and so forth until only one button remains: Play. But what if you want to replay a favorite scene? Or pause the movie while you take that all-important bathroom break? The fundamental question is, where's the balance between simplicity and complexity?

**HOW SIMPLE CAN
YOU MAKE IT?**



**HOW COMPLEX DOES
IT HAVE TO BE?**

On the one hand, you want a product or service to be easy to use; on the other hand you want it to do everything that a person might want it to do.

The process of reaching an ideal state of simplicity can be truly complex, so allow me to simplify it for you. The simplest way to achieve simplicity is through thoughtful reduction. When in doubt, just remove. But be careful of what you remove.

It's not about removing for the sake of removing.

When it is possible to reduce a system's functionality without significant penalty, true simplification is realized. When everything that can be removed is gone, a second battery of methods can be employed. I call these methods SHE: SHRINK, HIDE, EMBODY.

[...]

Simplicity is about the unexpected pleasure derived from what is likely to be insignificant and would otherwise go unnoticed.

If you're short on time you can stop here. If you're interested in SHE (Shrink, Hide, Embody) keep reading.

Size matters.

The smaller the object, the more forgiving we can be when it misbehaves.

Making things smaller doesn't make them necessarily better, but when made so we tend to have a more forgiving attitude towards their existence. A larger-than-human-scale object demands its rightful respect, whereas a tiny object can be something that deserves our pity. When comparing a kitchen spoon to a construction bulldozer the larger scale of the vehicle instills fear, while the rounded utensil appears harmless and inconsequential. The bulldozer can run you over and end your life, but if the spoon were to fall on top of you, your life would likely be spared. Guns, mace cannisters, and little karate experts of course are the exception to this rule of "fear the large, endear the small."

Technology is SHRINK-ing.

The computational power of a machine that sixty years ago weighed 60,000 pounds and occupied 1,800 square feet can now be packed onto a sliver of metal less than a tenth the size of the nail on your pinkie. Integrated circuit (IC) chip technology-commonly referred to as "computer chips"-allows far greater complexity at a much tinier scale. IC chips lie at the heart of the problem of complex devices today as they enable increasingly smaller devices to be created. A kitchen spoon and a mobile phone can share the exact same physical dimensions, yet the many IC's embedded inside the phone make the device easily more complex than the bulldozer-so looks can be deceiving.

Thus while IC's are a primary driver of complexity in modern day objects, they also enable the ability to shrink a frighteningly complex machine to the size of a cute little gumbdrop.

The smaller the object is, the lower the expectations; the more IC's that are inside, the greater the power. In this age of wireless technology that connects the IC inside the phone with all the computers in the world, power has now become absolute. There is no turning back to the age when large objects were complex and small objects were simple.

[...]

Lessening the inevitable complicating blow of these technologies by way of SHRINK may seem like a form of deception, which it is. But anything that can make the medicine of complexity go down easier is a form of simplicity, even when it is an act of deceit.

SHE: HIDE

When all features that can be removed have been, and a product has been made slim, light, and thin, it's time for the second method: HIDE the complexity through brute-force methods. A classical example of this technique is the Swiss army knife. Only the tool you wish to use is exposed, while the other blades and drivers are hidden.

[...]

Hiding complexity through ingenious mechanical doors or tiny display screens is an overt form of deception. If the deceit feels less like malevolence, more like magic, then hidden complexities become more of a treat than a nuisance. The ear-catching "click" when opening a Motorola Razr cell phone or the cinematic performance of an on-screen visual in Apple's Mac OS X creates the satisfaction of owning the power to will complexity from simplicity. Thus complexity becomes a switch that the owner can choose to flip into action on their own terms, and not by their device's will.

SHRINK-ing an object lowers expectations, and the hiding of complexities allows the owner to manage the expectations himself. Technology creates the problem of complexity, but also affords new materials and methods for the design of our relationship with complexities that shall only continue to multiply.

SHE: EMBODY

As features go into hiding and products shrink, it becomes ever more necessary to embed the object with a sense of the value that is lost after HIDE and SHRINK. Consumers will only be drawn to the smaller, less functional product if they perceive it to be more valuable than a bigger version of the product with more features. Thus the perception of quality becomes a critical factor when making the choice of less over more.

And in contrast to Sanjay Bakshi's pragmatic take on the luxury goods business, Maeda takes a different approach.

Embodying an object with properties of real quality is the basis of the luxury goods industry and is rooted in their use of precious materials and exquisite craftsmanship. Relatedly, a designer of Ferrari cars once told me that a Ferrari has fewer parts than a common car, but the parts themselves are significantly better than anything else on this earth. This elegant tale of construction uses the simple philosophy that if good parts can make a great product, incredible parts can lead to a legendary one.

[...]

It is necessary to advertise qualities that cannot be conveyed implicitly, especially when the message of embodiment simply tells the truth.

The first law can be summed up as:

Lessen what you can and conceal everything else without losing the sense of inherent value. EMBODY-ing a greater sense of quality through enhanced materials and other messaging cues is an important subtle counterbalance to SHRINK-ing and HIDEing the directly understood aspects of a product. Design, technology, and business work in concert to realize the final decisions that will lead to how much reduction in a product is tolerable, and how much quality it will embody in spite of its reduced state of being. Small is better when SHE'd.

32. Lifelong Learning

Your education shouldn't end when your schooling does. If you want to get an edge in life, you must be constantly learning, not coasting along on what you already know. Lifelong learning requires the ability to reflect on your mistakes, a lot of reading, and testing what you know.

"By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third by experience, which is the bitterest."

— Confucius

I'm a huge fan of Laurence Endersen's book: *Pebbles of Perception: How a Few Good Choices Make All The Difference*. I think it deserves to be on the shelf of every knowledge seeker in the world.

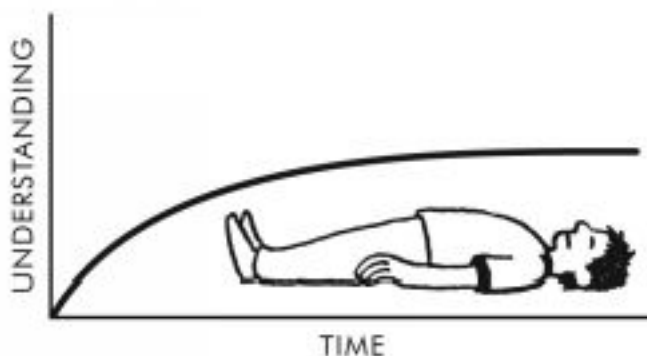
There is a chapter in the book on lifelong learning.

When we are captain of our own ship, life can be a wonderful continuous voyage of discovery. Yet we frequently pigeonhole our learning and discovery into limiting discrete blocks. There are the childhood years, filled with exploration and getting to know the world around us at a sensory level. The early school years follow, during which we are introduced to reading and writing. Middle school years bring a range of core subjects and some people will finish up the formal part of their education with university-level learning. Then we add some work experience and attain a certain level of competence. From this perch we coast pretty well. It's like driving. How many of us are getting better at driving? All of those hours behind the wheel are not deliberate practice. If you consider the product of the modern knowledge worker to be decisions, all of this coasting without getting better should concern you.

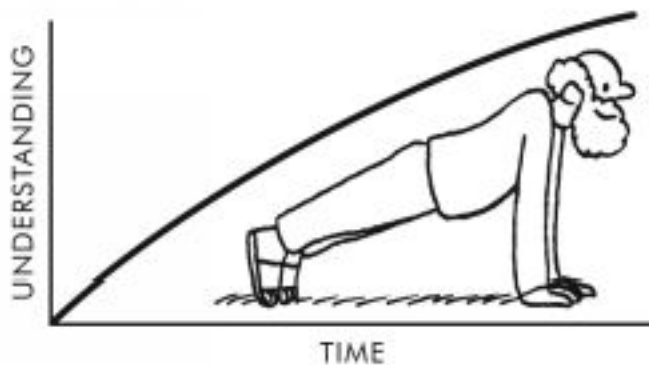
Lifelong Learning

The incentives to follow a path of lifelong learning are not easily apparent.

When assessing our competence in any particular discipline, we can place our level of ability somewhere along a continuum moving from ignorance, to conversational competence, to operational competence, then towards proficiency, and finally all the way to mastery. For most of us, if we get to operational competence in our main career area we are happy enough. We can get by and we don't have to expend too much energy continuously learning. We become what I call flat-line learners. For the flat-line learner the learning curve might look something like this:



And yet, Endersen argues that if we pursue a path of lifelong learning our path more closely resembles this:



You could even make an argument that lifelong learning puts you on a non-linear path but I'll leave that for you to think about.

The question as to why everyone doesn't want to become a lifelong learner remains.

It may boil down to choices and priorities. It is easy to be drawn towards passive entertainment, which requires less from us, over more energetic, active understanding. Inconvenience might be an alibi: "I don't have time for continuous learning as I am too busy with real life". But that excuse doesn't withstand close scrutiny, as experiences (coupled with reflection) can be the richest of all sources of investigation and discovery. Why not make a conscious decision to learn something new every day? No matter how small the daily learning, it is significant when aggregated over a lifetime. Resolving early in life to have a continuous learning mindset is not only more interesting than the passive alternative, it is also remarkably powerful. Choosing lifelong learning is one of the few good choices that can make a big difference in our lives, giving us an enormous advantage when practiced over a long period of time.

Reflection

The ignorant man can't learn from his own mistake and the fool can't learn from the mistakes of others. These are the primary ways we learn: Through our own experiences and through the experiences of others.

While both avenues have their place, there is no substitute for direct learning through experience – which we enhance through reflection. The process of thoughtful reflection makes our experiences more concrete, and helps with future recall and understanding. Reflecting about what we learned, how we felt, how we and others behaved, and what interests were at play, hardwires the learning in our brain and gives us a depth of context and relevance that would otherwise be absent.

Even if it were desirable, which it's not, there simply is not enough time to learn everything we need to know through direct experience.

Reading

"Reading," writes Endersen, "is the foundation of indirect learning." Learning how to read and finding time to read are two of the easiest and best changes you can make if you want to pursue lifelong learning.

Many read for entertainment. Some read for information. Too few read for understanding. Adler's book (How To Read a Book) is concerned with reading to understand. Being widely read is not the same as being well read. The more effort and skill we put into reading, the greater our understanding.

The Feynman Technique

As for testing whether we really understand something after we've read it, there is a powerful and elegant technique called the Feynman Technique.

Step 1. Choose the topic or concept that you are trying to understand. Take a blank piece of paper and write the name of the topic at the top.

Step 2. Assume you're teaching the topic to someone else. Write out a clear explanation of the topic, as if you were trying to teach it. A great way to learn is to teach. You identify gaps in your knowledge very quickly when trying to explain something to someone else in simple terms.

Step 3. If you get bogged down, go back to the source materials. Keep going back until you can explain the concept in its most basic form.

Step 4. Go back and simplify your language. The goal is to use your own words, not the words of the source material. Overly elaborate language is often a sure sign that you don't fully understand the concept. Use simple language and build on that with a clear analogy. An example that springs to mind is Warren Buffet's explanation of compound interest (i.e., interest earned on interest), when he likened it to a snowball that gathers snow as it rolls down a hill.

Lifelong learning is a better path than flat-line learning.

Savour experiences as opportunities to learn. Reflect on your experiences. Read regularly. Learn how to read for understanding. Know how to test whether you really understand something by demonstrating that you could teach it in simple terms with a clear analogy.

33. Steven Pinker: What a Broad Education Should Entail

Harvard's biologist/psychologist Steven Pinker is one of my favorites, even though I'm just starting to get into his work.

What makes him great is not just his rational mind, but his multidisciplinary approach. He pulls from many fields to make his (generally very good) arguments. And he's a rigorous scientist in his own field, even before we get to his ability to synthesize.

I first encountered Pinker in reading Poor Charlie's Almanack: Charlie Munger gives him the edge over Noam Chomsky and others in the debate over whether the capacity for language has been "built into" our DNA through natural selection.

Pinker wrote the bestseller, The Language Instinct, in which he argued that the capacity for complex language is innate. We develop it, of course, throughout our lives, but it's in our genes from the beginning (an idea that has since been criticized).

Pinker went on to write books with modest titles like How the Mind Works, The Blank Slate: The Modern Denial of Human Nature, and The Better Angels of Our Nature: Why Violence Has Declined. The latter is a controversial one: Bill Gates loves it, Nassim Taleb hates it. You'll have to make up your own mind.

The reason for writing about Pinker is that, while re-reading William Deresiewicz's brilliant speech, Solitude and Leadership, I noticed that he had an extremely popular piece about not sending your kids to Ivy League schools. It's an interesting argument, though I'm not sure I agree with all of it.

A little Googling told me that Pinker, himself a professor at an Ivy League school, responded with an even better piece on why Deresiewicz was imprecise in his criticisms and anecdotes.

I was fascinated most by Pinker's discussion of what an elite education *should* entail. This tells you a lot about his mind:

This leads to Deresiewicz's second goal, "building a self," which he explicates as follows: "it is only through the act of establishing communication between the mind and the heart, the mind and experience, that you become an individual, a unique being—a soul." Perhaps I am emblematic of everything that is wrong with elite American education, but I have no idea how to get my students to build a self or become a soul. It isn't taught in graduate school, and in the hundreds of faculty appointments and promotions I have participated in, we've never evaluated a candidate on how well he or she could accomplish it. I submit that if "building a self" is the goal of a university education, you're going to be reading anguished articles about how the universities are failing at it for a long, long time. I think we can be more specific. It seems to me that educated people should know something about the 13-billion-year prehistory of our species and the basic laws governing the physical and living world, including our bodies and brains. They should grasp the timeline of human history from the dawn of agriculture to the present. They should be exposed to the diversity of human cultures, and the major systems of belief and value with which they have made sense of their lives. They should know about the formative events in human history, including the blunders we can hope not to repeat. They should understand the principles behind democratic governance and the rule of law. They should know how to appreciate works of fiction and art as sources of aesthetic pleasure and as impetuses to reflect on the human condition.

On top of this knowledge, a liberal education should make certain habits of rationality second nature. Educated people should be able to express complex ideas in clear writing and speech. They should appreciate that objective knowledge is a precious commodity, and know how to distinguish vetted fact from superstition, rumor, and unexamined conventional wisdom. They should know how to reason logically and statistically, avoiding the fallacies and biases to which the untutored human mind is vulnerable. They should

think causally rather than magically, and know what it takes to distinguish causation from correlation and coincidence. They should be acutely aware of human fallibility, most notably their own, and appreciate that people who disagree with them are not stupid or evil. Accordingly, they should appreciate the value of trying to change minds by persuasion rather than intimidation or demagoguery.

I believe (and believe I can persuade you) that the more deeply a society cultivates this knowledge and mindset, the more it will flourish. The conviction that they are teachable gets me out of bed in the morning. Laying the foundations in just four years is a formidable challenge. If on top of all this, students want to build a self, they can do it on their own time.

If this seems familiar to some of you, that's because it very closely parallels thoughts by Charlie Munger, who has argued many times for something similar in his demand for multidisciplinary worldly wisdom. We must learn the big ideas from the big disciplines. Notice the buckets Pinker talks about: 13 billion years of organic and inorganic history, 10,000 years of human culture, hundreds of years of modern civilization. These are the most reliable forms of wisdom.

So if the education system won't do it for you, the job must be done anyway. Pinker and Munger have laid out the kinds of things you want to go about learning. Don't let the education system keep you from having a real education. Learn how to think. Figure out how to spend more time reading. When you do, focus on the most basic and essential wisdom — including the lessons from history.

Article Summary

- If the goal of university education is to build the self, we will be disappointed.
- Rather, the goal of university education should be to: (1) give people an idea of our prehistory; (2) the basic laws governing the physical and living worlds; (3) the timeline of human history; (4) multiple cultures; (5) the formative events in human history; (6) the principles behind democracy and the rule of law; (7) read the great works of fiction and appreciate the great works of art as sources of aesthetic pleasure and reflections on the human condition; (8) make the habits of rationality second nature; (9) learn how to express ideas clearly in writing and talking; (10) appreciate objective knowledge; (11) learn how to reason and think statistically; (12) think causally rather than magically and understand the difference between causation and correlation and coincidence; and (13) appreciate human fallibility, most notably our own.
- You can't blame the education system if you don't get this education, it's up to you.

34. Academic Economics: Strengths and Weaknesses, Considering Interdisciplinary Needs by Charlie Munger

This is the full text of Charlie Munger's Herb Kay Memorial Lecture, 'Academic Economics: Strengths and Weaknesses, after Considering Interdisciplinary Needs,' at the University of California at Santa Barbara, 2003.



If you don't know how to think, you'll always
be a one-legged man in an ass-kicking contest

farnamstreetblog.com

Transcript

I've outlined some remarks in a rough way, and after I'm finished talking from that outline, I'll take questions as long as anybody can endure listening until they drag me away to wherever else I'm supposed to go.

As you might guess, I agreed to do this because the subject of getting the soft sciences so they talked better to each other has been one that has interested me for decades. And, of course, economics is in many respects the queen of the soft sciences. It's expected to be better than the rest. It's my view that economics is better at the multi-disciplinary stuff than the rest of the soft science. And it's also my view that it's still lousy, and I'd like to discuss this failure in this talk. As I talk about strengths and weaknesses in academic economics, one interesting fact you are entitled to know is that I never took a course in economics. And with this striking lack of credentials, you may wonder why I have the chutzpah to be

up here giving this talk. The answer is I have a black belt in chutzpah. I was born with it. Some people, like some of the women I know, have a black belt in spending. They were born with that. But what they gave me was a black belt in chutzpah.

But I come from two peculiar strands of experience that may have given me some useful economic insights. One is Berkshire Hathaway and the other is my personal educational history.

Berkshire, of course, has finally gotten interesting. When Warren took over Berkshire, the market capitalization was about ten million dollars. And forty-something years later, there are not many more shares outstanding now than there were then, and the market capitalization is about a hundred billion dollars, ten thousand for one. And since that has happened, year after year, in kind of a grind-ahead fashion, with very few failures, it eventually drew some attention, indicating that maybe Warren and I knew something useful in microeconomics.

Non-use of Efficient Market Theory at Berkshire

For a long time there was a Nobel Prize-winning economist who explained Berkshire Hathaway's success as follows:

First, he said Berkshire beat the market in common stock investing through one sigma of luck, because nobody could beat the market except by luck. This hard-form version of efficient market theory was taught in most schools of economics at the time. People were taught that nobody could beat the market. Next, the professor went to two sigmas, and three sigmas, and four sigmas, and when he finally got to six sigmas of luck, people were laughing so hard he stopped doing it.

Then he reversed the explanation 180 degrees. He said, "No, it was still six sigmas, but it was six sigmas of skill." Well, this very sad history demonstrates the truth of Benjamin Franklin's observation in Poor Richard's Almanac. If you would persuade, appeal to interest and not to reason. The man changed his view when his incentives made him change it, and not before.

I watched the same thing happen at the Jules Stein Eye Institute at UCLA. I asked at one point, why are you treating cataracts only with a totally obsolete cataract operation? And the man said to me, "Charlie, it's such a wonderful operation to teach." (Laughter). When he stopped using that operation, it was because almost all the patients had voted with their feet. Again, appeal to interest and not to reason if you want to change conclusions.

Well, Berkshire's whole record has been achieved without paying one ounce of attention to the efficient market theory in its hard form. And not one ounce of attention to the descendants of that idea, which came out of academic economics and went into corporate finance and morphed into such obscenities as the capital asset pricing model, which we also paid no attention to. I think you'd have to believe in the tooth fairy to believe that you could easily outperform the market by seven-percentage points per annum just by investing in high volatility stocks.

Yet, believe it or not, like the Jules Stein doctor, people once believed this stuff. And the belief was rewarded. And it spread. And many people still believe it. But Berkshire never paid any attention to it. And now I think the world is coming our way and the idea of perfection in all market outcomes is going the way of the DoDo.

It was always clear to me that the stock market couldn't be perfectly efficient, because as a teenager, I'd been to the racetrack in Omaha where they had the parimutuel system. And it was quite obvious to me that if the house's take, the croupier's take, was 17%, some people consistently lost a lot less than 17% of all their bets, and other people consistently lost more than 17% of all their bets. So the parimutuel system in Omaha had no perfect efficiency. And so I didn't accept the argument that the stock market was always perfectly efficient in creating rational prices.

Indeed, there's been some documented cases since, of people getting so good at understanding horses and odds, that they actually are able to beat the house in off-track

betting. There aren't many people who can do that, but there are a few people in America who can.

Personal Multidisciplinary Education

Next, my personal education history is interesting because its deficiencies and my peculiarities eventually created advantages. For some odd reason, I had an early and extreme multidisciplinary cast of mind. I couldn't stand reaching for a small idea in my own discipline when there was a big idea right over the fence in somebody else's discipline. So I just grabbed in all directions for the big ideas that would really work. Nobody taught me to do that; I was just born with that yen. I also was born with a huge craving for synthesis. And when it didn't come easily, which was often, I would rag the problem, and then when I failed I would put it aside and I'd come back to it and rag it again. It took me 20 years to figure out how and why the Reverend Moon's conversion methods worked. But the psychology departments haven't figured it out yet, so I'm ahead of them.

But anyway, I have this tendency to want to rag the problems. Because WW II caught me. I drifted into some physics, and the Air Corps sent me to Caltech where I did a little more physics as part of being made into a meteorologist. And there, at a very young age, I absorbed what I call the fundamental full attribution ethos of hard science. And that was enormously useful to me. Let me explain that ethos.

Under this ethos, you've got to know all the big ideas in all the disciplines less fundamental than your own. You can never make any explanation, which can be made in a more fundamental way, in any other way than the most fundamental way. And you always take with full attribution to the most fundamental ideas that you are required to use. When you're using physics, you say you're using physics. When you're using biology, you say you're using biology. And so on and so on. I could early on see that that ethos would act as a fine organizing system for my thoughts. And I strongly suspected that it would work really well in the soft sciences as well as the hard sciences, so I just grabbed it and used it all through my life in soft science as well as hard science. That was a very lucky idea for me. Let me explain how extreme that ethos is in hard science. There is a constant, one of the fundamental constants in physics, known as Boltzmann's constant. You probably all know it very well. And the interesting thing about Boltzmann's constant is that Boltzmann didn't discover it. So why is Boltzmann's constant now named for Boltzmann? Well, the answer was that Boltzmann derived that constant from basic physics in a more fundamental way than the poor forgotten fellow who found the constant in the first place in some less fundamental way. The ethos of hard science is so strong in favor of reductionism to the more fundamental body of knowledge that you can wash the discoverer right out of history when somebody else handles his discovery in a more fundamental way. I think that is correct. I think Boltzmann's constant should be named for Boltzmann.

At any rate, in my history and Berkshire's history, Berkshire went on and on into considerable economic success while ignoring the hard form efficient markets doctrine once very popular in academic economics and ignoring the descendants of that doctrine in corporate finance, where the results became even sillier than they were in the economics. This naturally encouraged me.

Finally, with my peculiar history, I'm also bold enough to be here today, because at least when I was young I wasn't a total klutz. For one year at the Harvard Law School, I was ranked second in my group of about a thousand, and I always figured that, while there were always a lot of people much smarter than I was, I didn't have to hang back totally in the thinking game.

The Obvious Strengths of Academic Economics

Let me begin by discussing the obvious strengths of academic economics. The first obvious strength, and this is true of a lot of places that get reputations, is that it was in the right place at the right time. Two hundred years ago, aided by the growth of technology and the growth of other developments in the civilization, the real output per capita of the civilized

world started going up at about 2% per annum, compounded. And before that, for the previous thousands of years, it had gone up at a rate that hovered just a hair's breadth above zero. And, of course, economics grew up amid this huge success. Partly it helped the success, and partly it explained it. So, naturally, academic economics grew. And lately with the collapse of all the communist economies, as the free market economies or partially free market economies flourished, that added to the reputation of economics. Economics has been a very favorable place to be if you're in academia.

Economics was always more multidisciplinary than the rest of soft science. It just reached out and grabbed things as it needed to. And that tendency to just grab whatever you need from the rest of knowledge if you're an economist has reached a fairly high point in Mankiw's new textbook (Principles of Economics). I checked out that textbook. I must have been one of the few businessmen in America that bought it immediately when it came out because it had gotten such a big advance. I wanted to figure out what the guy was doing where he could get an advance that great. So this is how I happened to riffle through Mankiw's freshman textbook. And there I found laid out as principles of economics: opportunity cost is a superpower, to be used by all people who have any hope of getting the right answer. Also, incentives are superpowers.

And lastly, the tragedy of the commons model, popularized by UCSB's Garrett Hardin. Hardin caused the delightful introduction into economics – alongside Smith's beneficent invisible hand – of Hardin's wicked evil-doing invisible foot. Well, I thought that the Hardin model made economics more complete, and I knew when Hardin introduced me to his model, the Tragedy of the Commons, that it would be in the economics textbooks eventually. And, low and behold, it finally made it about 20 years later. And it's right for Mankiw to reach out into other disciplines and grab Hardin's model and anything else that works well.

Another thing that helped economics is that from the beginning it attracted the best brains in soft science. Its denizens also interacted more with the practical world than was at all common in soft science and the rest of academia, and that resulted in very creditable outcomes like the three cabinet appointments of economics PhD George Schultz and the cabinet appointment of Larry Summers. So this has been a very favored part of academia. Also, economics early on attracted some of the best writers of language in the history of the earth. You start out with Adam Smith. Adam Smith was so good a thinker, and so good a writer, that in his own time, Emmanuel Kant, then the greatest intellectual in Germany, simply announced that there was nobody in Germany to equal Adam Smith. Well Voltaire, being an even more pithy speaker than Kant, which wouldn't be that hard, immediately said, "Oh well, France doesn't have anybody who can even be compared to Adam Smith." So economics started with some very great men and great writers.

And then there have been later great writers like John Maynard Keynes, whom I quote all the time, and who has added a great amount of illumination to my life. And finally, even in the present era, if you take Paul Krugman and read his essays, you will be impressed by his fluency. I can't stand his politics; I'm on the other side. But I love this man's essays. I think Paul Krugman is one of the best essayists alive. And so economics has constantly attracted these fabulous writers. And they are so good that they have this enormous influence far outside their economic discipline, and that's very uncommon in other academic departments.

Okay, now it's time to extend criticism, instead of praise. We've recognized that economics is better than other soft-science academic departments in many ways. And one of the glories of civilization. Now it's only fair that we outline a few things that are wrong with academic economics.

What's Wrong with Economics

1) Fatal Unconnectedness, Leading To "Man With A Hammer Syndrome," Often Causing Overweighing What Can Be Counted

I think I've got eight, no nine objections, some being logical subdivisions of a big general objection. The big general objection to economics was the one early described by Alfred North Whitehead when he spoke of the fatal unconnectedness of academic disciplines, wherein each professor didn't even know the models of the other disciplines, much less try to synthesize those disciplines with his own.

I think there's a modern name for this approach that Whitehead didn't like, and that name is bonkers. This is a perfectly crazy way to behave. Yet economics, like much else in academia, is too insular.

The nature of this failure is that it creates what I always call, "man with a hammer syndrome." And that's taken from the folk saying: To the man with only a hammer, every problem looks pretty much like a nail. And that works marvelously to gum up all professions, and all departments of academia, and indeed most practical life. The only antidote for being an absolute klutz due to the presence of a man with a hammer syndrome is to have a full kit of tools. You don't have just a hammer. You've got all the tools. And you've got to have one more trick.

You've got to use those tools checklist-style because you'll miss a lot if you just hope that the right tool is going to pop up unaided whenever you need it. But if you've got a full list of tools, and go through them in your mind, checklist-style, you will find a lot of answers that you won't find any other way. So limiting this big general objection that so disturbed Alfred North Whitehead is very important, and there are mental tricks that help do the job.

Overweighing what can be counted

A special version of this "man with a hammer syndrome" is terrible, not only in economics but practically everywhere else, including business. It's really terrible in business. You've got a complex system and it spews out a lot of wonderful numbers that enable you to measure some factors. But there are other factors that are terribly important, [yet] there's no precise numbering you can put to these factors. You know they're important, but you don't have the numbers. Well practically everybody (1) overweighs the stuff that can be numbered, because it yields to the statistical techniques they're taught in academia, and (2) doesn't mix in the hard-to-measure stuff that may be more important. That is a mistake I've tried all my life to avoid, and I have no regrets for having done that.

The late, great, Thomas Hunt Morgan, who was one of greatest biologists who ever lived, when he got to Caltech, had a very interesting, extreme way of avoiding some mistakes from overcounting what could be measured, and undercounting what couldn't. At that time there were no computers and the computer substitute then available to science and engineering was the Frieden calculator, and Caltech was full of Frieden calculators. And Thomas Hunt Morgan banned the Frieden calculator from the biology department. And when they said, "What the hell are you doing, Mr. Morgan?," He said, "Well, I am like a guy who is prospecting for gold along the banks of the Sacramento River in 1849. With a little intelligence, I can reach down and pick up big nuggets of gold. And as long as I can do that, I'm not going to let any people in my department waste scarce resources in placer mining." And that's the way Thomas Hunt Morgan got through life.

I've adopted the same technique, and here I am in my 80th year. I haven't had to do any placer mining yet. And it begins to look like I'm going to get all the way through, as I'd always hoped, without doing any of that damned placer mining. Of course, if I were a physician, particularly an academic physician, I'd have to do the statistics, do the placer mining. But it's amazing what you can do in life without the placer mining if you've got a few good mental tricks and just keep ragging the problems the way Thomas Hunt Morgan did.

2) Failure To Follow The Fundamental Full Attribution Ethos of Hard Science

What's wrong with the way Mankiw does economics is that he grabs from other disciplines without attribution. He doesn't label the grabbed items as physics or biology or psychology, or game theory, or whatever they really are, fully attributing the concept to the basic

knowledge from which it came. If you don't do that, it's like running a business with a sloppy filing system. It reduces your power to be as good as you can be. Now Mankiw is so smart he does pretty well even when his technique is imperfect. He got the largest advance any textbook writer ever got.

But, nonetheless, he'd be better if he had absorbed this hard science ethos that I say has been so helpful to me.

I have names for Mankiw's approach, grabbing whatever you need without attribution. Sometimes I call it "take what you wish," and sometimes I call it "Kiplingism." And when I call it Kiplingism, I'm reminding you of Kipling's stanza of poetry, which went something like this: "When Homer smote his blooming lyre, he'd heard men sing by land and sea, and what he thought he might require, he went and took, the same as me." Well that's the way Mankiw does it. He just grabs. This is much better than not grabbing. But it is much worse than grabbing with full attribution and full discipline, using all knowledge plus extreme reductionism where feasible.

3) Physics Envy

The third weakness that I find in economics is what I call physics envy. And of course, that term has been borrowed from penis envy as described by one of the world's great idiots, Sigmund Freud. But he was very popular in his time, and the concept got a wide vogue.

Washington Post case study

One of the worst examples of what physics envy did to economics was cause adaptation and hard-form efficient market theory. And then when you logically derived consequences from this wrong theory, you would get conclusions such as: it can never be correct for any corporation to buy its own stock. Because the price by definition is totally efficient, there could never be any advantage. And they taught this theory to some partner at McKinsey when he was at some school of business that had adopted this crazy line of reasoning from economics, and the partner became a paid consultant for the Washington Post. And Washington Post stock was selling at a fifth of what an orangutan could figure was the plain value per share by just counting up the values and dividing. But he so believed what he'd been taught in graduate school that he told the Washington Post they shouldn't buy their own stock. Well, fortunately, they put Warren Buffett on the Board, and he convinced them to buy back more than half of the outstanding stock, which enriched the remaining shareholders by much more than a billion dollars. So, there was at least one instance of a place that quickly killed a wrong academic theory.

It's my view that economics could avoid a lot of this trouble that comes from physics envy. I want economics to pick up the basic ethos of hard science, the full attribution habit, but not the craving for an unattainable precision that comes from physics envy. The sort of precise reliable formula that includes Boltzmann's constant is not going to happen, by and large, in economics. Economics involves too complex a system. And the craving for that physics-style precision does little but get you in terrible trouble, like the poor fool from McKinsey.

Einstein and Sharon Stone

I think that economists would be way better off if they paid more attention to Einstein and Sharon Stone. Well, Einstein is easy because Einstein is famous for saying, "Everything should be made as simple as possible, but no more simple." Now, the saying is a tautology, but it's very useful, and some economist – it may have been Herb Stein – had a similar tautological saying that I dearly love: "If a thing can't go on forever, it will eventually stop."

Sharon Stone contributed to the subject because someone once asked her if she was bothered by penis envy. And she said, "absolutely not, I have more trouble than I can handle with what I've got." (Laughter).

When I talk about this false precision, this great hope for reliable, precise formulas, I am reminded of Arthur Laffer, who's in my political party, and who is one of the all-time horses'

asses when it comes to doing economics. His trouble is his craving for false precision, which is not an adult way of dealing with his subject matter.

The situation of people like Laffer reminds me of a rustic legislator – and this really happened in America. I don't invent these stories. Reality is always more ridiculous than what I'm going to tell you. At any rate, this rustic legislator proposed a new law in his state. He wanted to pass a law rounding Pi to an even 3.2 so it would be easier for the school children to make the computations. Well, you can say that this is too ridiculous, and it can't be fair to liken economics professors like Laffer to a rustic legislator like this. I say I'm under-criticizing the professors. At least when this rustic legislature rounded Pi to an even number, the error was relatively small. But once you try to put a lot of false precision into a complex system like economics, the errors can compound to the point where they're worse than those of the McKinsey partner when he was incompetently advising the Washington Post. So, economics should emulate physics' basic ethos, but its search for precision in physics-like formulas is almost always wrong in economics.

4) Too Much Emphasis on Macroeconomics

My fourth criticism is that there's too much emphasis on macroeconomics and not enough on microeconomics. I think this is wrong. It's like trying to master medicine without knowing anatomy and chemistry. Also, the discipline of microeconomics is a lot of fun. It helps you correctly understand macroeconomics. And it's a perfect circus to do. In contrast, I don't think macroeconomics people have all that much fun. For one thing, they are often wrong because of extreme complexity in the system they wish to understand.

Case study: Nebraska Furniture Mart's new store in Kansas City

Let me demonstrate the power of microeconomics by solving two microeconomic problems. One simple and one a little harder. The first problem is this: Berkshire Hathaway just opened a furniture and appliance store in Kansas City. At the time Berkshire opened it, the largest selling furniture and appliance store in the world was another Berkshire Hathaway store, selling \$350 million worth of goods per year. The new store in a strange city opened up selling at the rate of more than \$500 million a year. From the day it opened, the 3,200 spaces in the parking lot were full. The women had to wait outside the ladies' restroom because the architects didn't understand biology. (Laughter). It's hugely successful.

Well, I've given you the problem. Now, tell me what explains the runaway success of this new furniture and appliance store, which is outselling everything else in the world?

(Pause). Well, let me do it for you. Is this a low-priced store or a high-priced store?

(Laughter). It's not going to have a runaway success in a strange city as a high-priced store. That would take time. Number two, if it's moving \$500 million worth of furniture through it, it's one hell of a big store, furniture being as bulky as it is. And what does a big store do? It provides a big selection. So what could this possibly be except a low-priced store with a big selection?

But, you may wonder, why wasn't it done before, preventing its being done first now?

Again, the answer just pops into your head: it costs a fortune to open a store this big. So, nobody's done it before. So, you quickly know the answer. With a few basic concepts, these microeconomic problems that seem hard can be solved much as you put a hot knife through butter. I like such easy ways of thought that are very remunerative. And I suggest that you people should also learn to do microeconomics better

Case study: Les Schwab Tires

Now I'll give you a harder problem. There's a tire store chain in the Northwest, which has slowly succeeded over 50 years, the Les Schwab tire store chain. It just ground ahead. It started competing with the stores that were owned by the big tire companies that made all the tires, the Goodyears and so forth. And, of course, the manufacturers favored their own stores. Their "tied stores" had a big cost advantage. Later, Les Schwab rose in competition with the huge price discounters like Costco and Sam's Club and before that Sears

Roebuck and so forth. And yet here is Schwab now, with hundreds of millions of dollars in sales. And here's Les Schwab in his 80s, with no education, having done the whole thing. How did he do it? (Pause). I don't see a whole lot of people looking like a light bulb has come on. Well, let's think about it with some microeconomic fluency.

Is there some wave that Schwab could have caught? The minute you ask the question, the answer pops in. The Japanese had a zero position in tires and they got big. So this guy must have ridden that wave some in the early times. Then the slow following success has to have some other causes. And what probably happened here, obviously, is this guy did one hell of a lot of things right. And among the things that he must have done right is he must have harnessed what Mankiw calls the superpower of incentives. He must have a very clever incentive structure driving his people. And a clever personnel selection system, etc. And he must be pretty good at advertising. Which he is. He's an artist. So, he had to get a wave in the Japanese tire invasion, the Japanese being as successful as they were. And then a talented fanatic had to get a hell of a lot of things right, and keep them right with clever systems. Again, not that hard of an answer. But what else would be a likely cause of the peculiar success?

We hire business school graduates and they're no better at these problems than you were. Maybe that's the reason we hire so few of them.

Causes of problem-solving success

Well, how did I solve those problems? Obviously, I was using a simple search engine in my mind to go through checklist-style, and I was using some rough algorithms that work pretty well in a great many complex systems, and those algorithms run something like this:

Extreme success is likely to be caused by some combination of the following factors:

A) Extreme maximization or minimization of one or two variables. Example, Costco or our furniture and appliance store.

B) Adding success factors so that a bigger combination drives success, often in a non-linear fashion, as one is reminded by the concept of breakpoint and the concept of critical mass in physics. Often results are not linear. You get a little bit more mass, and you get a lollapalooza result. And of course, I've been searching for lollapalooza results all my life, so I'm very interested in models that explain their occurrence.

C) An extreme of good performance over many factors. Example, Toyota or Les Schwab.

D) Catching and riding some sort of big wave. For example, Oracle. By the way, I put down Oracle before I knew that the Oracle CFO was a big part of the proceedings here today.

Generally, I recommend and use in problem-solving cut-to-the quick algorithms, and I find you have to use them both forward and backward. Let me give you an example. I irritate my family by giving them little puzzles, and one of the puzzles that I gave my family not very long ago was when I said, "There's an activity in America, with one-on-one contests, and a national championship. The same person won the championship on two occasions about 65 years apart." "Now," I said, "name the activity," (Pause). Again, I don't see a lot of light bulbs going on. And in my family, not a lot of light bulbs were flashing. But I have a physicist son who has been trained more in the type of thinking I like. And he immediately got the right answer, and here's the way he reasoned:

It can't be anything requiring a lot of hand-eye coordination. Nobody 85 years of age is going to win a national billiards tournament, much less a national tennis tournament. It just can't be. Then he figured it couldn't be chess, which this physicist plays very well, because it's too hard. The complexity of the system, the stamina required are too great. But that led into checkers. And he thought, "Ah ha! There's a game where vast experience might guide you to be the best even though you're 85 years of age."

And sure enough, that was the right answer.

Anyway, I recommend that sort of mental trickery to all of you, flipping one's thinking both backward and forward. And I recommend that academic economics get better at very small-scale microeconomics as demonstrated here.

5) Too Little Synthesis in Economics

My fifth criticism is there is too little synthesis in economics. Not only with matters outside traditional economics, but also within economics. I have posed at two different business schools the following problem. I say, "You have studied supply and demand curves. You have learned that when you raise the price, ordinarily the volume you can sell goes down, and when you reduce the price, the volume you can sell goes up. Is that right? That's what you've learned?" They all nod yes. And I say, "Now tell me several instances when, if you want the physical volume to go up, the correct answer is to increase the price?" And there's this long and ghastly pause. And finally, in each of the two business schools in which I've tried this, maybe one person in fifty could name one instance. They come up with the idea that occasionally a higher price acts as a rough indicator of quality and thereby increases sales volumes.

This happened in the case of my friend Bill Ballhaus. When he was head of Beckman Instruments it produced some complicated product where if it failed it caused enormous damage to the purchaser. It wasn't a pump at the bottom of an oil well, but that's a good mental example. And he realized that the reason this thing was selling so poorly, even though it was better than anybody else's product, was because it was priced lower. It made people think it was a low quality gizmo. So he raised the price by 20% or so and the volume went way up. But only one in fifty can come up with this sole instance in a modern business school – one of the business schools being Stanford, which is hard to get into. And nobody has yet come up with the main answer that I like. Suppose you raise that price, and use the extra money to bribe the other guy's purchasing agent? (Laughter). Is that going to work? And are there functional equivalents in economics – microeconomics – of raising the price and using the extra sales proceeds to drive sales higher? And of course there are a zillion, once you've made that mental jump. It's so simple.

One of the most extreme examples is in the investment management field. Suppose you're the manager of a mutual fund, and you want to sell more. People commonly come to the following answer: You raise the commissions, which of course reduces the number of units of real investments delivered to the ultimate buyer, so you're increasing the price per unit of real investment that you're selling the ultimate customer. And you're using that extra commission to bribe the customer's purchasing agent. You're bribing the broker to betray his client and put the client's money into the high-commission product. This has worked to produce at least a trillion dollars of mutual fund sales.

This tactic is not an attractive part of human nature, and I want to tell you that I pretty completely avoided it in my life. I don't think it's necessary to spend your life selling what you would never buy. Even though it's legal, I don't think it's a good idea. But you shouldn't accept all my notions because you'll risk becoming unemployable. You shouldn't take my notions unless you're willing to risk being unemployable by all but a few.

I think my experience with my simple question is an example of how little synthesis people get, even in advanced academic settings, considering economic questions. Obvious questions, with such obvious answers. Yet people take four courses in economics, go to business school, have all these IQ points and write all these essays, but they can't synthesize worth a damn. This failure is not because the professors know all this stuff and they're deliberately withholding it from the students. This failure happens because the professors aren't all that good at this kind of synthesis. They were trained in a different way. I can't remember if it was Keynes or Galbraith who said that economics professors are most economical with ideas. They make a few they learned in graduate school last a lifetime. (Laughter).

The second problem with synthesis

The second interesting problem with synthesis involves two of the most famous examples in the economics. Number one is Ricardo's principle of comparative advantage in trade, and the other is Adam Smith's pin factory. And both of these, of course, work to vastly

increase economic output per person, and they're similar in that each somehow directs functions into the hands of people who are very good at doing the functions. Yet they're radically different examples in that one of them is the ultimate example of central planning, the pin factory, where the whole system was planned by somebody, while the other example, Ricardo's, happens automatically as a natural consequence of trade.

And, of course, once you get into the joys of synthesis, you immediately think. "Do these things interact?" Of course they interact. Beautifully. And that's one of the causes of the power of a modern economic system. I saw an example of that kind of interaction years ago. Berkshire had this former savings and loan company, and it had made this loan on a hotel right opposite the Hollywood Park Racetrack. In due time the neighborhood changed and it was full of gangs, pimps, and dope dealers. They tore copper pipe out of the wall for dope fixes, and there were people hanging around the hotel with guns, and nobody would come. We foreclosed on it two or three times, and the loan value went down to nothing. We seemed to have an insolvable economic problem — a microeconomic problem.

Now we could have gone to McKinsey, or maybe a bunch of professors from Harvard, and we would have gotten a report about 10 inches thick about the ways we could approach this failing hotel in this terrible neighborhood. But instead, we put a sign on the property that said: "For sale or rent." And in came, in response to that sign, a man who said, "I'll spend \$200,000 fixing up your hotel, and buy it at a high price on credit, if you can get zoning so I can turn the parking lot into a putting green." "You've got to have a parking lot in a hotel," we said. "What do you have in mind?" He said. "No, my business is flying seniors in from Florida, putting them near the airport, and then letting them go out to Disneyland and various places by bus and coming back. And I don't care how bad the neighborhood is going to be because my people are selfcontained behind walls. All they have to do is get on the bus in the morning and come home in the evening, and they don't need a parking lot; they need a putting green." So we made the deal with the guy. The whole thing worked beautifully, and the loan got paid off, and it all worked out.

Obviously that's an interaction of Ricardo and the pin factory examples. The odd system that this guy had designed to amuse seniors was pure pin factory, and finding the guy with this system was pure Ricardo. So these things are interacting.

Well, I've taken you part way through the synthesis. It gets harder when you want to figure out how much activity should be within private firms, and how much should be within the government, and what are the factors that determine which functions are where, and why do the failures occur, and so on and so on.

It's my opinion that anybody with a high IQ who graduated in economics ought to be able to sit down and write a ten-page synthesis of all these ideas that's quite persuasive. And I would bet a lot of money that I could give this test in practically every economics department in the country, and get a perfectly lousy bunch of synthesis. They'd give me Ronald Coase. They'd talk about transaction costs. They'd click off a little something that their professors gave them and spit it back. But in terms of really understanding how it all fits together, I would confidently predict that most people couldn't do it very well.

By the way, if any of you want to try and do this, go ahead. I think you'll find it hard. In this connection, one of the interesting things that I want to mention is that Max Planck, the great Nobel laureate who found Planck's Constant, tried once to do economics. He gave it up. Now why did Max Planck, one of the smartest people who ever lived, give up economics? The answer is, he said, "It's too hard. The best solution you can get is messy and uncertain." It didn't satisfy Planck's craving for order, and so he gave it up. And if Max Planck early on realized he was never going to get perfect order, I will confidently predict that all of the rest of you are going to have exactly the same result.

By the way there's a famous story about Max Planck which is apocryphal: After he won his prize, he was invited to lecture everywhere, and he had this chauffeur that drove him around to give public lectures all through Germany. And the chauffeur memorized the

lecture, and so one day he said, "Gee Professor Planck, why don't you let me try it as we switch places?" And so he got up and gave the lecture. At the end of it some physicist stood up and posed a question of extreme difficulty. But the chauffeur was up to it. "Well," he said, "I'm surprised that a citizen of an advanced city like Munich is asking so elementary a question, so I'm going to ask my chauffeur to respond." (Laughter).

6) Extreme and Counterproductive Psychological Ignorance

All right, I'm down to the sixth main defect, and this is a subdivision of the lack of adequate multidisciplinary: Extreme and counterproductive psychological ignorance in economics. Here I want to give you a very simple problem. I specialize in simple problems. You own a small casino in Las Vegas. It has fifty standard slot machines. Identical in appearance, they're identical in function. They have exactly the same payout ratios. The things that cause the payouts are exactly the same. They occur in the same percentages. But there's one machine in this group of slot machines that, no matter where you put it among the fifty, in fairly short order, when you go to the machines at the end of the day, there will be 25% more winnings from this one machine than from any other machine. Now surely I'm not going to have a failure here. What is different about that heavy winning machine? (Silence) Can anybody do it?

Male: More people play it.

Charles Munger: No, no, I want to know why more people play it. What's different about that machine is people have used modern electronics to give a higher ratio of near misses. That machine is going bar, bar, lemon. Bar, bar, grapefruit, way more often than normal machines, and that will cause heavier play. How do you get an answer like that? Easy. Obviously, there's a psychological cause: That machine is doing something to trigger some basic psychological response.

If you know the psychological factors, if you've got them on a checklist in your head, you just run down the factors, and, boom!, you get to one that must explain this occurrence. There isn't any other way to do it effectively. These answers are not going to come to people who don't learn these mental tricks. If you want to go through life like a one-legged man in an ass-kicking contest, why be my guest. But if you want to succeed, like a strong man with two legs, you have to pick up these tricks, including doing economics while knowing psychology.

In this vein, I next want to mention a strange Latin American case of a dysfunctional economy that got fixed. In this little subdivision of Latin America, a culture had arisen wherein everybody stole everything. They embezzled from the company, they stole everything that was loose in the community. And of course, the economy came practically to a halt. And this thing got fixed. Now where did I read about this case? I'll give you a hint. It wasn't in the annals of economics. I found this case in the annals of psychology. Clever people went down and used a bunch of psychological tricks. And they fixed it.

Well, I think there's no excuse if you're an economist, when there are wonderful cases like that of the dysfunctional economy becoming fixed, and these simple tricks that solve so many problems, and you don't know how to do the fixes and understand the problems. Why be so ignorant about psychology that you don't even know psychology's tricks that will fix your own dysfunctional economic systems?

Here I want to give you an extreme injunction. This is even tougher than the fundamental organizing ethos of hard science. This has been attributed to Samuel Johnson. He said in substance that if an academic maintains in place an ignorance that can be easily removed with a little work, the conduct of the academic amounts to treachery. That was his word, "treachery." You can see why I love this stuff. He says you have a duty if you're an academic to be as little of a klutz as you can possibly be, and therefore you have got to keep grinding out of your system as much removable ignorance as you can remove.

7) Too Little Attention to Second and Higher Order Effects

On to the next one the seventh defect: Too little attention in economics to second order and even higher order effects. This defect is quite understandable, because the consequences have consequences, and the consequences of the consequences have consequences, and so on. It gets very complicated. When I was a meteorologist I found this stuff very irritating. And economics makes meteorology look like a tea party.

Mispredicting Medicare costs

Extreme economic ignorance was displayed when various experts, including Ph D. economists, forecast the cost of the original Medicare law. They did simple extrapolations of past costs. Well the cost forecast was off by a factor of more than 1000%. The cost they projected was less than 10% of the cost that happened. Once they put in place all these new incentives, the behavior changed in response to the incentives, and the numbers became quite different from their projection. And medicine invented new and expensive remedies, as it was sure to do. How could a great group of experts make such a silly forecast? Answer: They over simplified to get easy figures, like the rube rounding Pi to 3.2! They chose not to consider effects of effects on effects, and so on.

Investing in textile looms

One good thing about this common form of misthinking from the viewpoint of academia, is that business people are even more foolish about microeconomics. The business version of the Medicare-type insanity is when you own a textile plant and a guy comes in and says, "Oh, isn't this wonderful? They invented a new loom. It'll pay for itself in three years at current prices because it adds so much efficiency to the production of textiles." And you keep buying these looms for 20 years, and their equivalent, and you keep making 4% on capital, you never go anywhere. And the answer is, it wasn't that technology didn't work, it's that the laws of economics caused the benefit from the new looms to go to the people that bought the textiles, not the guy that owned the textile plant. How could anybody not know that if he'd taken freshmen economics or been through business school? I think the schools are doing a lousy job. Otherwise such insanities wouldn't happen so often. Usually, I don't use formal projections. I don't let people do them for me because I don't like throwing up on the desk (laughter), but I see them made in a very foolish way all the time, and many people believe in them, no matter how foolish they are. It's an effective sales technique in America to put a foolish projection on a desk.

And if you're an investment banker, it's an art form. I don't read their projections either. Once Warren and I bought a company and the seller had a big study done by an investment banker, it was about this thick. We just turned it over as if it were a diseased carcass. He said, "We paid \$2 million for that." I said, "We don't use them. Never look at them."

Workman's comp madness

Anyway, as the Medicare example showed, all human systems are gamed, for reasons rooted deeply in psychology, and great skill is displayed in the gaming because game theory has so much potential. That's what's wrong with the workman's comp system in California. Gaming has been raised to an art form. In the course of gaming the system, people learn to be crooked. Is this good for civilization? Is it good for economic performance? Hell no. The people who design easily-gameable systems belong in the lowest circle of hell.

I've got a friend whose family controls about 8% of the truck trailer market. He just closed his last factory in California and he had one in Texas that was even worse. The workman's comp cost in his Texas plant got to be about 30% of payroll. Well, there's no such profit in making truck trailers. He closed his plant and moved it to Ogden, Utah, where a bunch of believing Mormons are raising big families and don't game the workman's comp system. The workman's comp expense is 2% of payroll.

Are the Latinos who were peopling his plant in Texas intrinsically dishonest or bad compared to the Mormons? No. It's just the incentive structure that so rewards all this

fraud is put in place by these ignorant legislatures, many members of which have been to law school, and they just don't think about what terrible things they're doing to the civilization because they don't take into account the second order effects and the third order effects in lying and cheating. So, this happens everywhere, and when economics is full of it, it is just like the rest of life.

Niederhoffer the curriculum

There was a wonderful example of gaming a human system in the career of Victor Niederhoffer in the Economics Department of Harvard. Victor Niederhoffer was the son of a police lieutenant, and he needed to get A's at Harvard. But he didn't want to do any serious work at Harvard, because what he really liked doing was, one, playing world-class checkers; two, gambling in high-stakes card games, at which he was very good, all hours of the day and night; three, being the squash champion of the United States, which he was for years; and, four, being about as good a tennis player as a part-time tennis player could be.

This did not leave much time for getting A's at Harvard so he went into the Economics Department. You'd think he would have chosen French poetry. But remember, this was a guy who could play championship checkers. He thought he was up to outsmarting the Harvard Economics Department. And he was. He noticed that the graduate students did most of the boring work that would otherwise go to the professors, and he noticed that because it was so hard to get to be a graduate student at Harvard, they were all very brilliant and organized and hard working, as well as much needed by grateful professors. And therefore, by custom, and as would be predicted from the psychological force called reciprocity tendency, in a really advanced graduate course, the professors always gave an A. So Victor Niederhoffer signed up for nothing but the most advanced graduate courses in the Harvard Economics Department, and of course, he got A, after A, after A, after A, and was hardly ever near a class. And for a while, some people at Harvard may have thought it had a new prodigy on its hands. That's a ridiculous story, but the scheme will work still. And Niederhoffer is famous: they call his style "Niederhoffer the curriculum." (Laughter). This shows how all-human systems are gamed. Another example of not thinking through the consequences of the consequences is the standard reaction in economics to Ricardo's law of comparative advantage giving benefit on both sides of trade. Ricardo came up with a wonderful, non-obvious explanation that was so powerful that people were charmed with it, and they still are, because it's a very useful idea. Everybody in economics understands that comparative advantage is a big deal, when one considers first order advantages in trade from the Ricardo effect. But suppose you've got a very talented ethnic group, like the Chinese, and they're very poor and backward, and you're an advanced nation, and you create free trade with China, and it goes on for a long time.

Now let's follow with second and third order consequences: You are more prosperous than you would have been if you hadn't traded with China in terms of average well-being in the United States, right? Ricardo proved it. But which nation is going to be growing faster in economic terms? It's obviously China. They're absorbing all the modern technology of the world through this great facilitator in free trade, and, like the Asian Tigers have proved, they will get ahead fast. Look at Hong Kong. Look at Taiwan. Look at early Japan. So, you start in a place where you've got a weak nation of backward peasants, a billion and a quarter of them, and in the end they're going to be a much bigger, stronger nation than you are, maybe even having more and better atomic bombs. Well, Ricardo did not prove that that's a wonderful outcome for the former leading nation. He didn't try to determine second order and higher order effects.

If you try and talk like this to an economics professor, and I've done this three times, they shrink in horror and offense because they don't like this kind of talk. It really gums up this nice discipline of theirs, which is so much simpler when you ignore second and third order consequences.

The best answer I ever got on that subject – in three tries – was from George Schultz. He said, “Charlie, the way I figure it is if we stop trading with China, the other advanced nations will do it anyway, and we wouldn’t stop the ascent of China compared to us, and we’d lose the Ricardodiagnosed advantages of trade.” Which is obviously correct. And I said, “Well George, you’ve just invented a new form of the tragedy of the commons. You’re locked in this system and you can’t fix it. You’re going to go to a tragic hell in a handbasket, if going to hell involves being once the great leader of the world and finally going to the shallows in terms of leadership.” And he said, “Charlie, I do not want to think about this.” I think he’s wise. He’s even older than I am, and maybe I should learn from him.

8) Not Enough Attention to the Concept of Febezzlement

Okay, I’m now down to my eighth objection: Too little attention within economics to the simplest and most fundamental principle of algebra. Now this sounds outrageous, that economics doesn’t do algebra, right? Well, I want to try an example – I may be wrong on this. I’m old and I’m iconoclastic – but I throw it out anyway. I say that economics doesn’t pay enough attention to the concept of febezzlement. And that I derive from Galbraith’s idea. Galbraith’s idea was that, if you have an undisclosed embezzlement, it has a wonderful Keynesian stimulating effect on the economy because the guy who’s been embezzled thinks he is as rich as he always was and spends accordingly, and the guy that had stolen the money gets all this new purchasing power. I think that’s correct analysis on Galbraith’s part. The trouble with his notion is that he’s described a minor phenomenon. Because when the embezzlement is discovered, as it almost surely will be, the effect will quickly reverse. So the effect quickly cancels out.

But suppose you paid a lot of attention to algebra, which I guess Galbraith didn’t, and you think, “Well, the fundamental principle of algebra is, ‘If A is equal to B and B is equal to C, then A is equal to C.’” You’ve then got a fundamental principle that demands that you look for functional equivalents, all you can find. So suppose you ask the question, “Is there such a thing in economics as a febezzlement?” By the way, Galbraith invented the word “bezzle” to describe the amount of undisclosed embezzlement, so I invented the word “febezzlement”: the functional equivalent of embezzlement.

This happened after I asked the question “Is there a functional equivalent of embezzlement?” I came up with a lot of wonderful affirmative answers. Some were in investment management. After all I’m near investment management. I considered the billions of dollars totally wasted in the course of investing common stock portfolios for American owners. As long as the market keeps going up, the guy who’s wasting all this money doesn’t feel it, because he’s looking at these steadily rising values. And to the guy who is getting the money for investment advice, the money looks like well earned income, when he’s really selling detriment for money, surely the functional equivalent of undisclosed embezzlement. You can see why I don’t get invited to many lectures.

So I say, if you look in the economy for febezzlement, the functional equivalent of embezzlement, you’ll find some enormously powerful factors. They create some “wealth effect” that is on steroids, compared to the old “wealth effect.” But practically nobody thinks as I do, and I quitclaim my idea to any hungry graduate student who has independent means, which he will need before his thesis topic is approved.

9) Not Enough Attention to Virtue and Vice Effects

Okay, my ninth objection: Not enough attention to virtue and vice effects in economics. It has been plain to me since early life that there are enormous virtue effects in economics, and also enormous vice effects. But economists get very uncomfortable when you talk about virtue and vice. It doesn’t lend itself to a lot of columns of numbers. But I would argue that there are big virtue effects in economics. I would say that the spreading of double-entry bookkeeping by the Monk, Fra Luca de Pacioli, was a big virtue effect in economics. It made business more controllable, and it made it more honest. Then the cash

register. The cash register did more for human morality than the congregational church. It was a really powerful phenomenon to make an economic system work better, just as, in reverse, a system that can be easily defrauded ruins a civilization. A system that's very hard to defraud, like a cash register, helps the economic performance of a civilization by reducing vice, but very few people within economics talk about it in those terms.

Religion

I'll go further: I say economic systems work better when there's an extreme reliability ethos. And the traditional way to get a reliability ethos, at least in past generations in America, was through religion. The religions instilled guilt. We have a charming Irish Catholic priest in our neighborhood and he loves to say, "Those old Jews may have invented guilt, but we perfected it." (Laughter). And this guilt, derived from religion, has been a huge driver of a reliability ethos, which has been very helpful to economic outcomes for man.

Pay for directors and judges

Many bad effects from vice are clear. You've got the crazy booms and crooked promotions – all you have to do is read the paper over the last six months. There's enough vice to make us all choke. And, by the way, everybody's angry about unfair compensation at the top of American corporations, and people should be. We now face various crazy nostrums invented by lawyers which won't give us a fix for unfair compensation, yet a good partial solution is obvious: If directors were significant shareholders who got a pay of zero, you'd be amazed what would happen to unfair compensation of corporate executives as we dampened effects from reciprocity tendency.

A roughly similar equivalent of this no-pay system has been tried in a strange place. In England, the lower criminal courts which can send you to prison for a year or fine you substantially, are staffed by lay magistrates. You've got three judges sitting up there, and they all get a pay of zero. Their expenses are reimbursed, but not too liberally. And they work about 40 half-days a year, as volunteers. It's worked beautifully for about 700 years. Able and honest people compete to become magistrates, to perform the duty and get the significance, but no pay.

This is the system Benjamin Franklin, near the end of his life, wanted for U.S. government. He didn't want the high executives of government to be paid, but to be like himself or the entirely unpaid, well-off ministers and rulers of the Mormon Church. And when I see what's happened in California, I'm not sure he wasn't right. At any rate, no one now drifts in Franklin's direction. For one thing, professors – and most of them need money – get appointed directors.

Not a vice that some systems are deliberately made unfair. It is not always recognized that, to function best, morality should sometimes appear unfair, like most worldly outcomes. The craving for perfect fairness causes a lot of terrible problems in system function. Some systems should be made deliberately unfair to individuals because they'll be fairer on average for all of us. I frequently cite the example of having your career over, in the Navy, if your ship goes aground, even if it wasn't your fault. I say the lack of justice for the one guy that wasn't at fault is way more than made up by a greater justice for everybody when every captain of a ship always sweats blood to make sure the ship doesn't go aground. Tolerating a little unfairness to some to get greater fairness for all is a model I recommend to all of you. But again, I wouldn't put it in your assigned college work if you want to be graded well, particularly in a modern law school wherein there is usually an over-love of fairness-seeking process.

Contributions of vice to bubbles

There are, of course, enormous vice effects in economics. You have these bubbles with so much fraud and folly. The aftermath is frequently very unpleasant, and we've had some of that lately. One of the first big bubbles, of course, was the huge and horrible South Sea bubble in England.

And the aftermath was interesting. Many of you probably don't remember what happened after the South Sea Bubble, which caused an enormous financial contraction, and a lot of pain. They banned publicly traded stock in England for decades. Parliament passed a law that said you can have a partnership with a few partners, but you can't have publicly traded stock. And, by the way, England continued to grow without publicly traded stock. The people who are in the business of prospering because there's a lot of stock being traded in casino-like frenzy wouldn't like this example if they studied it enough. It didn't ruin England to have a long period when they didn't have publicly traded shares. Just as in real estate. We had all the shopping centers and auto dealerships, and so on, we needed for years when we didn't have publicly traded real estate shares. It's a myth that once you've got some capital market, economic considerations demand that it has to be as fast and efficient as a casino. It doesn't.

Paradoxical good contributions from vice; the irremovability of paradox

Another interesting problem is raised by vice effects involving envy. Envy wisely got a very strong condemnation in the laws of Moses. You remember how they laid it on with a trowel: You couldn't covet thy neighbor's ass, you couldn't covet thy neighbor's servant girl, you couldn't covet...—Those old Jews knew how envious people are and how much trouble it caused. They really laid it on hard, and they were right. But Mandeville, remember his fable of bees? He demonstrated convincingly – to me, anyway – that envy was a great driver of proclivity to spend.

And so here's this terrible vice, which is forbidden in the Ten Commandments, and here it's driving all these favorable results in economics. There's some paradox in economics that nobody's going to get out.

When I was young, everybody was excited by Godel who came up with proof that you couldn't have a mathematical system without a lot of irritating incompleteness in it. Well, since then my betters tell me that they've come up with more irremovable defects in mathematics and have decided that you're never going to get mathematics without some paradox in it. No matter how hard you work, you're going to have to live with some paradox if you're a mathematician.

Well, if the mathematicians can't get the paradox out of their system when they're creating it themselves, the poor economists are never going to get rid of paradoxes, nor are any of the rest of us. It doesn't matter. Life is interesting with some paradoxes. When I run into a paradox I think either I'm a total horse's ass to have gotten to this point, or I'm fruitfully near the edge of my discipline. It adds excitement to life to wonder which it is.

Conclusion

Clinging to failed ideas – a horror story

As I conclude, I want to tell one more story demonstrating how awful it is to get a wrong idea from a limited repertoire and just stick to it. And this is the story of Hyman Liebowitz who came to America from the old country. In the new country, as in the old, he tried to make his way in the family trade, which was manufacturing nails. And he struggled and he struggled, and finally, his little nail business got to vast prosperity, and his wife said to him, "You are old, Hyman, it's time to go to Florida and turn the business over to our son."

So down he went to Florida, turning his business over to the son, but he got weekly financial reports. And he hadn't been in Florida very long before they turned sharply negative. In fact, they were terrible. So he got on an airplane and he went back to New Jersey, where the factory was. As he left the airport on the way to the factory he saw this enormous outdoor advertising sign lighted up. And there was Jesus, spread out on the cross. And under it was a big legend, "They Used Liebowitz's Nails." So he stormed into the factory and said, "You dumb son! What do you think you're doing? It took me 50 years to create this business!" "Papa," he said, "trust me. I will fix it."

So back he went to Florida, and while he was in Florida he got more reports, and the results kept getting worse. So he got on the airplane again. Left the airport, drove by the

sign, looked up at this big lighted sign, and now there's a vacant cross. And, low and behold, Jesus is crumpled on the ground under the cross, and the sign said, "They Didn't Use Liebowitz's Nails." (Laughter). Well, you can laugh at that. It is ridiculous but it's no more ridiculous than the way a lot of people cling to failed ideas.

Keynes said "It's not bringing in the new ideas that's so hard. It's getting rid of the old ones." And Einstein said it better, attributing his mental success to "curiosity, concentration, perseverance, and self-criticism." By self-criticism, he meant becoming good at destroying your own best-loved and hardest-won ideas. If you can get really good at destroying your own wrong ideas, that is a great gift.

Repeating the big lesson

Well, it's time to repeat the big lesson in this little talk. What I've urged is the use of a bigger multidisciplinary bag of tricks, mastered to fluency, to help economics and everything else. And I also urged that people not be discouraged by irremovable complexity and paradox. It just adds more fun to the problems. My inspiration again is Keynes: Better roughly right than precisely wrong.

And so I end by repeating what I said once before on a similar occasion. If you skillfully follow the multidisciplinary path, you will never wish to come back. It would be like cutting off your hands.

Well, that's the end. I'll take questions as long as people can endure me.

35. Karl Popper: The Line Between Science and Pseudoscience

It's not immediately clear to the layman what the essential difference is between science and something masquerading as science: pseudoscience. The distinction between the two is at the core of what comprises human knowledge: How do we actually know something to be true?

Sir Karl Popper (1902-1994), the scientific philosopher, was interested in the same problem. How do we actually define the scientific process? How do we know which theories can be said to be truly explanatory?

He began addressing it in a lecture, which is printed in the book Conjectures and Refutations: The Growth of Scientific Knowledge:

When I received the list of participants in this course and realized that I had been asked to speak to philosophical colleagues I thought, after some hesitation and consultation, that you would probably prefer me to speak about those problems which interest me most, and about those developments with which I am most intimately acquainted. I therefore decided to do what I have never done before: to give you a report on my own work in the philosophy of science, since the autumn of 1919 when I first began to grapple with the problem, 'When should a theory be ranked as scientific?' or 'Is there a criterion for the scientific character or status of a theory?'

Popper saw a problem with the number of theories he considered *non-scientific*.

Theories that, on their surface, seemed to have a lot in common with good, hard, rigorous science. But the question of how we decide which theories are compatible with the scientific method, and those which are not, was harder than it seemed.

What's Scientific?

It is most common to say that science is done by collecting observations and grinding out theories from them. Charles Darwin said, after working long and hard on the problem (see the work of thinking):

My mind seems to have become a kind of machine for grinding general laws out of large collections of facts.

This is a popularly accepted notion. We observe, observe, and observe, and we look for theories to best *explain* the mass of facts. (Although even this is not really true: Popper points out that we must start with some *a priori* knowledge to be able to generate new knowledge. Observation is always done with some hypotheses in mind — we can't understand the world from a totally blank slate.)

The problem, as Popper saw it, is that some bodies of knowledge, more properly named pseudoscience, would be considered scientific if the "Observe & Deduce" operating definition were left alone. For example, a believing astrologist can ably provide you with "evidence" that their theories are sound. The biographical information of a great many people can be explained this way, they'd say.

The astrologist would tell you, for example, about how "Leos" seek to be the centre of attention; ambitious, strong, seeking the limelight. As proof, they might follow up with a host of real-life Leos: World-leaders, celebrities, politicians, and so on. In some sense, the theory would hold up. The observations could be explained by the theory, which is how science works, right?

Popper lived during a time when psychoanalytic theories were all the rage at just the same time Einstein was laying out a new foundation for the physical sciences with the concept of relativity. What made Popper uncomfortable were *comparisons between the two*. Why did he feel so uneasy putting Marxist theories and Freudian psychology in the same category of knowledge as Einstein's Relativity? Did all three not have vast explanatory power in the world? Each theory's proponents certainly believed so, but Popper was not satisfied.

It was during the summer of 1919 that I began to feel more and more dissatisfied with these three theories—the Marxist theory of history, psychoanalysis, and individual psychology; and I began to feel dubious about their claims to scientific status. My problem perhaps first took the simple form, ‘What is wrong with Marxism, psycho-analysis, and individual psychology? Why are they so different from physical theories, from Newton’s theory, and especially from the theory of relativity?’

I found that those of my friends who were admirers of Marx, Freud, and Adler, were impressed by a number of points common to these theories, and especially by their apparent explanatory power. These theories appeared to be able to explain practically everything that happened within the fields to which they referred. The study of any of them seemed to have the effect of an intellectual conversion or revelation, opening your eyes to a new truth hidden from those not yet initiated. Once your eyes were thus opened you saw confirming instances everywhere: the world was full of verifications of the theory. Whatever happened always confirmed it. Thus its truth appeared manifest; and unbelievers were clearly people who did not want to see the manifest truth; who refused to see it, either because it was against their class interest, or because of their repressions which were still ‘un-analysed’ and crying aloud for treatment.

The Importance of Falsifiability

Here was the salient problem: The proponents of these new sciences saw validations and verifications of their theories everywhere. If you were having trouble as an adult, it could *always* be explained by something your mother or father had done to you when you were young, some repressed something-or-other that hadn’t been analyzed and solved. They were confirmation bias machines.

What was the missing element? Popper had figured it out before long: The non-scientific theories could not be *falsified*. They were not *testable* in a legitimate way. There was no possible objection that could be raised which would show the theory to be wrong.

In a true science, the following statement can be easily made: “If x happens, it would show demonstrably that theory y is not true.” We can then design an experiment, a physical one or sometimes a simple thought experiment, to figure out if x actually does happen. It’s the opposite of looking for verification; you must try to show the theory is *incorrect*, and if you fail to do so, thereby *strengthen* it.

Pseudosciences cannot and do not do this—they are not strong enough to hold up. As an example, Popper discussed Freud’s theories of the mind in relation to Alfred Adler’s so-called “individual psychology,” which was popular at the time:

I may illustrate this by two very different examples of human behaviour: that of a man who pushes a child into the water with the intention of drowning it; and that of a man who sacrifices his life in an attempt to save the child. Each of these two cases can be explained with equal ease in Freudian and in Adlerian terms. According to Freud the first man suffered from repression (say, of some component of his Oedipus complex), while the second man had achieved sublimation. According to Adler the first man suffered from feelings of inferiority (producing perhaps the need to prove to himself that he dared to commit some crime), and so did the second man (whose need was to prove to himself that he dared to rescue the child). I could not think of any human behaviour which could not be interpreted in terms of either theory. It was precisely this fact—that they always fitted, that they were always confirmed—which in the eyes of their admirers constituted the strongest argument in favour of these theories. It began to dawn on me that this apparent strength was in fact their weakness.

Popper contrasted these theories against Relativity, which made specific, verifiable predictions, giving the conditions under which the predictions *could be shown false*. It turned out that Einstein’s predictions came to be true when tested, thus verifying the theory through attempts to falsify it. But the essential nature of the theory gave grounds under which it could have been wrong. To this day, physicists seek to figure out where

Relativity *breaks down* in order to come to a more fundamental understanding of physical reality. And while the theory may eventually be proven incomplete or a special case of a more general phenomenon, it has still made accurate, testable predictions that have led to practical breakthroughs.

Thus, in Popper's words, science requires testability: *"If observation shows that the predicted effect is definitely absent, then the theory is simply refuted."* This means a good theory must have an element of risk to it. It must be able to be proven wrong under stated conditions.

Popper's Essential Conclusions

From there, Popper laid out his essential conclusions, which are useful to any thinker trying to figure out if a theory they hold dear is something that can be put in the scientific realm:

1. *It is easy to obtain confirmations, or verifications, for nearly every theory—if we look for confirmations.*
2. *Confirmations should count only if they are the result of risky predictions; that is to say, if, unenlightened by the theory in question, we should have expected an event which was incompatible with the theory—an event which would have refuted the theory.*
3. *Every 'good' scientific theory is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is.*
4. *A theory which is not refutable by any conceivable event is nonscientific. Irrefutability is not a virtue of a theory (as people often think) but a vice.*
5. *Every genuine test of a theory is an attempt to falsify it, or to refute it. Testability is falsifiability; but there are degrees of testability: some theories are more testable, more exposed to refutation, than others; they take, as it were, greater risks.*
6. *Confirming evidence should not count except when it is the result of a genuine test of the theory; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory. (I now speak in such cases of 'corroborating evidence'.)*
7. *Some genuinely testable theories, when found to be false, are still upheld by their admirers—for example by introducing ad hoc some auxiliary assumption, or by re-interpreting the theory ad hoc in such a way that it escapes refutation. Such a procedure is always possible, but it rescues the theory from refutation only at the price of destroying, or at least lowering, its scientific status. (I later described such a rescuing operation as a 'conventionalist twist' or a 'conventionalist stratagem'.)*

One can sum up all this by saying that the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.

Finally, Popper was careful to say that it is impossible to prove that Freudianism was *not true*, at least in part. But we *can* say that we simply don't *know* whether it's true because it does not make specific testable predictions. It may have many kernels of truth in it, but we can't tell. This is the essential "line of demarcation," as Popper called it, between science and pseudoscience.

36. The Three Buckets of Knowledge

The three most fundamental sources of knowledge are physics, math, and human history. They offer us endless learning and mental models. Here's how mastering the three buckets of knowledge can give you a deeper understanding of the world.

When we seek to understand the world, we're faced with a basic question: Where do I start? Which sources of knowledge are the most useful and the most fundamental?

FS takes its lead here from Charlie Munger, who argued that the "base" of your intellectual pyramid should be the great ideas from the big academic disciplines: Mental models (For a great book on the subject check out The Great Mental Models series.)

Similarly, Peter Kaufman's idea, presented above, is that we can learn the most fundamental knowledge from the three oldest and most invariant forms of knowledge: Physics and math, from which we derive the rules the universe plays by; biology, from which we derive the rules life on Earth plays by; and human history, from which we derive the rules humans have played by.

"Every statistician knows that a large, relevant sample size is their best friend. What are the three largest, most relevant sample sizes for identifying universal principles? Bucket number one is inorganic systems, which are 13.7 billion years in size. It's all the laws of math and physics, the entire physical universe. Bucket number two is organic systems, 3.5 billion years of biology on Earth. And bucket number three is human history, you can pick your own number, I picked 20,000 years of recorded human behavior. Those are the three largest sample sizes we can access and the most relevant."

— Peter Kaufman

With that starting point, we've explored a lot of ideas and read a lot of books, looking for connections among the big, broad areas of useful knowledge. Our search led us to a wonderful book called The Lessons of History, which we've previously discussed.

The book is a hundred-page distillation of the lessons learned in 50 years of work by two brilliant historians, Will and Ariel Durant. The Durants' spent those years writing a sweeping 11-book, 10,000-page synthesis of the major figures and periods in human history, with an admitted focus on Western civilization. (Although they admirably tackle Eastern civilization up to 1930 or so in the epic Our Oriental Heritage.) With *The Lessons of History*, the pair sought to derive a few major lessons learned from the long pull.

Let's explore a few ways in which the Durants' work connects with the three buckets of human knowledge that help us understand the world at a deep level.

Lessons of Geologic Time

Durant has a classic introduction for this kind of "big synthesis" historical work:

Since man is a moment in astronomic time, a transient guest of the earth, a spore of his species, a scion of his race, a composite of body, character, and mind, a member of a family and a community, a believer or doubter of a faith, a unit in an economy, perhaps a citizen in a state or a soldier in an army, we may ask under the corresponding heads—astronomy, geology, geography, biology, ethnology, psychology, morality, religion, economics, politics, and war—what history has to say about the nature, conduct, and prospects of man. It is a precarious enterprise, and only a fool would try to compress a hundred centuries into a hundred pages of hazardous conclusions. We proceed.

The first topic Durant approaches is our relationship to the physical Earth, a group of knowledge we can place in the second bucket, in Kaufman's terms. We must recognize that the varieties of geology and physical climate we live in have to a large extent determined the course of human history. (Jared Diamond would agree, that being a major component of his theory of human history.)

History is subject to geology. Every day the sea encroaches somewhere upon the land, or the land upon the sea; cities disappear under the water, and sunken cathedrals ring their melancholy bells. Mountains rise and fall in the rhythm of emergence and erosion; rivers swell and flood, or dry up, or change their course; valleys become deserts, and isthmuses become straits. To the geologic eye all the surface of the earth is a fluid form, and man moves upon it as insecurely as Peter walking on the waves to Christ.

There are some big, useful lessons we can draw from studying geologic time. The most obvious might be the concept of gradualism, or slow incremental change over time. This was most well-understood by Darwin, who applied that form of reasoning to understand the evolution of species. His hero was Charles Lyell, whose Principles of Geology created our understanding of a slow, move-ahead process on the long scale of geology.

And of course, that model is quite practically useful to us today — it is through slow, incremental, grinding change, punctuated at times by large-scale change when necessary and appropriate, that things move ahead most reliably. We might be reminded in the modern corporate world of General Electric, which ground ahead from an electric lamp company to an industrial giant, step-by-step over a long period which destroyed many thousands of lesser companies with less adaptive cultures.

We can also use this model to derive the idea of human nature as nearly fixed; it changes in geologic time, not human time. This explains why the fundamental problems of history tend to recur. We're basically the same as we've always been:

History repeats itself in the large because human nature changes with geological leisureliness, and man is equipped to respond in stereotyped ways to frequently occurring situations and stimuli like hunger, danger, and sex. But in a developed and complex civilization individuals are more differentiated and unique than in a primitive society, and many situations contain novel circumstances requiring modifications of instinctive response; custom recedes, reasoning spreads; the results are less predictable. There is no certainty that the future will repeat the past. Every year is an adventure.

Lastly, Mother Nature's long history also teaches us something of resilience, which is connected to the idea of grind-ahead change. Studying evolution helps us understand that what is fragile will eventually break under the stresses of competition: Most importantly, fragile relationships break, but strong win-win relationships have super glue that keeps parties together. We also learn that weak competitive positions are eventually rooted out due to competition and new environments, and that a lack of adaptiveness to changing reality is a losing strategy when the surrounding environment shifts enough. These and others are fundamental knowledge and work the same in human organizations as in Nature.

The Biology of History

Durant moves from geology into the realm of human biology: Our nature determines the "arena" in which the human condition can play out. Human biology gives us the rules of the chessboard, and the Earth and its inhabitants provide the environment in which we play the game. The variety of outcomes approaches infinity from this starting point. That's why this "bucket" of human knowledge is such a crucial one to study. We need to know the rules.

Thinking with the first "bucket" of knowledge — the mathematics and physics that drive all things in the universe — it's easy to derive that compounding multiplication can take a small population and make it a very large one over a comparatively short time. 2 becomes 4 becomes 8 becomes 16, and so on. But because we also know that the spoils of the physical world are finite, the "Big Model" of Darwinian natural selection flows naturally from the compounding math: As populations grow but their surroundings offer limitations, there must be a way to derive who gets the spoils.

Not only does this provide the basis for biological competition over resources, a major lesson in the second bucket, it also provides the basis for the political and economic

systems in bucket three of human history: Our various systems of political and economic organization are fundamentally driven by decisions on how to give order and fairness to the brutal reality created by human competition.

In this vein, we have previously discussed Durant's three lessons of biological history: Life is Competition. Life is Selection. Life must Replicate. These simple precepts lead to the interesting results in biology, and most relevant to us, to similar interesting results in human culture itself:

Like other departments of biology, history remains at bottom a natural selection of the fittest individuals and groups in a struggle wherein goodness receives no favors, misfortunes abound, and the final test is the ability to survive.

We do, however, need to be careful to think with the right “bucket” at the right time. Durant offers us a cautionary tale here: The example of the growth and decay of societies shows an area where the third bucket, human culture, offers a different reality than what a simple analogy from physics or biology might show. Cultural decay is not inevitable, as it might be with an element or a physical organism:

If these are the sources of growth, what are the causes of decay? Shall we suppose, with Spengler and many others, that each civilization is an organism, naturally and yet mysteriously endowed with the power of development and the fatality of death? It is tempting to explain the behavior of groups through analogy with physiology or physics, and to ascribe the deterioration of a society to some inherent limit in its loan and tenure of life, or some irreparable running down of internal force. Such analogies may offer provisional illumination, as when we compare the association of individuals with an aggregation of cells, or the circulation of money from banker back to banker with the systole and diastole of the heart.

But a group is no organism physically added to its constituent individuals; it has no brain or stomach of its own; it must think or feel with the brains or nerves of its members. When the group or a civilization declines, it is through no mystic limitation of a corporate life, but through the failure of its political or intellectual leaders to meet the challenges of change.

[...]

But do civilizations die? Again, not quite. Greek civilization is not really dead; only its frame is gone and its habitat has changed and spread; it survives in the memory of the race, and in such abundance that no one life, however full and long, could absorb it all. Homer has more readers now than in his own day and land. The Greek poets and philosophers are in every library and college; at this moment Plato is being studied by a hundred thousand discoverers of the “dear delight” of philosophy overspreading life with understanding thought. This selective survival of creative minds is the most real and beneficent of immortalities.

In this sense, the ideas that thrive in human history are not bound by the precepts of physics. Knowledge — the kind which can be passed from generation to generation in an accumulative way — is a unique outcome in the human culture bucket. Other biological creatures only pass down DNA, not accumulated learning. (Yuval Harari similarly declared that “The Cognitive Revolution is accordingly the point when history declared its independence from biology.”)

With that caveat in mind, the concept of passed-down ideas does have some predictable overlap with major mental models of the first two buckets of physics/math and biology. The first is compounding: Ideas and knowledge compound in the same mathematical way that money or population does. If I have an idea and tell my idea to you, we both have the idea. If we each take that idea and recombine it with another idea we already had, we now have three ideas from a starting point of only one. If we can each connect that one idea to two ideas we had, we now have five ideas between us. And so on — you can see how

compounding would take place as we told our friends about the five ideas and they told theirs. So the Big Model of compound interest works on ideas too.

The second interplay is to see that human ideas go through natural selection in the same way biological life does.

Intellect is therefore a vital force in history, but it can also be a dissolvent and destructive power. Out of every hundred new ideas ninety-nine or more will probably be inferior to the traditional responses which they propose to replace. No one man, however brilliant or well-informed, can come in one lifetime to such fullness of understanding as to safely judge and dismiss the customs or institutions of his society, for these are the wisdom of generations after centuries of experiment in the laboratory of history.

This doesn't tell us that the *best* ideas survive any more than natural selection tells us that the best *creatures* survive. It just means, at the risk of being circular, that the ideas most fit for propagation are the ones that survive for a long time. Most truly bad ideas tend to get tossed out in the vicissitudes of time either through the early death of their proponents or basic social pressure. But any idea that strikes a fundamental chord in humanity can last a very long time, even if it's wrong or harmful. It simply has to be memorable and have at least a kernel of intuitive truth.

37. At Some Point, You Have to Eat The Broccoli

It's a wonderful idea to try to find a set of systems and principles that "work better" for big swaths of your life. Better habits, better mental tendencies, better methods of inquiry, and so on. We're strong advocates of this approach, believing that good thinking and good decision making can be learned the same as a good golf swing can: Through practice and instruction.

So, read the below with this caveat in mind: Constant learning and self-improvement can and must be done for great life results.

Now, with that out of the way.

Progress Requires Effort

The problem with the search for self-improvement methods, including the kind of multidisciplinary thinking we espouse, is that many, perhaps most of them, are a snare and a delusion for most people. And there's a simple reason why: They won't actually do it.

Think about it. Isn't that the most common result? That you don't do it? For example, we heard from many people after we wrote a piece late last year on Reading 25 Pages a Day, a little practice that we think would benefit almost anyone in *creating* a very desirable reading habit.

What we suspect, though, is that even of the subset of people who felt so strongly about the idea that they contacted us, only a minority of them followed through and maintained to the habit to this day, ten months later.

The Failure to Implement Habits

Why is that? A huge part of it is Homeostasis: The basic self-regulating feedback loops that keep us repeating the same habits over and over. Predictable forces that keep us from changing *ourselves*, just as some forces keep us from changing *organizations*. (Or any self-regulating system.)

The failure to follow new systems and habits (mental or physical) follows this basic formula:

1. A system is proposed which makes the adherent think that they can live life a healthy life "without eating any broccoli." (Whether intended by the author or not.) You see this over and over: Money-making schemes, exercise-habit formation routines, 4-hour workweek promises, new cultural principles for businesses, and so on. Promises that lead people to think "healthy eating with no broccoli," so to speak. An easy fix.
2. Potential adherent to the "broccoli-free" system buys into the paradigm, and starts giving it a try.
3. Potential adherent realizes very quickly that either (A) The broccoli must, indeed, be eaten, or (B) The system does not work.

Do the Work

Now, with regards to the 25-pages a day "system" we outlined, we were careful not to make a "no broccoli" promise: All we said was that reading 25 pages per day was a habit that almost anyone could form and that it would lead them far. But you still have to do all the reading. You have to actually do the thing. That's the part where everyone falls away. We suspect that some people thought it would be easy to read 25 pages per day. That the pages would essentially "read themselves," or that the time to do so would spontaneously free up, just because they starting wanting it. This is never, ever the case. At some point, to be healthy, you do need to suck it up and eat some broccoli! And for many days in a row. Or, more to the point: The "failure point" with any new system; any method of improvement; any proposed solution to a life problem or an organization problem, is when

the homeostatic regulation kicks in, when we realize some part of it will be hard, new, or unnatural.

Even a really well-designed system can only cut up the broccoli into little pieces and sneak it into your mac-and-cheese. A popular example would be a fitness system whereby you do one pushup a day, then two pushups on the second day, then three the third day, and so on. It makes the habit digestible at first, as you get used to it. This is plenty smart. But eventually, if you're going to hang on to that habit, you'll have to do a whole lot of pushups every day! You can't just go back to plain mac-and-cheese, no broccoli. When the newness of the "one day at a time" system wears off, you'll be left with a *heaping* portion of broccoli. Will you continue eating it?

There is no free lunch. When you're evaluating a proposed improvement to your life or to your organization, you must figure out when and where the broccoli will get eaten, and understand that you will have to sacrifice something (even if it's just comfort) to get what you want. And if anyone ever promises you "no broccoli," it's a sham.

The willingness to pay the price is what separates people into two groups. On one hand, you have the people who want to want something and won't do anything hard to get it. These people are passive — life is always happening to them ... stuff is never perfect ... there is always something getting in the way. Soon enough they'll trade today's want for a new one, momentarily distracting themselves from their lack of progress. But nothing will ever change for these people. They'll never put in the work needed to make progress because they're not willing to pay the price or they're scared of failing. On the other hand, the second group is willing to do the work. They don't make excuses. They don't wait for perfection. They put their head down and get better every day. While they sometimes come up short, they get up and try again.

Which group do you think is more likely to succeed? Which group do you think is happier? Which group do you want to be a part of?

Remember that anything really worth doing is probably hard work, and will absolutely require you to do things you don't currently do, which will feel uncomfortable for a while. This is a "hard truth" we must all face. If it was easy, everyone would already be doing it.

Let's take the example of learning how to give better feedback. What could be a more useful skill? But actually *doing so*, actually following through with the idea, is not at all easy. You have to overcome your natural impulse to criticize. You have to get over your natural ego. You have to be very careful to watch your words, trying to decipher what will be *heard* when you deliver feedback. All of these are hard things to do, all of them unnatural. All will require some re-doubling to accomplish.

Thus, most people won't actually do it. This an Iron Rule of life: *Biological systems tend towards what is comfortable*. (Yes, human beings are "biological systems".)

But this Iron Rule is a problem and an opportunity wrapped together. As the saying goes, "*If you do what everyone else does, you'll get what everyone else gets*." If you can recognize that all things worth doing are hard at first, and that there is always some broccoli to be eaten, you are part of the way toward true advantageous differentiation. The rest is self-discipline.

We "go back" on our habits when they aren't truly formed yet. We think we're there, but we're really not — we've just been fooled by our sensory apparatus.

And the real and comforting truth is that you might really start liking, and even get used to eating, broccoli. Eating potato chips and candy will eventually feel like the uncomfortable and unnatural thing.

And that's when you know you've really got a great new discipline: Going back would feel like cutting off your hands.

38. How To Mentally Overachieve — Charles Darwin's Reflections On His Own Mind

We've written quite a bit about the marvelous British naturalist Charles Darwin, who with his Origin of Species created perhaps the most intense intellectual debate in human history, one which continues up to this day.

Darwin's *Origin* was a courageous and detailed thought piece on the nature and development of biological species. It's the starting point for nearly all of modern biology. But, as we've noted before, Darwin was not a man of pure IQ. He was not Issac Newton, or Richard Feynman, or Albert Einstein — breezing through complex mathematical physics at a young age.

Charlie Munger thinks Darwin would have placed somewhere in the *middle* of a good private high school class. He was also in notoriously bad health for most of his adult life and, by his son's estimation, a terrible sleeper. He really only worked a few hours a day in the many years leading up to the *Origin of Species*.

Yet his "thinking work" outclassed almost everyone. An incredible story.

In his autobiography, Darwin reflected on this peculiar state of affairs. What was he good at that led to the result? What was he so weak at? Why did he achieve better thinking outcomes? As he put it, his goal was to:

"Try to analyse the mental qualities and the conditions on which my success has depended; though I am aware that no man can do this correctly."

In studying Darwin ourselves, we hope to better appreciate our own strengths and weaknesses and, not to mention understand the working methods of a "*mental overachiever*."

Let's explore what Darwin saw in himself.

1. He did *not* have a quick intellect or an ability to follow long, complex, or mathematical reasoning. He may have been a bit hard on himself, but Darwin realized that he wasn't a "5 second insight" type of guy (and let's face it, most of us aren't). His life also proves how little that trait matters *if you're aware of it and counter-weight it with other methods*.

I have no great quickness of apprehension or wit which is so remarkable in some clever men, for instance, Huxley. I am therefore a poor critic: a paper or book, when first read, generally excites my admiration, and it is only after considerable reflection that I perceive the weak points. My power to follow a long and purely abstract train of thought is very limited; and therefore I could never have succeeded with metaphysics or mathematics. My memory is extensive, yet hazy: it suffices to make me cautious by vaguely telling me that I have observed or read something opposed to the conclusion which I am drawing, or on the other hand in favour of it; and after a time I can generally recollect where to search for my authority. So poor in one sense is my memory, that I have never been able to remember for more than a few days a single date or a line of poetry.

2. He did *not* feel easily able to write clearly and concisely. He compensated by getting things down quickly and then coming back to them later, thinking them through again and again. Slow, methodical....and ridiculously effective: For those who haven't read it, the Origin of Species is extremely readable and clear, even now, 150 years later.

I have as much difficulty as ever in expressing myself clearly and concisely; and this difficulty has caused me a very great loss of time; but it has had the compensating advantage of forcing me to think long and intently about every sentence, and thus I have been led to see errors in reasoning and in my own observations or those of others.

There seems to be a sort of fatality in my mind leading me to put at first my statement or proposition in a wrong or awkward form. Formerly I used to think about my sentences before writing them down; but for several years I have found that it saves time to scribble in a vile hand whole pages as quickly as I possibly can, contracting half the words; and

then correct deliberately. Sentences thus scribbled down are often better ones than I could have written deliberately.

3. He forced himself to be an incredibly effective and organized collector of information. Darwin's system of reading and indexing facts in large portfolios is worth emulating, as is the habit of taking down conflicting ideas immediately.

As in several of my books facts observed by others have been very extensively used, and as I have always had several quite distinct subjects in hand at the same time, I may mention that I keep from thirty to forty large portfolios, in cabinets with labelled shelves, into which I can at once put a detached reference or memorandum. I have bought many books, and at their ends I make an index of all the facts that concern my work; or, if the book is not my own, write out a separate abstract, and of such abstracts I have a large drawer full. Before beginning on any subject I look to all the short indexes and make a general and classified index, and by taking the one or more proper portfolios I have all the information collected during my life ready for use.

4. He had possibly the most valuable trait in any sort of thinker: A passionate interest in understanding reality and putting it in useful order in his head. This "Reality Orientation" is hard to measure and certainly does not show up on IQ tests, but probably determines, to some extent, success in life.

On the favourable side of the balance, I think that I am superior to the common run of men in noticing things which easily escape attention, and in observing them carefully. My industry has been nearly as great as it could have been in the observation and collection of facts. What is far more important, my love of natural science has been steady and ardent.

This pure love has, however, been much aided by the ambition to be esteemed by my fellow naturalists. From my early youth I have had the strongest desire to understand or explain whatever I observed,—that is, to group all facts under some general laws. These causes combined have given me the patience to reflect or ponder for any number of years over any unexplained problem. As far as I can judge, I am not apt to follow blindly the lead of other men. I have steadily endeavoured to keep my mind free so as to give up any hypothesis, however much beloved (and I cannot resist forming one on every subject), as soon as facts are shown to be opposed to it.

Indeed, I have had no choice but to act in this manner, for with the exception of the Coral Reefs, I cannot remember a single first-formed hypothesis which had not after a time to be given up or greatly modified. This has naturally led me to distrust greatly deductive reasoning in the mixed sciences. On the other hand, I am not very sceptical—a frame of mind which I believe to be injurious to the progress of science. A good deal of scepticism in a scientific man is advisable to avoid much loss of time, but I have met with not a few men, who, I feel sure, have often thus been deterred from experiment or observations, which would have proved directly or indirectly serviceable.

[...]

Therefore my success as a man of science, whatever this may have amounted to, has been determined, as far as I can judge, by complex and diversified mental qualities and conditions. Of these, the most important have been—the love of science—unbounded patience in long reflecting over any subject—industry in observing and collecting facts—and a fair share of invention as well as of common sense.

5. Most inspirational to us of average intellect, he outperformed his own mental aptitude with these good habits, surprising even himself with the results.

With such moderate abilities as I possess, it is truly surprising that I should have influenced to a considerable extent the belief of scientific men on some important points.

38. A Short List of Books for Doing New Things

Andrew Ng has quite the modern resume.

He founded Coursera, a wonderful website that gives anyone with Internet access the ability to take high level university courses on almost any topic. He founded the *Google Brain* project at Google, their deep learning research project intended to help bring about better artificial intelligence. Now he's the Chief Scientist at Baidu Research.

Ng is, unsurprisingly, *devoted to reading and learning*. As he puts it,

In my own life, I found that whenever I wasn't sure what to do next, I would go and learn a lot, read a lot, talk to experts. I don't know how the human brain works but it's almost magical: when you read enough or talk to enough experts, when you have enough inputs, new ideas start appearing. This seems to happen for a lot of people that I know.

When you become sufficiently expert in the state of the art, you stop picking ideas at random. You are thoughtful in how to select ideas, and how to combine ideas. You are thoughtful about when you should be generating many ideas versus pruning down ideas. [...]

I read a lot and I also spend time talking to people a fair amount. I think two of the most efficient ways to learn, to get information, are reading and talking to experts. So I spend quite a bit of time doing both of them. I think I have just shy of a thousand books on my Kindle. And I've probably read about two-thirds of them.

Ng thinks innovation and creativity can be *learned* — that they are pattern-recognition and combinatorial creativity exercises which can be performed by an intelligent and devoted practitioner with the right approach.

He also encourages the creation of new things; new businesses, new technologies. And on that topic, Ng has a few book recommendations. Given his list of accomplishments, the quality of his mind, and his admitted devotion to reading the printed word, it seems worth our time to check out the list.

Zero to One

The first is "Zero to One" by Peter Thiel, a very good book that gives an overview of entrepreneurship and innovation.

Crossing the Chasm / The Lean Startup

We often break down entrepreneurship into B2B ("business to business," i.e., businesses whose customers are other businesses) and B2C ("business to consumer").

For B2B, I recommend "Crossing the Chasm." For B2C, one of my favorite books is "The Lean Startup," which takes a narrower view but it gives one specific tactic for innovating quickly. It's a little narrow but it's very good in the area that it covers.

Talking to Humans

Then to break B2C down even further, two of my favorites are "Talking to Humans," which is a very short book that teaches you how to develop empathy for users you want to serve by talking to them.

Rocket Surgery Made Easy

Also, "Rocket Surgery Made Easy." If you want to build products that are important, that users care about, this teaches you different tactics for learning about users, either through user studies or by interviews.

The Hard Thing about Hard Things

Then finally there is "The Hard Thing about Hard Things." It's a bit dark but it does cover a lot of useful territory on what building an organization is like.

So Good They Can't Ignore You

For people who are trying to figure out career decisions, there's a very interesting one: "So Good They Can't Ignore You." That gives a valuable perspective on how to select a path for one's career.

39. Zero — Invented or Discovered?

It seems almost a bizarre question. Who thinks about whether zero was invented or discovered? And why is it important?

Answering this question, however, can tell you a lot about yourself and how you see the world.

Let's break it down.

"Invented" implies that humans created the zero and that without us, the zero and its properties would cease to exist.

"Discovered" means that although the symbol is a human creation, what it represents would exist independently of any human ability to label it.

So do you think of the zero as a purely mathematical function, and by extension think of all math as a human construct like, say, cheese or self-driving cars? Or is math, and the zero, a symbolic language that describes the world, the content of which exists completely independently of our descriptions?

The zero is now a ubiquitous component of our understanding.

The concept is so basic it is routinely mastered by the pre-kindergarten set. Consider the equation $3-3=0$. Nothing complicated about that. It is second nature to us that we can represent "nothing" with a symbol. It makes perfect sense now, in 2017, and it's so common that we forget that zero was a relatively late addition to the number scale.

Here's a fact that's amazing to most people: the zero is actually younger than mathematics. Pythagoras's famous conclusion — that in a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides — was achieved without a zero. As was Euclid's entire *Elements*.

How could this be? It seems surreal, given the importance the zero now has to mathematics, computing, language, and life. How could someone figure out the complex geometry of triangles, yet not realize that nothing was also a number?

Tobias Dantzig, in *Number: The Language of Science*, offers this as a possible explanation: "The concrete mind of the ancient Greeks could not conceive the void as a number, let alone endow the void with a symbol." This gives us a good direction for finding the answer to the original question because it hints that you must first understand the concept of the void before you can name it. You need to see that nothingness still takes up space.

It was thought, and sometimes still is, that the number zero was invented in the pursuit of ancient commerce. Something was needed as a placeholder; otherwise, 65 would be indistinguishable from 605 or 6050. The zero represents "no units" of the particular place that it holds. So for that last number, we have six thousands, no hundreds, five tens, and no singles.

A happy accident of no great original insight, zero then made its way around the world. In addition to being convenient for keeping track of how many bags of grain you were owed, or how many soldiers were in your army, it turned our number scale into an extremely efficient decimal system. More so than any numbering system that preceded it (and there were many), the zero transformed the power of our other numerals, propelling mathematics into fantastic equations that can explain our world and fuel incredible scientific and technological advances.

But there is, if you look closely, a missing link in this story.

What changed in humanity that made us comfortable with confronting the void and giving it a symbol? And is it reasonable to imagine creating the number without understanding what it represented? Given its properties, can we really think that it started as a placeholder? Or did it contain within it, right from the beginning, the notion of defining the void, of giving it space?

In *Finding Zero*, Amir Aczel offers some insight. Basically, he claims that the people who discovered the zero must have had an appreciation of the emptiness that it represented. They were labeling a concept with which they were already familiar. He rediscovered the oldest known zero, on a stone tablet dating from 683 CE in what is now Cambodia.

On his quest to find this zero, Aczel realized that it was far more natural for the zero to first appear in the Far East, rather than in Western or Arab cultures, due to the philosophical and religious understandings prevalent in the region.

Western society was, and still is in many ways, a binary culture. Good and evil. Mind and body. You're either with us or against us. A patriot or a terrorist. Many of us naturally try to fit our world into these binary understandings. If something is "A," then it cannot be "not A." The very definition of "A" is that it is not "not A." Something cannot be both.

Aczel writes that this duality is not at all reflected in much Eastern thought. He describes the *catuskoti*, found in early Buddhist logic, that presents four possibilities, instead of two, for any state: that something is, is not, is both, or is neither.

At first, a typical Western mind might rebel against this kind of logic. My father is either bald or not bald. He cannot be both and he cannot be neither, so what is the use of these two other almost nonsensical options?

A closer examination of our language, though, reveals that the expression of the non-binary is understood, and therefore perhaps more relevant than we think. Take, for example, "you're either with us or against us." Is it possible to say "I'm both with you and against you"? Yes. It could mean that you are for the principles but against the tactics. Or that you are supportive in contrast to your values. And to say "I'm neither with you nor against you" could mean that you aren't supportive of the tactic in question, but won't do anything to stop it. Or that you just don't care.

Feelings, in particular, are a realm where the binary is often insufficient. Watching my children, I know that it's possible to be both happy and sad, a traditional binary, at the same time. And the zero itself defies binary categorization. It is something and nothing simultaneously.

Aczel reflects on a conversation he had with a Buddhist monk. "Everything is not everything — there is always something that lies outside of what you may think covers all creation. It could be a thought, or a kind of void, or a divine aspect. Nothing contains everything inside it."

He goes on to conclude that "Here was the intellectual source of the number zero. It came from Buddhist meditation. Only this deep introspection could equate absolute nothingness with a number that had not existed until the emergence of this idea."

Which is to say, certain properties of the zero likely were understood conceptually before the symbol came about — nothingness was a thing that could be represented. This idea fits with how we treat the zero today; it may represent nothing, but that nothing still has properties. And investigating those properties demonstrates that there is power in the void — it has something to teach us about how our universe operates.

Further contemplation might illuminate that the zero has something to teach us about existence as well. If we accept zero, the symbol, as being discovered as part of our realization about the existence of nothingness, then trying to understand the zero can teach us a lot about moving beyond the binary of alive/not alive to explore other ways of conceptualizing what it means to be.

39. Loops of Progress, or How Modern Are You?

On your way to work, you grab breakfast from one of the dozen coffee shops you pass. Most of the goods you buy get delivered right to your door. If you live in a large city and have a car, you barely use it, preferring Uber or ride-sharing services. You feel modern. Your parents didn't do any of this. Most of their meals were consumed at home, and they took their cars everywhere, in particular to purchase all the stuff they needed. You think of your life as being so different from theirs. It is. You think of this as progress. It isn't.

We tend to consider social development as occurring in a straight line: we progressed from A to B to C, with each step being more advanced and, we assume, better than the one before. This perception isn't always accurate, though. Part of learning from the past is appreciating that we humans have tried many different ways to organize ourselves, with lots of repetitions. If we want success now, we need to understand our past efforts in order to see what changes might be needed this time around.

Would you be surprised to learn that in Victorian London (the nineteenth century), the vast majority of people ate their food on the run? That ride sharing was common? Or that you could purchase everything you needed without ever leaving your house?

To be fair, these situations didn't exist in the exact instantiations that they do today.

Obviously, there was no amazon.com back then. But while the parallels are not exact, they are worth exploring, if only to remind us that no matter the array of pressures we face as a society, there are only so many ways we can organize ourselves.

To start with, street food was the norm. All classes except the very wealthy (thus, essentially, anyone who worked) ate on the run. At outdoor stalls or indoor counters. Food purchased from street vendors or chophouses (the Victorian equivalent of fast-food outlets). Food was purchased and consumed outside of the home, on the commute to or from work.

Why? Why would everyone from the middle classes to the working poor eat out?

Unlike today, eating out was cheaper then. As Judith Flanders explains in The Victorian City:

Today, eating out is more expensive than cooking at home, but in the nineteenth century the situation was reversed. Most of the working class lived in rooms, not houses. They might have had access to a communal kitchen, but more often they cooked in their own fireplace: to boil a kettle before going to work, leaving the fire to burn when there was no one home, was costly, time-consuming and wasteful. ... Several factors — the lack of storage space, routine infestations of vermin and being able, because of the cost, to buy food only in tiny quantities — meant that storing any foodstuff, even tea, overnight was unusual.

Even food delivery isn't new.

Every eating place expected to deliver meals, complete with cutlery, dishes and even condiments, which were brought by waiters who then stayed on, if wanted, to serve.

Endless processions of meals passed through the streets daily. ... Large sums of money were not necessary for this service.

People need to eat. It's fundamental. No matter what living conditions we find ourselves in, the drive away from starvation means that we are willing to experiment in how we organize to get our food.

Public transportation took hold in Victorian London and is another interesting point of comparison. Then, its use was not due to a sense of civic responsibility or concerns about the environment. Public transportation succeeded because it was faster. Most cities had grown organically, and streets were not designed for the volume they had to carry in the nineteenth century. There was no flow, and there were no traffic rules. The population was

swelling and road surfaces would be devastating to today's SUVs. It was simply painful to get anywhere.

Thus the options exploded. Buses and cabs to get about the city. Stagecoaches and the railroad for longer excursions (and commutes!). And the Underground. Buses "increased the average speed of travel to nearly six miles an hour; with the railway this figure rose to over twelve, sometimes double that." Public transportation allowed people to move faster, and "therefore, areas that had traditionally been on the edges of London now housed commuters."

As a direct consequence of the comparable efficiency of the public transportation system, "most people could not imagine ever owning a private carriage. It was not just the cost of the carriage itself, of the horse and its accoutrements — harnesses and so on — but the running costs: the feed and care of the horse, the stabling, as well as the taxes that were imposed on carriages throughout the century." As well as the staff. A driver, footmen, their salaries and uniforms.

A form of ride-sharing was also common then. For travel outside of the city, one could hire a post-chaise. "A post-chaise was always hired privately, to the passenger's own schedule, but the chaise, horses, driver and postboys all belonged to the coaching inn or a local proprietor."

Aside from the cost of owning your own transportation, neither the work day nor the city infrastructure was designed for reliance on individual transport. London in the nineteenth century (and to a large extent today) functioned better with an extensive public transport system.

[quote]There was no social safety net. You worked or you died.[/quote]

Finally, living in London in the nineteenth century was very much about survival. There was no social safety net. You worked or you died. And given the concentration of wealth in the top tier of society, there was a lot of competition among the working poor for a slight edge that would mean the difference between living another day and starvation.

This situation is likely part of the reason that sellers went to buyers, rather than the other way around. Unlike today, when so many bookstores are owned by the same company or when a conglomerate makes multiple brands of "unique" luxury goods, a watercress girl owned and sold only the watercress she could carry. And this watercress was no different from the bundles the girl one street over had. The competition to sell was fierce.

And so, as Flanders describes, in the first half of the nineteenth century, street vendors in all neighborhoods sold an astonishing array of goods and services. First chimney sweeps, then milkmaids; "the next sellers were the watercress girls, followed by the costermongers, then the fishmongers', the butchers' and the bakers' boys to take the daily orders." Next came the guy selling horsemeat.

Other goods regularly available from itinerant sellers in the suburbs included: footstools; embroidery frames; clothes horses, clothes-pegs and clothes line; sponges, chamois leathers, brushes and brooms; kitchen skewers, toasting-forks and other tinware; razors and penknives; trays, keyrings, and small items of jewellery; candlesticks, tools, trivets, pots and pans; bandboxes and hatboxes; blackleading for kitchen ranges and grates, matches and glue; china ornaments and crockery; sheets, shirts, laces, thread, ribbons, artificial flowers, buttons, studs, handkerchiefs; pipes, tobacco, snuff, cigars; spectacles, hats, combs and hairbrushes; firewood and sawdust.

You didn't have to leave your house to purchase items for meeting your daily needs.

This is not to say that Victorian London had everything figured out or that progress is always a loop. For example, there is no time in history in which it was better to be a woman than it is now, and modern medicine and the scientific method are significant steps up over what has come before. But reading these accounts of how London functioned almost two hundred years ago hints that a lot of what we consider modern innovations have been tried before.

Maybe ways of organizing come and go depending on time and place. When things are useful, they appear; as needs change, those things disappear. There really is no new way of doing business.

But we can look at the impact of social progress, how it shapes communities, and what contributes to its ebb and flow. Flanders notes that in the second half of the nineteenth century, there was a shift to going out to shop in stores. What changes did this give rise to? And how did those changes contribute to the loop we are experiencing and to our current desire to have everything brought to us?

40. Finding Truth in History

If we are to learn from the past, does the account of it have to be true? One would like to think so. Otherwise you might be preparing for the wrong battle. There you are, geared up for mountains, and instead you find swamps. You've done a bunch of reading, trying to understand the terrain you are about to enter, only to find it useless. The books must have been written by crazy people. You are upset and confused. Surely there must be some reliable, objective account of the past. How are you supposed to prepare for the possibilities of the future if you can't trust the accuracy of the reports on anything that has come before?

For why do we study history, anyway? Why keep a record of things that have happened? We fear that if we don't, we are doomed to repeat history; but often that doesn't seem to stop us from repeating it. And we have an annoying tendency to remember only the things which don't really challenge or upset us. But still we try to capture what we can, through museums and ceremonies and study, because somehow we believe that eventually we will come to learn something about why things happen the way they do. And armed with this knowledge, we might even be able to shape our future.

This "problem of historical truth" is explored by Isaiah Berlin in The Hedgehog and the Fox: An Essay on Tolstoy's View of History. He explains that Tolstoy was driven by a "desire to penetrate to first causes, to understand how and why things happen as they do and not otherwise." We can understand this goal – because if we know how the world really works, we know everything.

Of course, it's not that simple, and — spoiler alert — Tolstoy never figured it out. But Berlin's analysis can illuminate the challenges we face with history and help us find something to learn from.

Tolstoy's main problem with historical efforts at the time was that they were "nothing but a collection of fables and useless trifles. ... History does not reveal causes; it presents only a blank succession of unexplained events." Seen like this, the study of history is a waste of time, other than for trivia games or pub quizzes. Being able to recite what happened is supremely uninteresting if you can't begin to understand why it happened in the first place. But Tolstoy was also an expert at tearing down the theories of anyone who attempted to make sense of history and provide the why. He thought that they "must be imposters, since no theories can possibly fit the immense variety of possible human behavior, the vast multiplicity of minute, undiscoverable causes and effects which form that interplay of men and nature which history purports to record."

[quote]History is more than just factoids, but its complexity makes it difficult for us to learn exactly why things happened the way they did.[/quote]

And therein lies the spectrum of the problem for Tolstoy. History is more than just factoids, but its complexity makes it difficult for us to learn exactly why things happened the way they did. A battle is more than dates and times, but trying to trace the real impact of the decisions of Napoleon or Churchill is a fool's errand. There is too much going on – too many decisions and interactions happening in every moment – for us to be able to conclude cause and effect with any certainty. After leaving an ice cube to melt on a table, you can't untangle exactly what happened with each molecule from the puddle. That doesn't mean we can't learn from history; it means only that we need to be careful with the lessons we draw and the confidence we have in them.

Berlin explains:

There is a particularly vivid simile [in War and Peace] in which the great man is likened to the ram whom the shepherd is fattening for slaughter. Because the ram duly grows fatter, and perhaps is used as a bellwether for the rest of the flock, he may easily imagine that he is the leader of the flock, and that the other sheep go where they go solely in obedience to his will. He thinks this and the flock may think it too. Nevertheless the purpose of his

selection is not the role he believes himself to play, but slaughter – a purpose conceived by beings whose aims neither he nor the other sheep can fathom. For Tolstoy, Napoleon is just such a ram, and so to some degree is Alexander, and indeed all the great men of history.

Arguing against this view of history was N. I. Kareev, who said:

...it is men, doubtless, who make social forms, but these forms – the ways in which men live – in their turn affect those born into them; individual wills may not be all-powerful, but neither are they totally impotent, and some are more effective than others. Napoleon may not be a demigod, but neither is he a mere epiphenomenon of a process which would have occurred unaltered without him.

This means that studying the past is important for making better decisions in the future. If we can't always follow the course of cause and effect, we can at least discover some very strong correlations and act accordingly.

We have a choice between these two perspectives: Either we can treat history as an impenetrable fog, or we can figure out how to use history while accepting that each day might reveal more and we may have to update our thinking.

Sound familiar? Sounds a lot like the scientific method to me – a preference for updating the foundation of knowledge versus being adrift in chaos or attached to a raft that cannot be added to.

Berlin argues that Tolstoy spent his life trying to find a theory strong enough to unify everything. A way to build a foundation so strong that all arguments would crumble against it. Although that endeavor was ambitious, we don't need to fully understand the why of history in order to be able to learn from it. We don't need the foundation of the past to be solid and fixed in order to gain some insight into our future. We can still find some truth in history.

How?

Funnily enough, Berlin clarifies that Tolstoy “believed that only by patient empirical observation could any knowledge be obtained.” But he also believed “that simple people often know the truth better than learned men, because their observation of men and nature is less clouded by empty theories.”

Unhelpfully, Tolstoy's position amounts to “the more you know, the less you learn.”

The answer to finding truth in history is not to be found in Tolstoy's writing. He was looking for “something too indivisibly simple and remote from normal intellectual processes to be assailable by the instruments of reason, and therefore, perhaps, offering a path to peace and salvation.” He never was able to conclude what that might be.

But there might be an answer in how Berlin interprets Tolstoy's major dissonance in life, the discrepancy that drove him and was never resolved. Tolstoy “tried to resolve the glaring contradiction between what he believed about men and events, and what he thought he believed, or ought to believe.”

Finding truth in history is about understanding that this truth is not absolute. In this sense, truth is based on perspective. The perspective of the person who captured it and the person interpreting it. And the perspective of the translators and editors and primary sources. We don't get to be invisible observers of moments in the past, and we don't get to go into other minds. The best we can do is keep our eyes open and keep our biases in check. And what history can teach us is found not just in the moments it tries to describe, but also in what we choose to look at and how we choose to represent it.

41. Epistemology: How do you know that you know what you know?

There is no definite way to confirm that we know anything at all. Only from our direct experience can we claim any knowledge about the world.

The role of perception in knowledge

It is hard to imagine a world that exists outside of what we can perceive. In the effort to get through each day without crashing our cars or some other calamity, we make assumptions about the objects in our physical world. Their continuity, their behavior.

Some of these assumptions are based on our own experience, some on the knowledge imparted by others of their experience, and some on inferences of logic.

Experience, however, comes through the lens of perception. How things look, how they feel, how they sound.

Our understanding of, and interaction with, the world comes through particular constructs of the human body – eyes, ears, fingers, etc. Most people intuitively understand the subjectivity of some of our perceptions.

Colors look 'different' to people who are color blind. Our feeling of temperature is impacted by immediate contrast – People stepping outside the doors of an airport will have a different impression of the temperature if they have just come from Moose Jaw or Cancun. Even more substantial understandings come to us through the lens of our senses. We can see the shape of a tree, or we could close our eyes and infer the shape through touch, but in either case, or even combining the two, we are relying on our senses to impart an understanding of the physical world.

The question of what objectively 'is', is something that has long been one of the subjects of philosophy. Philosophers from Descartes to Kant have tried to describe our existence in such a way as to arrive at understanding of the physical world in which things can be conclusively known.

Descartes introduces the idea in his Meditations: "Surely whatever I had admitted until now as most true I received either from the senses or through the senses. However, I have noticed that the senses are sometimes deceptive; and it is a mark of prudence never to place our complete trust in those who have deceived us even once."

Descartes famously employed systematic doubt, questioning all knowledge conveyed by his experience in the world until the only knowledge he couldn't doubt was the fact that he could doubt.

Therefore I suppose that everything I see is false. I believe that none of what my deceitful memory represents ever existed. I have no sense whatever. Body, shape, extension, movement, and place are all chimeras. What then will be true? ... Thus, after everything has been most carefully weighed, it must finally be established that this pronouncement "I am, I exist" is necessarily true every time I utter it or conceive it in my mind. (Descartes, Meditations)

Descartes confirmed we have a self. Unfortunately this self could be the one we see in the mirror each morning or a brain in a vat. If the only thing we cannot doubt is that we can doubt, essentially that guarantees us having only the mechanism to doubt. No body. We could therefore be isolated brains, being manipulated by things unknown, our entire world a mirage.

How then can we hope to claim knowledge about the physical world?

For Locke, our understanding of the world comes from our experience of it. It is this experience that provides knowledge. He says, in his Essay Concerning Human Understanding:

Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas: – How comes it to be furnished? Whence comes it by that vast store with the busy and boundless fancy of man has painted on it with an almost endless variety Whence

has it all the materials or reason and knowledge? To this I answer, in one word, from EXPERIENCE. In that all our knowledge is founded; and from that it ultimately derives itself.

He wrote that there were two types of qualities, ones that existed innately in an object or series of objects, such as size, number, or motion, and those that are wholly dependent on our perception of them, such as color or smell.

The particular bulk, number, figure, and motion of the parts of fire or snow are really in them, whether one's senses perceive them or no: and therefore they may be called real qualities, because they really exist in those bodies. But light, heat, whiteness, or coldness are not more really in them than sickness or pain is in manna. (Locke, An Essay Concerning Human Understanding)

Experience then, as long as we have an understanding of the limitations of our perception, will confer certain truths about the physical world we inhabit. For example, through experience we can claim knowledge of how many crows are perched on a telephone wire, but not how many of them have 'black' as an intrinsic property of their feathers.

Quite in opposition to this was George Berkeley (pronounced Bar-clay), for whom 'to be' was 'to be perceived'. Berkeley wrote in A Treatise Concerning the Principles of Human Knowledge:

Besides all that endless variety of ideas or objects of knowledge, there is likewise something which knows or perceives them and exercised divers operations, as willing, imagining, remembering, about them. This perceiving ... does not denote any one of my ideas, but a thing entirely distinct from them, wherein they exist or, which is the same thing, whereby they are perceived – for the existence of an idea consists in being perceived.

Because our knowledge of the world comes from our perception of it, it is impossible to conclusively know the existence of anything independent of our perception. Berkeley, wrote:

Hence, as it is impossible for me to see or feel anything without an actual sensation of that thing, so it is impossible for me to conceive in my thoughts any sensible thing or object distinct from the sensation or perception of it.

This line of inquiry ultimately results in the entire physical world being called into question, as Berkeley observed:

If we have any knowledge at all of external things, it must be by reason, inferring their existence from what is immediately perceived by sense. {However} it is granted on all hands (and what happens in dreams, frenzies, and the like, puts it beyond dispute) that it is possible we might be affected with all the ideas we have now, though no bodies existed without resembling them.

If we can not know things outside of perception, and our perceptions are entirely unreliable, where does that leave us? It certainly isn't useful to imagine your existence as the sum total of your knowledge, or that our experiences are inherently mistrustful.

What these philosophies can be useful for understanding though, is that often what we consider knowledge is more of a general social agreement on a somewhat consistent comprehension of the things before us. For example, we appreciate that the color green can be perceived differently by various people, but we organize our language based on a general understanding of the color green without worrying about the particular experience of green that any individual may have.

For David Hume, there definitely was a physical world, our perception of which was ultimately responsible for all of our ideas, no matter how complex or abstract. He wrote in An Enquiry Concerning Human Understanding:

When we analyze our thoughts or ideas, however compounded or sublime, we always find that they resolve themselves into such simple ideas as were copied from a precedent

feeling or sentiment. Even those ideas, which, at first view, seem the most wide of this origin, are found, upon a nearer scrutiny, to be derived from it.

Furthermore, since all of our perceptions of the physical world are coming from the same physical world, and the nature of perceiving works more or less the same in each person, we can achieve a consistency in our understanding.

So although it may not be possible to know things with the same certainty as knowing oneself, or to be able to really describe the construct of the world outside of our perception of it, at least we can get along with each other because of a general consistency of experience.

However, this experience still admits to a certain fragility. There is no guarantee that past experiences will be consistent with future ones. In *An Enquiry Concerning Human Understanding*, Hume observes:

Being determined by custom to transfer the past to the future, in all our inferences; where the past has been entirely regular and uniform, we expect the event with the greatest assurance and leave no room for any contrary supposition. But where different effects have been found to follow from causes, which are to appearance exactly similar, all these various effects must occur to the mind in transferring the past to the future, and enter into our consideration, when we determine the probability of the event.

To simultaneously understand all effects when considering an event in the future is not necessarily a limitation, thanks to our amazingly sophisticated brains. Immanuel Kant thought that the way we process the information provided by our senses was an important component of knowledge. Kant wrote in the *Prolegomena to Any Future Metaphysics*:

The difference between truth and dreaming is not ascertained by the nature of the representations which are referred to objects (for they are the same in both cases), but by their connection according to those rules which determine the coherence of the representation in the concept of an object, and by ascertaining whether they can subsist together in experience or not.

Kant did not support the view that the existence of objects was called into question because of the subjectivity of the perceptions by which we must experience them, but neither that all knowledge of the physical world comes from experience. Kant argued: *Experience teaches us what exists and how it exists, but never that it must necessarily exist so and not otherwise. Experience therefore can never teach us the nature of things in themselves.*

Knowledge then, is made up of things we infer, things we experience, and the way our brain processes both. The great metaphysical question of 'Why it is all this way?' may always be out of our reach.

Understanding some of this metaphysical uncertainty in knowledge does not mean that we have to give up on knowing anything. It simply points to a certain subjectivity, an allowance for different conceptions of the world. And hopefully it offers a set of tools with which to evaluate or build claims of knowledge.

42. The Narratives of History: Applying Lessons from the Past

“History is written by the winners” is the popular view. But your winner may not be my winner. A lot depends on the narrative you are trying to build.

History is rewritten all the time.

Sometimes it is rewritten because new information has come to light, perhaps from an archeological find or previously classified documents. When this happens, it is exciting. We joyfully anticipate that more information will deepen our understanding.

But rewriting frequently happens in the service of building a cultural or national narrative. We highlight bits of the past that support our perceived identities and willfully ignore the details that don't fit. We like our history uncomplicated. It's hard for us to understand our groups or our countries, and by extension ourselves, as both good and not-good at the same time.

Culture is a collective memory. It's the interwoven stories that we use to explain who we are as nations, organizations, or just loosely formed groups.

Many of us belong to multiple cultural groups, but only one national group. Margaret MacMillan, in *The Uses and Abuses of History*, explains that “Collective memory is more about the present than the past because it is integral to how the group sees itself.” And “while collective memory is usually grounded in fact, it need not be.”

We have seen how people justify all kinds of mistakes to preserve the personal narratives they are invested in, and groups also engage in this behavior. Countries rewrite their histories, from the textbook up, to support how they see themselves now. Instinctively we may recoil from this idea, believing that it's better to turn over all the rocks and confront what is lurking underneath. However, as MacMillan writes, “It can be dangerous to question the stories people tell about themselves because so much of our identity is both shaped by and bound up with our history. That is why dealing with the past, in deciding on which version we want, or on what we want to remember and to forget, can become so politically charged.”

For example, when Canada's new war museum opened, controversy immediately ensued because part of the World War II exhibit called attention “to the continuing debate over both the efficacy and the morality of the strategy of the Royal Air Force's bomber command, which sought to destroy Germany's capacity to fight on by massive bombing of German industrial and civilian targets.” RAF veterans were outraged that their actions were considered morally ambiguous. Critics of the exhibit charged that the veterans should have the final say because, after all, “they were there.”

We can see that this rationale makes no sense. Galilean relativity shows that the pilots who flew the bombing campaigns are actually the least likely to have an objective understanding of the events. And the ends don't always justify the means. It is possible to do bad things in the pursuit of morally justified outcomes.

MacMillan warns that the danger of abusing history is that it “flattens out the complexity of human experience and leaves no room for different interpretations of the past.”

Which leaves us asking, What do we want from history? Do we want to learn from it, with the hopes that in doing so we will avoid mistakes by understanding the experiences of others? Or do we want to practice self-justification on a national level, reinforcing what we already believe about ourselves to justify what we did and what we are doing? After all, “you could almost always find a basis for your claims in the past if you looked hard enough.”

As with medicine, there is certain fallibility to history. Our propensity to fool ourselves with self-justified narratives is hard to overcome. If we selectively use the past only to reinforce our claims in the present, then the situation becomes precarious when there is pressure to change. Instead of looking as objectively as possible at history, welcoming historians who

challenge us, we succumb to confirmation bias, allowing only those interpretations that are consistent with the narrative we are invested in.

Consider what MacMillan writes about nationalism, which “is a very late development indeed in terms of human history.”

It all started so quietly in the nineteenth century. Scholars worked on languages, classifying them into different families and trying to determine how far back into history they went. They discovered rules to explain changes in language and were able to establish, at least to their own satisfaction, that texts centuries old were written in early forms of, for example, German or French. Ethnographers like the Grimm brothers collected German folk tales as a way of showing that there was something called the German nation in the Middle Ages. Historians worked assiduously to recover old stories and pieced together the history of what they chose to call their nation as though it had an unbroken existence since antiquity. Archaeologists claimed to have found evidence that showed where such nations had once lived, and where they had moved to during the great waves of migrations.

The cumulative result was to create an unreal yet influential version of how nations formed. While it could not be denied that different peoples, from Goths to Slavs, had moved into and across Europe, mingling as they did so with peoples already there, such a view assumed that at some point, generally in the Middle Ages, the music had stopped. The dancing pieces had fallen into their chairs, one for the French, another for the Germans and yet another for the Poles. And there history had fixed them as “nations.” German historians, for example, could depict an ancient German nation whose ancestors had lived happily in their forests from before the time of the Roman Empire and which at some time, probably in the first century A.D., had become recognisably “German.” So — and this was the dangerous question — what was properly the German nation’s land? Or the land of any other “nation”? Was it where the people now lived, where they had lived at the time of their emergence in history, or both?

Would the scholars have gone on with their speculations if they could have seen what they were preparing the way for? The bloody wars that created Italy and Germany? The passions and hatred that tore apart the old multinational Austria-Hungary? The claims, on historical grounds, by new and old nations after World War I for the same pieces of territory? The hideous regimes of Hitler and Mussolini with their elevation of the nation and the race to the supreme good and their breathtaking demands for the lands of others?

When we selectively reach back into the past to justify claims in the present, we reduce the complexity of history and of humanity. This puts us in an awkward position because the situations we are confronted with are inherently complex. If we cut ourselves off from the full scope of history because it makes us uncomfortable, or doesn’t fit with the cultural narrative in which we live, we reduce our ability to learn from the past and apply those lessons to the situations we are facing today.

MacMillan says, “There are also many lessons and much advice offered by history, and it is easy to pick and choose what you want. The past can be used for almost anything you want to do in the present. We abuse it when we create lies about the past or write histories that show only one perspective. We can draw our lessons carefully or badly. That does not mean we should not look to history for understanding, support and help; it does mean that we should do so with care.”

We need to accept that people can do great things while still having flaws. Our heroes don’t have to be perfect, and we can learn just as much from their imperfections as from their achievements.

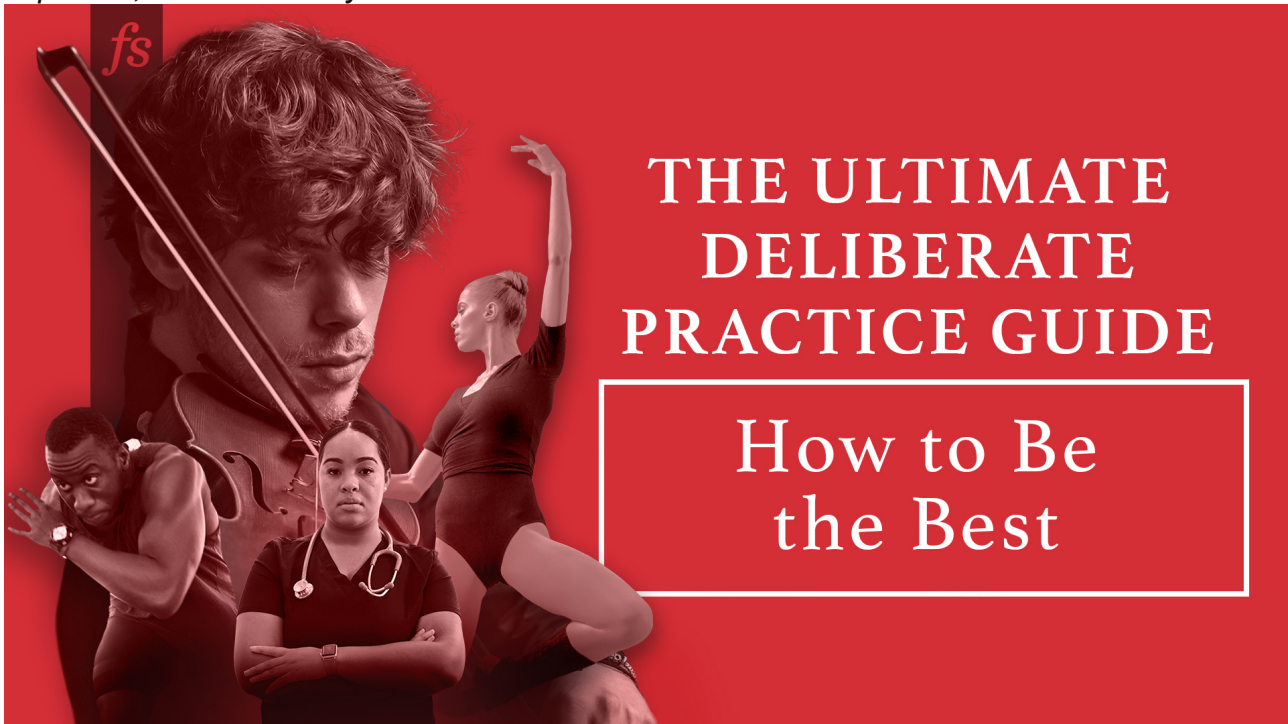
We have to allow that there are at least two sides to every story, and we have to be willing to listen to both. There are no conflicts in which one side doesn’t feel morally justified in their actions; that’s why your terrorist can be my freedom fighter. History can be an

important part of bridging this divide only if we are willing to lift up all the rocks and shine our lights on what is lurking underneath.

43. The Ultimate Deliberate Practice Guide: How to Be the Best

Everything You Need to Know to Improve Your Performance at Anything—For Beginners and Experts

Deliberate practice is the best technique for achieving expert performance in every field—including writing, teaching, sports, programming, music, medicine, therapy, chess, and business. But there's much more to deliberate practice than 10,000 hours. Read this to learn how to accelerate your learning, overcome the "OK" plateau, turn experience into expertise, and enhance your focus.



What is deliberate practice?

*“Engaged in the creative process we feel more alive than ever, because we are making something and not merely consuming, masters of the small reality we create. In doing this work, we are in fact creating ourselves.” —Robert Greene, *Mastery**

Deliberate practice is what turns amateurs into professionals. Across every field, deliberate practice is what creates top performers and what they use to stay at the top of their game. It's absolutely essential for expert performance.

As a general concept, “practice” means preparing. It's the act of repeatedly performing certain activities with the intention of improving a specific associated skill. We rehearse what to do in low-pressure situations so we'll be better when we use a skill in situations where something is actually at stake, such as in a competition or in the workplace.

Although this definition may seem obvious, it's crucial to distinguish between doing something and practicing it, because they're not always synonymous.

The key distinction between doing and practicing is that we're only practicing something when we do it in a way that makes us better at it—or at least with that intention.

Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them. Unlike regular practice, in which we work on a skill by repeating it again and again until it becomes almost mindless, deliberate practice is a laser-focused activity. It requires us to pay unwavering attention to what we're doing at any given moment and whether it's an improvement or not.

Geoff Colvin summarizes deliberate practice as such in *Talent Is Overrated*:

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding

mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

The extraordinary power of deliberate practice is that it aims at constant progress. Practitioners are not content with repeating a skill at the same level. They have metrics for measuring their performance. And they aspire to see those metrics get continuously better. While engaging in deliberate practice, we are always looking for errors or areas of weakness. Once we identify one, we establish a plan for improving it. If one approach doesn't work, we keep trying new ones until something does.

Using deliberate practice, we can overcome many limitations that we might view as fixed. We can go further than we might even think possible when we begin. Deliberate practice creates new physical and mental capabilities—it doesn't just leverage existing ones. The more we engage in deliberate practice, the greater our capabilities become. Our minds and bodies are far more malleable than we usually realize.

Deliberate practice is a universal technique, and you can employ it for whatever you're trying to be the best (or just get a little bit better) at. It's easiest to apply to competitive fields with clear measurements and standards, including music, dance, football/soccer, cricket, hockey, basketball, golf, horse riding, swimming, and chess.

But deliberate practice is also invaluable for improving performance in fields such as teaching, nursing, surgery, therapy, programming, trading, and investing. It can even accelerate your progress in widely applicable skills such as writing, decision-making, leadership, studying, and spoken communication.

The key in any area is to identify objective standards for performance, study top performers, and then design practice activities reflecting what they do. Recent decades have seen dramatic leaps in what people are capable of doing in many fields. The explanation for this is that we're getting better at understanding and applying the principles of deliberate practice. As a field advances, people can learn from the best of what those who came before them figured out. The result is that now average high-schoolers achieve athletic feats and children advance to levels of musical prowess that would have seemed unthinkable a century earlier. And there's little evidence to suggest we've reached the limits of our physical or mental abilities in any area whatsoever.

Many of us spend a lot of time each week practicing different skills in our lives and work. But we don't automatically get better just because we repeat the same actions and behaviors, even if we spend hours per day doing it. Research suggests that in areas such as medicine, people with many years of experience are often no better than novices—and may even be worse.

If we want to improve a skill, we need to know *what* exactly has to change and what might get us there. Otherwise, we plateau.

Some people will tell you it's only possible for anyone to improve at anything through deliberate practice, and any other sort of practice is a waste of time. This is an exaggeration. In reality, regular practice works for reinforcing and maintaining skills. It can also help us improve skills, particularly in the early stages of learning something. However, deliberate practice *is* the only way to:

1. Reach expert-level performance and enjoy competitive success
2. Overcome plateaus in our skill level
3. Improve at a skill much faster than through regular practice

If you're just doing something for fun and don't care about constantly improving at it, you don't need deliberate practice. For example, maybe you like to go for a walk around a local park in the afternoons to clear your head. Although you're practicing that walk each time you go, you probably don't care about increasing your walking speed day by day. It's

enough that the repetitions further ingrain the habit and help maintain a certain level of physical fitness. Not everything in life is a competition! But if you want to keep getting better at something as fast as possible or reach an expert level, deliberate practice is vital. Another important point to note is that deliberate practice isn't just a catchy name we came up with out of thin air. The term is largely attributed to Karl Anders Ericsson, one of the most influential figures of all time in the field of performance psychology. It's something many scientists have studied for decades. Everything we say here is supported by substantial academic research, particularly Ericsson's work. We'll also debunk the numerous myths swirling around deliberate practice as a concept and reveal some of its significant limitations. So if you're looking for quick hacks for overnight success, you might want to look elsewhere. If you want a realistic roadmap for improving your performance, read on.

If we want to improve a skill,
we need to know what exactly
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The elements of deliberate practice

“Life is not always a matter of holding good cards, but sometimes, playing a poor hand well.” —Jack London

In this section, we'll break down the fundamental elements of deliberate practice and exactly how to incorporate them into your practice sessions. As Ericsson wrote in *Peak*, *“No matter what the field, the most effective approach to improving performance is to follow a single set of principles.”* We'll explain why each component is crucial and how they apply to different fields, and we'll cover multiple ways to implement them depending on your goals.

Deliberate practice is structured and methodical

“Everyone has talent. What's rare is the courage to follow it to the dark places where it leads.” —Erica Jong

As humans, we're wired to want to do the easiest thing at all times in order to conserve energy. Put more simply, it's in our nature to be lazy. When we practice something a lot, we develop habits that become almost effortless to enact. While that's beneficial in many areas of our lives (and helps us survive), it's something we have to overcome in order to engage in deliberate practice. We can't expect constant improvement if we keep repeating the elements of a skill we already know how to do with ease. That's only enough if we're just having fun or want to reinforce our habits.

Deliberate practice is structured to improve specific elements of a skill through defined techniques. Practitioners focus above all on what they *can't* do. They seek out areas of weaknesses impacting their overall performance, then target those. At every stage, they set tailored, measurable goals in order to gauge whether their practice is effective at moving them forwards. Numbers are a deliberate practitioner's best friend.

If you want to reach an expert level of performance, you need to begin practice sessions with a plan in mind. You need to know what you're working on, why, and how you intend to improve it. You also need a way to tell if your improvement efforts aren't working and if you need to try a new tactic. Once you reach your goal for that particular component of the skill, it's time to identify a new area of weakness to work on next.

Having lots of little, realistic goals with a game plan for achieving them makes deliberate practice motivating. There's a sense of ongoing movement, yet the next step is always a realistic stretch. Day by day, the gains from deliberate practice may feel modest. But when we look back over a longer period of time, small bits of progress compound into gigantic leaps.

How to implement this: Take the skill you're aiming to improve and break it down into the smallest possible component parts. Make a plan for working through them in a logical order, beginning with the fundamentals, then building upon them. Decide which parts you'd like to master over the next month. Put your practice sessions in your calendar, then plan precisely which parts of the skill you're going to work on during each session.

Don't expect your plan to be perfect. You'll likely need to keep modifying it as you discover new elements or unexpected weaknesses. The most important thing is to always go into practice with a plan for what you're working on and how. Knowing what you're doing next is the best way to stay on track and avoid aimless time-wasting. That means seeking to keep figuring out what separates you from the next level of performance so you can concentrate on that.

Deliberate practice is challenging and uncomfortable

"One must develop an instinct for what one can just barely achieve through one's greatest efforts." —Albert Einstein (attributed)

Imagine the world from the perspective of a baby learning to walk for the first time. It's not usually an easy process. They need to develop a lot of new skills and capabilities. They need to build enough muscular strength to stand upright without support. And they need to learn how to coordinate their limbs well enough to move around. Along the way, a baby needs to develop numerous sub-skills, such as how to grip supports to pull themselves up. It likely takes thousands of attempts to master walking—as well as numerous, falls, collisions, and other mishaps. We might not remember the process as adults, but a baby learning to walk needs to spend many hours challenging themselves and moving incrementally out of their comfort zone.

If we want to use deliberate practice, we could do with learning a thing or two from babies. Deliberate practice isn't necessarily fun while we're doing it. In fact, most of the time it's a process of repeated frustration and failure. We have to fall down a dozen times for every step we take. That's the whole point.

Seeing as deliberate practice requires us to keep targeting our weakest areas, it means spending time doing stuff we're not good at. In the moment, that can feel pretty miserable. But the quickest route to improvement involves stepping outside of our comfort zones.

The reason why people who have spent decades doing something are not necessarily better than newbies is that they're liable to get complacent and stop pushing themselves. We need to keep attempting to do things that feel out of reach at the moment.

In his studies of elite violinists, Ericsson asked them to rate different practice activities by how enjoyable they were and how much they contributed to improving performance.

Invariably, there was an inverse correlation between the usefulness of an activity and its enjoyability. As Ericsson puts it in *Peak*:

The reason that most people don't possess these extraordinary physical capabilities isn't because they don't have the capacity for them, but rather because they're satisfied to live in the comfortable rut of homeostasis and never do the work that is required to get out of it. They live in the world of "good enough." The same thing is true for all the mental activities we engage in.

Elsewhere in the book, he writes *"This is a fundamental truth about any sort of practice: If you never push yourself beyond your comfort zone, you will never improve."* The interesting part is the more time you spend deliberately practicing, the more comfortable you'll become with being uncomfortable.

Daniel Coyle writes in *The Little Book of Talent*:

There is a place, right on the edge of your ability, where you learn best and fastest. It's called the sweet spot.... The underlying pattern is the same: Seek out ways to stretch yourself. Play on the edges of your competence. As Albert Einstein said, "One must develop an instinct for what one can just barely achieve through one's greatest efforts." The key word is 'barely.'

A quick way to assess if you're doing deliberate practice or just regular rote practice is to ask yourself if you ever feel bored or zone out during practice sessions. If the answer is yes, you're probably not practicing deliberately.

Deliberate practice isn't boring. Frustrating, yes. Maddening, yes. Annoying, even. But never boring. As soon as practicing a skill gets comfortable, it's time to up the stakes. Challenging yourself is about more than trying to work harder—it means doing new things. Pushing ourselves just beyond the limits of our abilities is uncomfortable, yet it's how we do our best—and indeed, it can be the source of some of our greatest moments of satisfaction. According to psychologist Mihaly Csikszentmihalyi, we often experience happiness as a result of entering a "flow" state, which occurs when we intensely focus on an activity that is challenging yet achievable. During moments of flow, we become so immersed in the activity that we lose any sense of time or of ourselves.

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time when we're practicing, we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed, as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of our reach.

Repetition inside the comfort zone does not equal deliberate practice. Deliberate practice requires that you operate in the learning zone and you repeat the activity a lot with feedback.

How to implement this: Each time you practice a component of a skill, aim to make it 10% harder than the level you find comfortable.

Once per month, have a practice session where you set yourself an incredibly ambitious stretch goal—not impossible, just well above your current level. Challenge yourself to see how close you can get to it. You might surprise yourself and find you perform far better than expected.

A common deliberate practice mistake is to plan a long practice session, then adjust the intensity of your practice to allow you to engage in a skill for the whole time. It's far more effective to engage in "sprints." Practice with the most intense focus you can manage for short periods of time, then take breaks. Seeing as you learn most when you stretch yourself beyond your current capabilities, shorter, more challenging practice periods are the way to go.

Deliberate practice requires rest and recovery time

“There is a time for many words, and there is also a time for sleep.” —Homer, The Odyssey

Seeing as deliberate practice is so challenging, it’s impossible to do it all day long. Across fields, top practitioners rarely spend more than around three to five hours per day on deliberate practice, at the high end. They may work for more hours than that per day, but few can sustain the mental energy to engage in deliberate practice for eight hours a day. Additional hours often result in diminishing negative returns, meaning more practice makes performance worse because it results in burnout. Geoff Colvin writes:

The work is so great that it seems no one can sustain it for very long. A finding that is remarkably consistent across disciplines is that four or five hours a day seems to be the upper limit of deliberate practice, and this is frequently accomplished in sessions lasting no more than an hour to ninety minutes.

Ericsson’s studies of elite violinists found they often took afternoon naps and slept an average of eight hours per night, considerably more than the average person. They were highly aware of the importance of sleep.

Even fitting in a single hour per day of deliberate practice is ample time to make substantial improvements, especially when we’re consistent with committing to it over the long haul. Continuous investments in success compound. In the long run, commitment pays off.

Not only do most deliberate practitioners not spend all day at it, they also devote a lot of time to recuperation and recovery. They sleep as much as their bodies need. They nap if necessary. They take frequent, refreshing breaks. Most of us understand that rest is necessary after physical activity. But we can underestimate its importance after mental activity, too. Deliberate practice needs to be sustainable for the long term. How long a person keeps at a skill is often far more important than how many hours a day they spend on it.

When you’re practicing deliberately, truly practice. When you’re recuperating, truly relax. No one can spend every waking hour on deliberate practice.

Sleep is a vital part of deliberate practice. Being asleep doesn’t mean you’re not still improving your skill. We consolidate memories at night, moving them from short-term to long-term memory. And we can’t exactly benefit from deliberate practice sessions if we don’t remember what we learn each time. Not only that, but sleep deprivation also results in a plethora of negative cognitive effects that impact performance. If we skimp on sleep, we’re likely to forget far more of what we learn during deliberate practice sessions, rendering them less useful.

When you’re not engaging in deliberate practice, your brain is still at work. During deliberate practice, we’re in focused mode. When we let our minds wander freely while at rest, we’re in diffuse mode. Although that time feels less productive, it’s when we form connections and mull over problems. Both modes of thinking are equally valuable, but it’s the harmony between them that matters. We can’t maintain the effort of the focused mode for long. At some point, we need to relax and slip into the diffuse mode. Learning a complex skill—a language, a musical instrument, chess, a mental model—requires both modes to work together. We master the details in focused mode, then comprehend how everything fits together in diffuse mode. It’s about combining creativity with execution. How to implement this: Make a list of activities you can engage in without too much conscious thought, letting yourself daydream while you do them. Common examples include going for a walk, washing the dishes, taking a shower, free-writing in a journal, playing with a toy like Lego, driving a familiar route, gardening, cooking, listening to music, or just gazing out the window. When you feel yourself getting tired or hitting a roadblock during deliberate practice, don’t keep pushing for too long. You want to be stretching yourself, not exhausting yourself. Instead, switch to one of those more relaxing activities

for at least five minutes. You'll likely come back to practice with new connections or at last feeling refreshed.

When you're practicing deliberately, truly practice. When you're recuperating, truly relax. No one can spend every waking hour on deliberate practice.



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Deliberate practice involves constant feedback and measurement

"Deliberate practice is hard. It hurts. But it works. More of it equals better performance and tons of it equals great performance." —Geoff Colvin, *Talent Is Overrated*

Practicing something without knowing whether you are getting better is pointless. Yet that is what most of us do every day without thinking.

As we saw before, deliberate practice involves continuously stretching yourself to improve on weak areas of a skill. For that to work, practitioners require constant feedback about their current level of performance so they can identify what works for making it better. What gets measured gets managed. To engage in deliberate practice, you need a way of measuring the most instructive metrics related to your performance. Seeing how those metrics change is the sole way to know if practice is working or not. Top performers across fields tend to spend time examining their past performance with care to identify areas for improvement. For example, a tennis player might film themselves playing a match so they can go through the footage frame by frame afterward. This provides valuable feedback, because they can figure out what might have held them back during weaker moments. In fields such as sports and chess, measuring performance tends to be straightforward. In other areas such as business, measurements are harder to take, and there may be no established markers of success. The influence of random factors may also be stronger, making it less clear whether technique changes are actually having an influence or not. When you engage in deliberate practice, it's always important to be aware of how strongly correlated your practice and your performance are likely to be.

When measuring your performance, beware of vanity metrics. These are numbers that are easy to calculate and feel good to boost. But they don't actually move the needle towards the real improvements in performance that help you reach your goals. For example, let's say you're using deliberate practice to improve the skill of email marketing, as part of the wider goal of getting more customers for your business. The number of email subscribers is a vanity metric; the number of paying customers is a useful metric. It's completely possible to increase the former without a corresponding increase in the latter.

How to implement this: Identify the most significant metrics related to performance in your chosen skill and keep a record of them each time you practice. It's easy to fool yourself

without a clear record of how you're doing. You might want to break the skill down into a few different parts to measure it, but make sure you're not fixating on vanity metrics. Deliberate practice is most effective with the help of a coach or some kind of teacher *"The best teacher is not the one who knows most but the one who is most capable of reducing knowledge to that simple compound of the obvious and wonderful."* —H.L. Mencken (attributed)

Deliberate practice is most effective when conducted with some kind of coach who can give feedback, point out errors, suggest techniques for improvement, and provide vital motivation. Although mastering any skill requires a lot of time engaging in solitary practice, working with a coach at least some of the time is incredibly valuable. In some fields such as sports and music, it's common for a coach to be present all of the time. But most top performers benefit from a combination of coaching and solitary practice.

When we look at the lives of people who achieved great things, we often find that those who did so at a young age or in a shorter time than expected benefited from having fantastic teachers. For example, physicist Werner Heisenberg had the epiphany that led to the formulation of matrix mechanics a mere five years after commencing serious study of physics. But he no doubt benefited from the mentorship of Niels Bohr and Max Born, two of the foremost physicists at the time.

Even people at the most elite levels of performance across fields can benefit from specialist coaching. Engaging in something and teaching that thing are separate skills in themselves. The best practitioners are not always the best teachers because teaching is a skill in itself.

Ericsson explained that *"the best way to get past any barrier is to come at it from a different direction, which is one reason it is useful to work with a teacher or coach."* We often make the same mistakes again and again because we simply don't realize what we're doing. Our performance falls into ruts and we can't figure out why we're running into the same problem yet again.

A coach can see your performance from the outside, without the influence of overconfidence and other biases. They can identify your blind spots. They can help you interpret key metrics and feedback.

Ericsson went on to say that *"even the most motivated and intelligent student will advance more quickly under the tutelage of someone who knows the best order in which to learn things, who understands and can demonstrate the proper way to perform various skills, who can provide useful feedback, and who can devise practice activities designed to overcome particular weaknesses."* An experienced coach will have worked with many people on the same skill so they'll be able to advise on the best ways to structure practice. They'll know when you're just repeating what you find easy, and they'll be able to push you to the next level.

Teachers or coaches see what you miss and make you aware of where you're falling short. Geoff Colvin writes:

In some fields, especially intellectual ones such as the arts, sciences, and business, people may eventually become skilled enough to design their own practice. But anyone who thinks they've outgrown the benefits of a teacher's help should at least question that view. There's a reason why the world's best golfers still go to teachers.

But what if you don't have access to a coach? What if you don't have the means to hire one or one isn't available for your particular skill? In that case, it's still possible to apply the same principles that make a coach useful by yourself. Top performers across fields build the skill of metacognition, essentially making it possible for them to coach themselves.

Colvin explains:

The best performers observe themselves closely. They are in effect able to step outside themselves, monitor what is happening in their own minds, and ask how it's going.

Researchers call this metacognition—knowledge about your own knowledge, thinking

about your own thinking. Top performers do this much more systematically than others do; it's an established part of their routine.

...A critical part of self-evaluation is deciding what caused those errors. Average performers believe their errors were caused by factors outside their control: my opponent got lucky; the task was too hard; I just don't have the natural ability for this. Top performers, by contrast, believe they are responsible for their errors. Note that this is not just a difference of personality or attitude. Recall that the best performers have set highly specific, technique-based goals and strategies for themselves; they have thought through exactly how they intend to achieve what they want. So when something doesn't work, they can relate the failure to specific elements of their performance that may have misfired.

How to implement this: Don't expect the same teacher to suit you forever. We usually need different teachers as our skill level progresses because we outgrow them. One attribute of a good teacher is that they know when to tell a student to move on. As we reach expert levels of performance, we need teachers who are themselves experts. If they're always a step ahead, we can learn from their mistakes instead of making our own.

You get the best results from working with a coach if you show yourself to be receptive to constructive criticism, even if it's uncomfortable to hear. If you respond badly, you disincentivize them from telling you what's most useful to know. Top performers know the goal is to get better, not just to hear you're already great.



Deliberate practice requires intrinsic motivation

Persisting with deliberate practice despite its innate difficulty and discomfort requires a lot of motivation. But that motivation needs to be intrinsic, meaning that it comes from inside us because we find an activity enjoyable for its own sake. This is in contrast to extrinsic motivation, where we participate in an activity to gain an external reward or avoid a negative consequence. Yet another reason why rest is important for deliberate practice is because it helps sustain motivation.

Although deliberate practice can lead to external rewards for using a skill (such as winning a competition or getting a promotion), this should not be the sole reason for practicing it. Extrinsic motivation is unlikely to be enough to get us through the long period of struggle necessary to master a skill. Becoming proficient at anything means spending time failing repeatedly at it, during which there are few external rewards. But if we enjoy getting better for its own sake, we have more of a chance of persevering until our practice starts paying off. We can navigate obstacles because we want to see where the road might take us—the obstacles aren't roadblocks.

If you want to use deliberate practice to master a skill, you need to be willing to keep practicing it no matter what. Although brute force and rewarding yourself can be effective in the short run, it won't work forever. If you're planning to engage in deliberate practice to reach expert-level performance, make sure it's a prospect you feel excited about even if it won't always be fun.

Extrinsic motivation isn't always ineffective, however. People who engage in consistent, sustainable deliberate practice tend to be adept at knowing when and how they need to employ external incentives. It's important to reward yourself when you make progress in your practice and reflect on how far you've come, not just how far is left to go.

The need for intrinsic motivation is one reason why children who are pushed to develop a skill from a young age by their parents don't always end up reaching a high level of performance and often quit as soon as they can.

How to implement this: Make a list of the reasons you want to work on a skill and the benefits getting better at it might bring. Before you begin a deep practice session, reread the list to remind you of why you're bringing your full focus to something difficult. You could also list some of the benefits you've experienced from it in the past or include quotes from

top performers in your field you find inspiring. It might feel cheesy, but it can provide a powerful boost during particularly difficult practice moments. Try to focus on intrinsic reasons and benefits, such as feeling fulfilled.

Keep a “motivation diary” for one week (or longer if possible.) Try setting an alarm to go off every fifteen minutes during each practice session. When the alarm sounds, score your motivation level out of ten (or whichever scale you prefer.) At the end of the week, review your notes to look for any patterns. For example, you might find that you begin to feel demotivated once you’ve been practicing for more than an hour, or that you feel more motivated in the morning, or some other pattern. This information could be enlightening for planning future deliberate practice sessions, even if it may disrupt your focus at the time. Another method is to simply take notes each day, documenting your current level of motivation to work on your chosen skill. Pay attention to any recurring influences. For example, you might feel more motivated to improve your skill after speaking with a more proficient friend, but less motivated after a bad night’s sleep.

One potent option for sustaining motivation is to find someone who can be a reliable cheerleader for you. In an Ask Me Anything session for Farnam Street members, Tesla co-founder Marc Tarpenning explained that having a cofounder is vital for entrepreneurs because partnering with someone else helps sustain motivation. It’s rare that both founders feel demotivated on the same day. So if one is struggling, the other can provide the encouragement needed to stay resilient. Having someone to provide extrinsic motivation when you need it can help you persevere at deliberate practice. Your cheerleader doesn’t necessarily need to be working on the same skill themselves. They just need to understand your reasons and be willing to remind you of them when you start to doubt whether the hard work is worthwhile.

Deliberate practice takes time and can be a lifelong process

Although deliberate practice tends to result in much faster progress than normal practice, truly mastering a skill is a lifelong process. Reaching the top of a field can take years or even decades, depending on its competitiveness. As the bar for success in many areas keeps rising, more deliberate practice is required to stand out.

When we applaud the top people in any field, we often fail to appreciate that their success almost always came after many years of deliberate practice, which Robert Greene refers to in *Mastery* as “a largely self-directed apprenticeship that lasts some five to ten years [and] receives little attention because it does not contain stories of great achievement or discovery.” They may have ultimately benefited from a lucky break, but their extensive preparation meant they were ready for it. Great achievements tend to come later in life or even near the ends of careers. Those who succeeded young started very young.

Throughout Ericsson’s decades of research, he searched high and low for an example of a true prodigy: someone born with an innate, remarkable talent. He never found a single proven example. Instead, he discovered that people labeled as prodigies invariably put in enormous amounts of deliberate practice—they just often obscured it on purpose or started at a young age.

Although innate differences count when beginning to learn something (and people who begin with advantages may be more likely to persist), in the long run, deliberate practice always wins out.

David Shenk writes in *The Genius in All of Us*: “Short-term intensity cannot replace long-term commitment. Many crucial changes take place over long periods of time.

Physiologically, it’s impossible to become great overnight.”

According to psychologist John Hayes, creative genius tends to come after ten years of studying relevant knowledge and developing skills. Hayes referred to this as the “ten years of silence.” In a study of seventy-six composers with sufficient biographical data available listed in *The Lives of the Great Composers*, Hayes found they almost always created their first notable works (defined as being those for which at least five different recordings were

available at the time) at least ten years after commencing a serious study of music. Just three of the five hundred works Hayes included in his sample were composed after less than a decade of preparation—and those were produced in years eight or nine. In additional studies, Hayes found similar patterns for painters and poets.

Later research reinforces Hayes' findings, and any casual survey of the lives of people widely considered to be geniuses tends to show a similar pattern. Making a breakthrough takes time. When it seems like someone was an overnight success, there's almost always a long period of silent deliberate practice preceding it. Innate talents are just a starting point. If we want to master a skill, we need to commit to working on it for a lengthy period of time, likely with few rewards. While there are no assurances that with struggle comes reward, without it the odds are lower.

Not only do world-class performers spend a long time getting good at their core skill, those in creative fields tend to produce an enormous quantity of work before gaining recognition. For every piece of work we're familiar with, there are likely dozens or even hundreds of others few people remember or ever saw.

For example, British prime minister Winston Churchill was known for his masterful public speaking. One of his best-known speeches "We Shall Fight on the Beaches," given in June 1940, displayed the extent of his command of oration and helped build morale at the time. But it's hard to overstate how prolific Churchill was as a speaker, giving an estimated 3,000 speeches during his political career. For every speech—an average of one per week between 1900 and 1955—he used deliberate practice to prepare. He engaged in focused rehearsals in front of a mirror, taking notes as he went to inform modifications. Churchill also left nothing to chance, planning his pauses and movements in advance. As well as devising his own techniques for added impact, he memorized the works of some of history's most inspiring orators.

Although he doubtless began with a degree of innate talent (his father, Randolph Churchill, was also an admired orator), Churchill clearly used extensive deliberate practice to build upon it. While this impressive resume and history solidified his place on the throne of oratorical excellence, it's important to note that he wasn't a "born speaker"—in fact, he made many mistakes. And he learned from them. If you want to produce a masterpiece, you need to accept that you'll make a lot of less remarkable work first.

Deliberate practice requires intense focus

"You seldom improve much without giving the task your full attention." —Karl Anders Ericsson

The deeper we focus during deliberate practice sessions, the more we get out of them. Intense focus allows us to increase skills and break through plateaus. Developing your attention span can have a huge impact on your life. When asked about his success, Charlie Munger once said, *"I succeeded because I have a long attention span."*

The authors of *The Game Before the Game* write, *"If you can pay attention for only five minutes in practice, then take a break every five minutes. If you can pay attention for only twenty balls, don't hit fifty. To be able to practice longer and maintain the quality of the practice, train yourself to pay attention for longer periods of time....Productive practice is about how present you can stay with your intention and is measured in the quality of the experience as opposed to the quantity of time used."*

A benefit of getting constant feedback is that it shows you what moves the needle towards improved performance and what is just running in place. Certain practice activities can feel good without having any impact. Top performers prioritize knowing what to prioritize. They always start with the most important thing because anything else is a distraction.

Intense focus is a multiplier of everything else. Keeping an eye on key metrics enables top performers to identify and systematically remove distractions from their lives. To be the best, you need to focus on both the micro and macro level. You need to pay full attention to what you're doing in the current practice sessions, and you need to know how it fits into

the bigger picture of your desired trajectory. Deliberate practice is part of the exploit phase of selecting opportunities.

As the authors of the *International Handbook of Research in Professional and Practice-Based Learning* write, “*Practicing the right things is at the core of the theory of deliberate practice.*”

How to implement this: Put the big rocks in first. You can do anything, but you can’t do everything. Figure out which practice activities have the biggest influence on your performance and plan to engage in those first before you even consider activities that offer marginal gains.

Deliberate practice leverages the spacing effect

One reason why consistent deliberate practice sessions over the course of years are more effective than longer sessions for a shorter period of time relates to the spacing effect. We can’t approach learning a skill through deliberate practice in the same way we quite likely approached studying for tests in school. If we better understand how our minds work, we can use them in the optimal way for learning. By leveraging the spacing effect, we can encode valuable knowledge related to our particular skill for life during practice sessions. Memory mastery comes from repeated exposure to the same material. The spacing effect refers to how we are better able to recall information and concepts if we learn them in multiple sessions with increasingly large intervals between them. The most effective way to learn new information is through spaced repetition. It works for learning almost anything, and research has provided robust evidence of its efficacy for people of all ages—and even for animals.

Spaced repetition is also satisfying because it keeps us on the edge of our abilities (which, as we saw earlier, is a core element of deliberate practice.) Spaced sessions allow us to invest less total time to memorize than one single session, whereas we might get bored while going over the same material again and again in a single session. Of course, when we’re bored we pay less and less attention. The authors of *Focused Determination* put it this way:

There is also minimal variation in the way the material is presented to the brain when it is repeatedly visited over a short time. This tends to decrease our learning. In contrast, when repetition learning takes place over a longer period, it is more likely that the materials are presented differently. We have to retrieve the previously learned information from memory and hence reinforce it. All of this leads us to become more interested in the content and therefore more receptive to learning it.

We simply cannot practice something once and expect it to stick.

By engaging in deliberate practice on a regular basis, even if each practice session is short, we leverage the power of the spacing effect. Once we learn something through spaced repetition, it actually sticks with us. After a certain point, we may only need to revisit it every few years to keep our knowledge fresh. Even if we seem to forget something between repetitions, it later proves easier to relearn.

How to implement this: Forget about cramming. Each time you’re learning a new component of a skill, make a schedule for when you’ll review it. Typical systems involve going over information after an hour, then a day, then every other day, then weekly, then fortnightly, then monthly, then every six months, then yearly. Guess correctly and the information moves to the next level and is reviewed less often. Guess incorrectly and it moves down a level and is reviewed more often.



The history of deliberate practice

Karl Anders Ericsson: The expert on expertise

“*Learning isn’t a way of reaching one’s potential but rather a way of developing it.*” —Karl Anders Ericsson, *Peak*

The concept of deliberate practice is attributed to Florida State University psychologist Karl Anders Ericsson, who along with his collaborators performed pioneering research in the field of expert performance. Ericsson spent decades seeking to answer the question of what it takes to become really good at something difficult. His research often focused on medicine, music, and sports.

Ericsson's interest in expert performance kicked off in the late 1970s, when he began working with psychologist Bill Chase at Carnegie Mellon University to study short-term memory. Together, they began a series of experiments to see how many random digits it's possible to memorize after hearing them once. Ericsson and Chase used an undergrad named Steve Faloan as their guinea pig. For a few hours each week, they read out numbers and Faloan repeated as many as he could recall.

Although the experiment might sound dull, they uncovered something intriguing. In a 1982 paper entitled "Exceptional Memory," Ericsson and Chase summarized their findings. Previously, researchers believed the average person could hold just seven random digits in their short-term memory. Yet with careful practice, Faloan began to remember more and more numbers. At his peak and after 200 hours of practice, he could recall 82 digits. To assess if this was a fluke, Ericsson tried the same with a friend, Dario Donatelli. Five years later, Donatelli could recall 113 digits. Both he and Faloan went far beyond what seemed to be an immovable ceiling on human performance and blew past existing world records. The experience of seeing two people who started off with ordinary memories enhance their capabilities in such a drastic way inspired Ericsson to further study the effects of practice on skills. Could it be that extraordinary abilities came from extraordinary practice, not just innate ability?

Through his studies of expert performers in a range of fields, Ericsson concluded they practiced their skills in a fundamentally different way than amateur practitioners. Ericsson described this kind of practice as "deliberate" due to its methodical, hyper-conscious nature. He argued that experts become experts largely as a result of the way they practice. They may benefit from innate advantages, but their talents themselves are not innate. Ericsson also believed that the standards in many additional fields could be improved far beyond their current level if practitioners employed the principles of deliberate practice. Indeed, many fields have seen remarkable increases in their standards for high performance over time. Today, high-schoolers manage athletic feats that were once Olympic level and children play music once considered world-class. This is possible because of better training and knowledge of what it takes to be the best. The more we improve how we train, the more we expand our range of possible performance.

In 2016, Ericsson published *Peak: Secrets from the New Science of Expertise*, a popular science book condensing his learnings from thirty years of research. He also co-edited the 2006 *Cambridge Handbook of Expertise and Expert Performance*.

Malcolm Gladwell: The 10,000 hour rule

The widespread awareness of Ericsson's work outside the scientific community is in part a result of Malcolm Gladwell's 2008 book, *Outliers: The Story of Success*. In the book, Gladwell attributed unusual success in different fields to a mixture of lucky factors (such as when or where a person was born) and around 10,000 hours of practice. He based this figure on research, including Ericsson's, that suggested top performers tended to have put in about that amount of time before reaching peak performance.

Gladwell showed how the success of Bill Gates, the Beatles, and other outstanding performers is not so much to do with what they are like but rather where they come from. "The people who stand before kings may look like they did it all by themselves," Gladwell writes. "But in fact they are invariably the beneficiaries of hidden advantages and extraordinary opportunities and cultural legacies that allow them to learn and work hard and make sense of the world in ways others cannot."

The so-called “10,000 hours rule” caught on. It’s a catchy idea, and many people took it to mean that anyone can master anything if they just put the time in. Ericsson himself disputed Gladwell’s representations of his research, which led to the widespread belief that the time someone spends practicing predicts their success, without emphasizing the quality of their practice.

Although the backlash against Gladwell’s calculation has arguably been exaggerated, it’s important to stress that research into deliberate practice emphasizes quality of practice, not quantity. It’s all too possible to spend 10,000 hours engaging in a skill without serious improvements. For example, most of us spend hours per day typing, yet we don’t see continuous improvements in speed and quality because we’re not using deliberate practice.

The useful takeaway from the “10,000 hours rule” is simply that it takes a lot of work to become the best. There’s no magic number of practice sessions, and everyone’s path will look different. Just because successful people in a given field have spent around 10,000 hours practicing their key skill, that doesn’t mean every person who practices that skill for 10,000 hours will become successful.

The limitations and downsides of deliberate practice

Part of us wants to believe expert performance is something innate and magical so we can recuse ourselves from hard work. The other part of us wants to believe that it’s something earned through blood, sweat, and tears—that we too could achieve amazing performance, if only we could devote ourselves to something.

Deliberate practice, in reality, is far more complex and nuanced than many people would have you believe. It’s not a panacea, and it won’t solve all of your work- and art-related problems. Let’s take a look at some of the limitations of deliberate practice.

First of all, deliberate practice is a necessary but insufficient part of becoming a world-class performer. You can’t rise to the top without it. But it’s not enough on its own to be the absolute best in any field. Once you reach higher echelons for any skill, everyone is engaging in a lot of deliberate practice.

If you’re aiming at expertise or just really good performance, deliberate practice will most likely get you there. But the higher you rise, the more luck and randomness end up mattering. However much you engage in deliberate practice, you can’t control the chance events (good or bad) that dictate a great deal of life.

When we look at the lives of top performers, they often benefited from specific backgrounds or opportunities, in addition to engaging in deliberate practice. For example, if you’re trying to become a champion chess player, it’s a big boost if your mother was a champion chess player. Not only will you have potential genetic advantages, you’ll have also likely grown up hearing about chess, been encouraged to practice it from a young age, and have someone to turn to for advice.

Seeing as it takes years of consistent deliberate practice to master a skill, people who begin early in life have an advantage over those who start later on. That doesn’t mean you can’t become exceptional at something you discover well into adulthood (just look at [Julia Child](#) or check out the book [Guitar Zero](#)). But it does mean that people who begin deliberate practice as kids are more likely to enjoy the success that makes it possible to keep committing to it. If you’re trying to master a skill while also having to work an unrelated job, care for your family, and deal with the other myriad responsibilities of adult life, you likely will have less room for it than a ten-year-old.

People who discover they want to master a skill or are encouraged to do so by others early in life have an advantage. Once the opportunity for practice is in place, the prospects of high achievement take off. And if practice is denied or diminished, no amount of talent is going to get you there.

In addition to lucky circumstances, high performers benefit from a combination of deliberate practice and innate talents or physical advantages. However much you practice, certain physical limitations are insurmountable. For example, if you're 165 centimeters tall, you're unlikely to become a professional basketball player. There are some physical abilities, such as particular kinds of flexibility, that can only be developed at a young age when a person's skeletal structure is still forming. It's important to be realistic about your starting point and be aware of any limitations. But that doesn't mean you can't develop workarounds or even use them to your advantage.

Another downside of deliberate practice is that the level of focus it requires can mean practitioners miss out on other parts of life. Top performers often devote almost every waking hour to practice, recuperation from practice, and support activities. For example, a professional dancer might spend several hours a day on deliberate practice with all of the remaining hours going toward sleep, low-impact exercise, stretching, preparing nutritious food, icing his feet, and so on. There is enormous satisfaction in the flow states produced by deliberate practice, but practitioners can absolutely miss out on other sources of happiness, such as spending time with friends.

Deliberate practice is part of the exploit phase of new opportunities. Yet sometimes we can end up having too much grit. We can keep persevering with the skill we're practicing right now, remaining overly passionate, past the point where it serves us. We can wear ourselves out or get hurt or fail to realize when it's no longer worth practicing a skill. For example, a new technology might mean our skill is no longer valuable. If we keep on deliberately practicing due to sunk costs, we'll be unlikely to see many long-term benefits from it. A crucial skill in life is knowing when to pivot. Focusing too much on our goals can blind us to risks.

In some fields, expertise is hard to quantify or measure, which makes it less clear how to structure practice. There may be no single target to hit or universal rule for what improves performance.

A final limitation to keep in mind is that, as Ericsson explained, "*the cognitive and physical changes caused by training require upkeep. Stop training and they go away.*" If someone can't practice for a period of time, such as due to an injury or having a child, they're likely to see the skills they developed through deliberate practice deteriorate.



Summary

Deliberate practice isn't everything, but if you want to keep improving at a skill or overcome a plateau, you'll benefit from incorporating the principles mentioned in this article. To recap:

- Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them.
- The more we engage in deliberate practice, the greater our capabilities become.
- Our minds and bodies are far more malleable than we usually realize.
- Deliberate practice is structured and methodical.
- Deliberate practice is challenging because it involves constantly pushing yourself out of your comfort zone.
- Deliberate practice requires constant feedback and measurement of informative metrics—not vanity metrics.
- Deliberate practice works best with the help of a teacher or coach.

- Continuing deliberate practice requires a great deal of intrinsic motivation.
- Deliberate practice requires constant, intense focus.
- Deliberate practice leverages the spacing effect—meaning a consistent commitment over time is crucial.
- If you're content with your current level of skill or just doing something for fun, you don't necessarily need to engage in deliberate practice
- Deliberate practice is best suited to pursuits where you're actively aiming for a high level of performance or to break beyond some kind of supposed limit.

44. The Terror of Totalitarianism Explained

We all hope totalitarianism — a form of government in which the state has no limits in authority and does whatever it wants — is a thing of the past.

Nazi Germany and Stalinist Russia showed what the end of humanity would look like, and it terrified us. But it's important to understand that totalitarianism didn't just spring up out of a mystical vacuum. As Hannah Arendt explains in *The Origins of Totalitarianism*, it is, rather, just one possibility along a path that most countries are on at one time or another. And that is why it is so important to understand what it is.

The People

One of the most disturbing things about Nazism in Germany is how quickly the country changed. They went from democracy to concentration camps in fewer than ten years. Most of us assume that the Germans of the time were different from us — *we'd* never fall for the kind of propaganda that Hitler spewed. And our democracy is too strong to be so easily dismantled. Right?

Wrong.

Arendt writes that “the success of totalitarian movements ... meant the end of two illusions of democratically ruled countries....” One illusion was that most citizens were politically active and were part of a political party. However,

... the [totalitarian] movements showed that the politically neutral and indifferent masses could easily be the majority in a democratically ruled country, [and] that therefore a democracy could function according to rules which are actively recognized by only a minority. The second democratic illusion exploded by the totalitarian movements was that these politically indifferent masses did not matter, that they were truly neutral and constituted no more than the inarticulate backward setting for the political life of the nation. In many modern democracies, we can see evidence of indifference and pervasive feelings of helplessness. There is low voter turnout and an assumption that things will be the way they are no matter what an individual does.

There is pent-up energy in apathy. Arendt suggests that the desire to be more than indifferent is what totalitarian movements initially manipulate until the individual is totally subsumed.

The disturbing factor in the success of totalitarianism is ... the true selflessness of its adherents: it may be understandable that a Nazi or Bolshevik will not be shaken in his conviction by crimes against people who do not belong to the movement...; but the amazing fact is that neither is he likely to waver when the monster begins to devour its own children and not even if he becomes a victim of persecution himself....

How does totalitarianism incite this kind of fanaticism? How does a political organization “succeed in extinguishing individual identity permanently and not just for the moment of collective heroic action”?

As Arendt demonstrates, both Nazi Germany and Stalinist Russia capitalized on tensions already present in society. There was essentially a massive rejection of the existing political system as ineffectual and self-serving.

The fall of protecting class walls transformed the slumbering majorities behind all parties into one great unorganized, structureless mass of furious individuals who had nothing in common except their vague apprehension that the hopes of party members were doomed, that, consequently, the most respected, articulate and representative members of the community were fools and that all the powers that be were not so much evil as they were equally stupid and fraudulent.

How does a totalitarian government harness this attitude of the masses? By completely isolating individuals through random “liquidating” (mass murder) so that “the most elementary caution demands that one avoid all intimate contacts, if possible – not in order to prevent discovery of one’s secret thoughts, but rather to eliminate, in the almost certain

case of future trouble, all persons who might have not only an ordinary cheap interest in your denunciation but an irresistible need to bring about your ruin simply because they are in danger [in] their own lives.”

It's important to understand that it is simple to isolate people who already feel isolated. When you feel disconnected from the system around you and the leaders it has, when you believe that neither your vote nor your opinion matters, it's not a huge leap to feel that your very self has no importance. This feeling is what totalitarianism figured out how to manipulate by random terror that severed any form of connection with other human beings.

Totalitarianism “demand[s] total, unrestricted, unconditional, and unalterable loyalty of the individual member. ... Such loyalty can be expected only from the completely isolated human being who, without any other social ties to family, friends, comrades, or even mere acquaintances, derives his sense of having a place in the world only from his belonging to a movement.”

The Politics and Propaganda

Totalitarianism does not have an end goal in the usual political sense. Its only real goal is to perpetuate its own existence. There is no one party line that, if you stick to it, will save you from persecution. Remember the random mass murders. Stalin repeatedly purged whole sections of his government — just because. The fear is a requirement. The fear is what keeps the movement going.

And how do they get there? How do they get this power?

Arendt argues that there is a “possibility that gigantic lies and monstrous falsehoods can eventually be established as unquestioned facts, that man may be free to change his own past at will, and that the difference between truth and falsehood may cease to be objective and become a mere matter of power and cleverness, of pressure and infinite repetition.”

This battle with truth is something we see today. Opinions are being given the same weight as facts, leading to endless debates and the assumption that nothing can be known anyway.

It is this turning away from knowledge that opens the doors to totalitarianism. “Before mass leaders seize the power to fit reality to their lies, their propaganda is marked by its extreme contempt for facts as such, for in their opinion fact depends entirely on the power of man who can fabricate it.”

These fabrications form the basis of the propaganda, with different messages crafted for different audiences. Arendt makes the point that “the necessities for propaganda are always dictated by the outside world and that the movements themselves do not actually propagate but indoctrinate.” Thus, propaganda can be understood as directed to those who are out of the control of the totalitarian movement, and it is used to convince them of its legitimacy. Then, once you are on the inside, it's about breaking down the individuality of the citizens until there is nothing but a “subdued population.”

The success of the propaganda directed internally demonstrated that “the audience was ready at all times to believe the worst, no matter how absurd, and did not particularly object to being deceived because it held every statement to be a lie anyhow.”

The Power

What does totalitarian rule look like? These states are not run by cliques or gangs. There is no protected group getting rich from this control of the masses. And no one is outside the message. For example, “Stalin ... shot almost everybody who could claim to belong to the ruling clique and ... moved the members of the Politburo back and forth whenever a clique was on the point of consolidating itself.”

Why no clique? One reason is that the goal of totalitarianism is not the welfare of the state. It is not economic prosperity or social advancement.

The reason why the ingenious devices of totalitarian rule, with their absolute and unsurpassed concentration of power in the hands of a single man, were never tried before

is that no ordinary tyrant was ever mad enough to discard all limited and local interests — economic, national, human, military — in favor of a purely fictitious reality in some indefinite distant future.

Since independent thinkers are a threat, they are among the first to be purged. Bureaucratic functions are duplicated and layered, with people being shifted all the time. *This regular violent turnover of the whole gigantic administrative machine, while it prevents the development of competence, has many advantages: it assures the relative youth of officials and prevents a stabilization of conditions which, at least in time of peace, are fraught with danger for totalitarian rule....*

Any chances of discontent and questioning of the status quo are eliminated by this perpetual rising of the newly indoctrinated.

The humiliation implicit in owing a job to the unjust elimination of one's predecessor has the same demoralizing effect that the elimination of the Jews had upon the German professions: it makes every jobholder a conscious accomplice in the crimes of the government....

Totalitarianism in power is about keeping itself in power. By preemptively removing large groups of people, the system neutralizes all those who might question it.

Possibly the one ray of hope in these systems is that because they pay no attention to actually governing, they are not likely to be sustainable in the long run.

The incredibility of the horrors is closely bound up with their economic uselessness. The Nazis carried this uselessness to the point of open anti-utility when in the midst of the war, despite the shortage of building material and rolling stock, they set up enormous, costly extermination factories and transported millions of people back and forth. In the eyes of a strictly utilitarian world the obvious contradiction between these acts and military expediency gave the whole enterprise an air of mad unreality.

But in the meantime, what these regimes create is so devastating to humanity that it would be naive to assume that humanity will always bounce back. "They have corrupted all human solidarity. Here the night has fallen on the future. When no witnesses are left, there can be no testimony."

Even though totalitarianism doesn't produce countries with a variety of strengths and a robustness to fight off significant challenges, they should not be easily dismissed. The carnage they create tears apart all social fabric. And we must not assume that they exist only in the past. Thus, from Hannah Arendt, a final word of caution: "Totalitarian solutions may well survive the fall of totalitarian regimes in the form of strong temptations which will come up whenever it seems impossible to alleviate political, social, or economic misery in a manner worthy of man."

45. Pain Plus Reflection Equals Progress

Our most painful moments are also our most important. Rather than run from pain, we need to identify it, accept it, and learn how to use it to better ourselves.

Our images of learning are filled with positive thoughts about how we learn from others. We read memoirs from the titans of industry, op-ed pieces from thought leaders, and gobble up the latest letters from CEOs in an attempt to absorb as much knowledge as we can. But it may surprise you that we're missing one of the most obvious sources of learning: ourselves.

Pain is something we all try to avoid, both instinctively and consciously. However, if we want to achieve great things in life, we need to change our relationship with pain.

Ray Dalio, the longtime leader of Bridgewater, the largest hedge fund in the world, argues in his book Principles that pain "is a signal that you need to find solutions so you can progress." Only by exploring it and reflecting on it can we start to learn and evolve.

There is an adage that states, "if you're not failing, then you're not really pushing the limits of what's possible." Sometimes when we push ourselves, we fall, and sometimes we break through. When we fall, the key is to reflect on our failures. However, doing that in the moment is often a very painful process that goes against human nature.

Our painful moments are important moments. When we confront something painful, we are left with a choice: accept an ugly and painful truth or embrace a beautiful delusion. Many of us opt for the latter, and it slows our progress.

We've known about our tendency to prefer delusion for a long time. We've watched others make mistakes and fail to learn from them. They are blind to the mistakes that are so clear to us. They run from the pain that could be the source of learning. They become comfortable operating without pain. They become comfortable protecting the version of themselves that existed yesterday, not the version of themselves that's better than they were yesterday.

Rather than running from pain, we need to identify it, accept it, and learn how to use it to better ourselves. In order for us to adapt, we need to learn from uncomfortable moments. We need to value a tough-love approach, where people show us what we're missing and help us improve.

You have a choice: You can prefer that the people around you fail to point out your blind spots, or you can prefer that they do. If you want them to, it's going to be uncomfortable. It's going to be awkward. It's going to hurt. Embracing this approach, however, means that you will learn faster and go further. It's a great example of "first-order negative, subsequent positive." This means the first step is the hardest and it hurts, but after that, you reap the benefits.

Of course, many of us prefer to tell ourselves that we have no weaknesses. That the world is wrong and we are right. We hide our weaknesses not only from others but also from ourselves. Being open about weaknesses means being open about who we are in the moment. It doesn't mean that's who we are forever. But we can't improve what we can't see.

Many of the people I talk to on the podcast have endured setbacks that seemed catastrophic at the time. Dalio, for instance, punched his boss in the face. Annie Duke lost millions. Countless others have been divorced, fired, or otherwise in a position where they felt unable to go on. I've been there too. It's in these moments, however, that a meaningful part of life happens. Life is about what you do in the painful moments; the choices you make and the path you choose.

The easy road is staying the same, avoiding pain and ignoring your flaws. The hard road is embracing the pain, examining your mistakes, and shining a light on your blind spots. This is the path to seeing reality and leaving your self-made bubble behind.

The people who have succeeded in life have learned to embrace pain and not be afraid to fall. They've learned from their failures and used them to make themselves better. Embracing pain is not easy but it is a choice that can lead to personal growth and success. Don't be afraid to confront your painful moments, be open about your weaknesses and strive to improve yourself, it's the only way to truly achieve greatness in life.

46. Double Loop Learning: Download New Skills and Information into Your Brain

We're taught single loop learning from the time we are in grade school, but there's a better way. Double loop learning is the quickest and most efficient way to learn anything that you want to "stick."

So, you've done the work necessary to have an opinion, learned the mental models, and considered how you make decisions. But how do you now implement these concepts and figure out which ones work best in your situation? How do you know what's effective and what's not? One solution to this dilemma is double loop learning.

We can think of double loop learning as learning based on Bayesian updating — the modification of goals, rules, or ideas in response to new evidence and experience. It might sound like another piece of corporate jargon, but double loop learning cultivates creativity and innovation for both organizations and individuals.

"Every reaction is a learning process; every significant experience alters your perspective."

— Hunter S. Thompson

Single Loop Learning

The first time we aim for a goal, follow a rule, or make a decision, we are engaging in single loop learning. This is where many people get stuck and keep making the same mistakes. If we question our approaches and make honest self-assessments, we shift into double loop learning. It's similar to the Orient stage in John Boyd's OODA loop. In this stage, we assess our biases, question our mental models, and look for areas where we can improve. We collect data, seek feedback, and gauge our performance. In short, we can't learn from experience without reflection. Only reflection allows us to distill the experience into something we can learn from.

In Teaching Smart People How to Learn, business theorist Chris Argyris compares single loop learning to a typical thermostat. It operates in a homeostatic loop, always seeking to return the room to the temperature at which the thermostat is set. A thermostat might keep the temperature steady, but it doesn't learn. By contrast, double loop learning would entail the thermostat's becoming more efficient over time. Is the room at the optimum temperature? What's the humidity like today and would a lower temperature be more comfortable? The thermostat would then test each idea and repeat the process. (Sounds a lot like Nest.)

Double Loop Learning

Double loop learning is part of *action science* — the study of how we act in difficult situations. Individuals and organizations need to learn if they want to succeed (or even survive). But few of us pay much attention to exactly how we learn and how we can optimize the process.

Even smart, well-educated people can struggle to learn from experience. We all know someone who's been at the office for 20 years and claims to have 20 years of experience, but they really have one year repeated 20 times.

Not learning can actually make you worse off. The world is dynamic and always changing. If you're standing still, then you won't adapt. Forget moving ahead; you have to get better just to stay in the same relative spot, and not getting better means you're falling behind.

Many of us are so focused on solving problems as they arise that we don't take the time to reflect on them after we've dealt with them, and this omission dramatically limits our ability to learn from the experiences. Of course, we want to reflect, but we're busy and we have more problems to solve — not to mention that reflecting on our idiocy is painful and we're predisposed to avoid pain and protect our egos.

Reflection, however, is an example of an approach I call first-order negative, second-order positive. It's got very visible short-term costs — it takes time and honest self-assessment about our shortcomings — but pays off in spades in the future. The problem is that the future is not visible today, so slowing down today to go faster at some future point seems like a bad idea to many. Plus with the payoff being so far in the future, it's hard to connect to the reflection today.



The Learning Dilemma: How Success Becomes an Impediment

Argyris wrote that many skilled people excel at single loop learning. It's what we learn in academic situations. But if we are accustomed only to success, double loop learning can ignite defensive behavior. Argyris found this to be the reason learning can be so difficult. It's not because we aren't competent, but because we resist learning out of a fear of seeming incompetent. Smart people aren't used to failing, so they struggle to learn from their mistakes and often respond by blaming someone else. As Argyris put it, "their ability to learn shuts down precisely at the moment they need it the most."

In the same way, a muscle strengthens at the point of failure, we learn best after dramatic errors.

The problem is that single loop processes can be self-fulfilling. Consider managers who assume their employees are inept. They deal with this by micromanaging and making every decision themselves. Their employees have no opportunity to learn, so they become discouraged. They don't even try to make their own decisions. This is a self-perpetuating cycle. For double loop learning to happen, the managers would have to let go a little. Allow someone else to make minor decisions. Offer guidance instead of intervention. Leave room for mistakes. In the long run, everyone would benefit. The same applies to teachers who think their students are going to fail an exam. The teachers become condescending and assign simple work. When the exam rolls around, guess what? Many of the students do badly. The teachers think they were right, so the same thing happens the next semester.

Many of the leaders Argyris studied blamed any problems on "unclear goals, insensitive and unfair leaders, and stupid clients" rather than making useful assessments. Complaining might be cathartic, but it doesn't let us learn. Argyris explained that this defensive reasoning happens even when we want to improve. Single loop learning just happens to be a way of minimizing effort. We would go mad if we had to

rethink our response every time someone asked how we are, for example. So everyone develops their own “theory of action—a set of rules that individuals use to design and implement their own behavior as well as to understand the behavior of others.” Most of the time, we don’t even consider our theory of action. It’s only when asked to explain it that the divide between how we act and how we think we act becomes apparent. Identifying the gap between our espoused theory of action and what we are actually doing is the hard part.

The Key to Double Loop Learning: Push to the Point of Failure

The first step Argyris identified is to stop getting defensive. Justification gets us nowhere. Instead, he advocates collecting and analyzing relevant data. What conclusions can we draw from experience? How can we test them? What evidence do we need to prove a new idea is correct?

The next step is to change our mental models. Break apart paradigms. Question where conventions came from. Pivot and make reassessments if necessary.

Problem-solving isn’t a linear process. We can’t make one decision and then sit back and await success.

Argyris found that many professionals are skilled at teaching others, yet find it difficult to recognize the problems they themselves cause (see Galilean Relativity). It’s easy to focus on other people; it’s much harder to look inward and face complex challenges. Doing so brings up guilt, embarrassment, and defensiveness. As John Grey put it, “If there is anything unique about the human animal, it is that it has the ability to grow knowledge at an accelerating rate while being chronically incapable of learning from experience.”

When we repeat a single loop process, it becomes a habit. Each repetition requires less and less effort. We stop questioning or reconsidering it, especially if it does the job (or appears to). While habits are essential in many areas of our lives, they don’t serve us well if we want to keep improving. For that, we need to push the single loop to the point of failure, to strengthen how we act in the double loop. It’s a bit like the Feynman technique — we have to dismantle what we know to see how solid it truly is.

“Fail early and get it all over with. If you learn to deal with failure... you can have a worthwhile career. You learn to breathe again when you embrace failure as a part of life, not as the determining moment of life.”

— Rev. William L. Swig

One example is the typical five-day, 9-to-5 work week. Most organizations stick to it year after year. They don’t reconsider the efficacy of a schedule designed for Industrial Revolution factory workers. This is single loop learning. It’s just the way things are done, but not necessarily the smartest way to do things.

The decisions made early on in an organization have the greatest long-term impact. Changing them in the months, years, or even decades that follow becomes a non-option. How to structure the work week is one such initial decision that becomes invisible. As G.K. Chesterton put it, “The things we see every day are the things we never see at all.” Sure, a 9-to-5 schedule might not be causing any obvious problems. The organization might be perfectly successful. But that doesn’t mean things cannot improve. It’s the equivalent of a child continuing to crawl because it gets them around. Why try walking if crawling does the job? Why look for another option if the current one is working?

A growing number of organizations are realizing that conventional work weeks might not be the most effective way to structure work time. They are using double loop learning to test other structures. Some organizations are trying shorter work days or four-day work weeks or allowing people to set their own schedules. Managers then keep track of how the tested structures affect productivity and profits. Over time, it becomes apparent whether the new schedule is better than the old one.

37Signals is one company using double loop learning to restructure their work week. CEO Jason Fried began experimenting a few years ago. He tried out a four-day, 32-hour work week. He gave employees the whole of June off to explore new ideas. He cut back on meetings and created quiet spaces for focused work. Rather than following conventions, 37Signals became a laboratory looking for ways of improving. Over time, what worked and what didn't became obvious.

Double loop learning is about data-backed experimentation, not aimless tinkering. If a new idea doesn't work, it's time to try something else.

In an op-ed for *The New York Times*, Camille Sweeney and Josh Gosfield give the example of David Chang. Double loop learning turned his failing noodle bar into an award-winning empire.

After apprenticing as a cook in Japan, Mr. Chang started his own restaurant. Yet his early efforts were ineffective. He found himself overworked and struggling to make money. He knew his cooking was excellent, so how could he make it profitable? Many people would have quit or continued making irrelevant tweaks until the whole endeavor failed. Instead, Mr. Chang shifted from single to double loop learning. A process of making honest self-assessments began. One of his foundational beliefs was that the restaurant should serve only noodles, but he decided to change the menu to reflect his skills. In time, it paid off; "the crowds came, rave reviews piled up, awards followed and unimaginable opportunities presented themselves." This is what double loop learning looks like in action: questioning everything and starting from scratch if necessary.

Josh Waitzkin's approach (as explained in *The Art of Learning*) is similar. After reaching the heights of competitive chess, Waitzkin turned his focus to martial arts. He began with tai chi chuan. Martial arts and chess are, on the surface, completely different, but Waitzkin used double loop learning for both. He progressed quickly because he was willing to lose matches if doing so meant he could learn. He noticed that other martial arts students had a tendency to repeat their mistakes, letting fruitless habits become ingrained. Like the managers Argyris worked with, students grew defensive when challenged. They wanted to be right, even if it prevented their learning. In contrast, Waitzkin viewed practice as an experiment. Each session was an opportunity to test his beliefs. He mastered several martial arts, earning a black belt in jujitsu and winning a world championship in tai ji tui shou.

Argyris found that organizations learn best when people know how to communicate. (No surprise there.) Leaders need to listen actively and open up exploratory dialogues so that problematic assumptions and conventions can be revealed. Argyris identified some key questions to consider.

- What is the current theory in use?
- How does it differ from proposed strategies and goals?
- What unspoken rules are being followed, and are they detrimental?
- What could change, and how?
- Forget the details; what's the bigger picture?

Meaningful learning doesn't happen without focused effort. Double loop learning is the key to turning experience into improvements, information into action, and conversations into progress.

47. The Power of Questions

The quality of the answers we get are directly correlated with the quality of the questions we ask. Here's how to improve your questions.

When we run our once-a-year Re:Think Europe event, 10 participants work with us for a month before the event to hone their questions. This is the most intense event we run for a reason. Each person brings a problem or challenge to the table for others to help with. Participants research each other's problems before the event. Before they even show up, refining and iterating the questions often help the participants make huge leaps forward. As a society, we tend to focus a lot on answers. Answers are solutions to problems. We tend to give less prestige to questions. Everyone has them. They're easy. It's the answers that take the work.

This overlooks the power of questions. Asking questions gives you a better understanding of everything: the situation you are in, the challenges you are facing. Life.

Let me share a story that took place in my second-year history class at university. We started discussing the assigned reading. I didn't really understand it, but I figured I'd get it just sitting there. Then this guy raised his hand and said, "Hey Professor, could you explain [technical term]? It wasn't clear to me from the article."

Boom. I had this startling insight. Up until then, I had always been afraid to ask questions like that for fear of looking stupid [read about pluralistic ignorance here]. But this guy didn't appear stupid. At that moment, he seemed like the smartest guy in the class.

Asking questions means you want to learn. You want to understand and know. So where do you start? Anywhere you want. But don't feel pressure to begin with the big questions, the ones we all confront at one time or another, like the meaning of life, or what exists beyond our physical experience of earth. There is a significant amount to be learned from the seemingly mundane ones, questions that seem so basic, once we reach about age 12 we no longer bother asking them—because we either think we know the answer or are afraid of admitting we don't.

Consider the following three questions:

1. What is a horse?
2. What is green?
3. What is a point in time?

At first glance, these don't seem difficult. They're grade school stuff. But these are actually really hard questions that can show us how much is to be gained from asking them.

First, what is a horse? Most people will list the physical characteristics that horses have in common, saying, "A horse has four legs, and a mane, and you can ride it." This is definitely true of some horses, but we would reasonably consider a three-legged horse still a horse. And a horse doesn't cease to be a horse if it can't be ridden. It doesn't become some other animal.

There is, I think, some component of DNA that is the same for all horses, a bit of code that tells the cells to form the horse. So why don't we reference a specific gene sequence when we are explaining what a horse is? Because it wouldn't in any way communicate what we mean by the word horse. Horses have properties that relate to our experience of them. The problem is, they all don't have the same properties.

So what we do is fix a vague concept in our minds of horseness. It can't be an image, because then it would be a specific horse, and it can't be explicitly defined because we wouldn't encompass the whole category. So we keep it at a fuzzy level that, despite its lack of precision, is extremely useful when we have to communicate in any way about horses. The abstract concept must stay abstract to retain its utility.

So, are you being pedantic when you ask, “What is a horse?” Not at all. You’re actually doing something very important. You are assessing the understanding of the person you are talking to about yours. And you discover that it’s never going to be a perfect match. As for the second question, what is green? This one is definitely more painful. The easy answer is a color. But that’s not a good answer, for what is a color? A quality that objects possess? Ooh cool. Where can I get some of this quality? Ah. Nowhere. Green is a quality that does not exist outside of the objects that possess it.

There is no place you can see green without seeing something being green. How unfair is this? I know green. I see it all the time. But it is not a thing I can hold. A change in the way my eyes process light and there could cease to be green [related: [How do you know that you know what you know?](#)]. But greenness would always be out there, a property of the interaction of light and molecules that can be so vivid but doesn’t actually exist on its own. Does this make asking, “What is green?” a waste of time? No. Wanting to get a handle on the fundamentals is never a waste of time. You can learn what you can influence and what you cannot. In this case you learn that you can change the color of an object, but you have no powers when it comes to color itself.

Finally, what is a point in time? This one really hurts. First, we should ask what is a point? Conveniently, [Euclid provided some definitions](#) over 2000 years ago.

1. A point is that which has no part.
2. A line is length without breadth.
3. A surface is that which has length and breadth only.

From this, we can conclude that a point has neither length nor breadth. That’s okay. It’s just this thing, and if you connect two of them with length you get a line. Euclid also said, “The extremities of lines are points.” It all works. Conceptually, it makes sense. I can wrap my head around it enough to do basic geometry. Great.

But if you actually think about it, your brain could explode. A point has neither length nor breadth? Then what does it have? It has to have something, to be something, doesn’t it? But anything that occupies space must have length and breadth, however infinitesimal. Since points have neither, they cannot occupy space. But then how can they form the ends of lines? How can they be?

The same thing happens when we try to conceive of a point in time. It’s something we all get. We say things like “going forward” as if there is a specific moment that we can measure all other moments against. But how exactly would you describe a moment in time? To say that implies that there are many moments, all of which could be distinguished from each other. But can they be? What fills the space between them? And if you say nothing, then how can the points be distinguished at all?

Are we unreasonable, then, when we question, “What is a point in time?” No. We can’t question everything every day, as it would likely put us in a state of paralysis, but asking questions like this shows that there is much to be gained from the act of trying to answer. We can learn a lot, often more, from work involved in answering a question than from the answer itself.

There are no dumb questions. Don’t be afraid to ask them. They are the most straight forward path to learning.

Article Summary

- Good questions are the key to better insights.
- Questions allow you to assess your understanding as well as others. Identifying gaps in your knowledge is the first step to filling them.

- We can learn a lot, often more, from the work involved in answering a question than from the answer itself.

48. Learning by Thinking: How Reflection Aids Performance

“By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third, by experience, which is the bitterest.”

— Confucius

It's been a while since I covered an academic paper. But one by Giada Di Stefano, Francesca Gino, Gary Pisano, and Bradley Staats on the role reflection plays in learning is fascinating.

Learning plays an important role in everything. This is why the concept of learning has gotten a lot of attention from scholars. You can argue that today's "Knowledge economy" further accelerates the pace of learning; things are changing and we need to keep up. This, the authors argue, makes our experience more productive and builds our confidence "in the ability to achieve a goal," which further translates into "higher rates of learning."

What is learning?

"Learning," they write, "is defined as a lasting change in knowledge generated by experience."

(There are) two types of learning, which are based on the source of such experience: direct learning from one's own experience and indirect learning from the experience of others.

Most research tends to focus on "learning by doing" whereas Farnam Street is more oriented towards indirect learning.

In Learning by Thinking: How Reflection Aids Performance the authors "take a less traveled road and focus on how individual learning can be augmented when individuals can not only "do" but also "think" about what they have been doing." That is, we learn better when we couple learning by doing with reflection — "that is, the intentional attempt to synthesize, abstract, and articulate the key lessons taught by experience."

This, the authors argue, makes our experience more productive and builds our confidence "in the ability to achieve a goal," which further translates into "higher rates of learning."

Dual Process Theory

The argument is based on the dual-process theory, which suggests:

"... the existence of two systems of thought that underlie intuitive and reflective processing, often referred to as type 1 and type 2, respectively ... We propose a dual-process learning model in which the automatic, unconscious process of learning generated from experience is coupled with the controlled, conscious attempt at learning."

Findings

Our findings suggest that reflection is a powerful mechanism by which experience is translated into learning. In particular, we find that individuals perform significantly better on subsequent tasks when they think about what they learned from the task they completed. Interestingly, we do not observe an additional boost in performance when individuals share the insights from their reflection efforts with others. Results of mediation analyses further show that the improvement in performance observed when individuals are learning by thinking is explained by increased self-efficacy generated by reflection.

Interesting, my system for remembering what I read has intuitive roots built around reflection.

General Discussion

Though some organizations are increasingly relying on some group reflection (e.g., "after-action reports"), there has been almost no effort to encourage individuals to reflect, and people often fail to engage in self-reflection themselves. Though reflection entails the high opportunity cost of one's time, we argue and show that reflecting after completing tasks is no idle pursuit: it can powerfully enhance the learning process. Learning, we find, can be augmented if one deliberately focuses on thinking about what one has been doing. In

addition to showing a significant performance differential when comparing learning-by-doing alone to learning-by-doing coupled with reflection, we also demonstrate that the effect of reflection on learning is mediated by greater self-efficacy.

This part was also interesting. What matters is reflection, not why you are reflecting. Across our studies, we also included a condition in which people shared their reflections with others. Interestingly, our results show that while sharing one's learning improves one's subsequent performance, the value of sharing is no different than that of reflecting and keeping one's thoughts to oneself.

Implications

The implications here support much that we've already covered on Farnam Street.

"... taking time away from training and reallocating that time to reflection actually improved individual performance."

Learning and decision journals encourage reflection and thus knowledge.

Companies often use tools such as learning journals as a way to encourage reflection in training and regular operations.

It's all about smarter, not harder.

"Our personal experience is that individuals of all ages may not treat these exercises with much seriousness."

So if you want a leg up, pay attention and take this seriously.

49. The Illusory Truth Effect: Why We Believe Fake News, Conspiracy Theories and Propaganda

When a “fact” tastes good and is repeated enough, we tend to believe it, no matter how false it may be. Understanding the illusory truth effect can keep us from being bamboozled.

A recent *Verge* article looked at some of the unsavory aspects of working as Facebook content moderators—the people who spend their days cleaning up the social network’s most toxic content. One strange detail stands out. The moderators the *Verge* spoke to reported that they and their coworkers often found themselves believing fringe, often hatemongering conspiracy theories they would have dismissed under normal circumstances. Others described experiencing paranoid thoughts and intense fears for their safety.

An overnight switch from skepticism to fervent belief in conspiracy theories is not unique to content moderators. In a *Nieman Lab* article by Laura Hazard Owen, she explains that researchers who study the spread of disinformation online can find themselves struggling to be sure about their own beliefs and needing to make an active effort to counteract what they see. Some of the most fervent, passionate conspiracy theorists admit that they first fell into the rabbit hole when they tried to debunk the beliefs they now hold. There’s an explanation for why this happens: the illusory truth effect.

The illusory truth effect

“Facts do not cease to exist because they are ignored.”

— *Aldous Huxley*

Not everything we believe is true. We may act like it is and it may be uncomfortable to think otherwise, but it’s inevitable that we all hold a substantial number of beliefs that aren’t objectively true. It’s not about opinions or different perspectives. We can pick up false beliefs for the simple reason that we’ve heard them a lot.

If I say that the moon is made of cheese, no one reading this is going to believe that, no matter how many times I repeat it. That statement is too ludicrous. But what about something a little more plausible? What if I said that moon rock has the same density as cheddar cheese? And what if I wasn’t the only one saying it? What if you’d also seen a tweet touting this amazing factoid, perhaps also heard it from a friend at some point, and read it in a blog post?

Unless you’re a geologist, a lunar fanatic, or otherwise in possession of an unusually good radar for moon rock-related misinformation, there is a not insignificant chance you would end up believing a made-up fact like that, without thinking to verify it. You might repeat it to others or share it online. This is how the illusory truth effect works: we all have a tendency to believe something is true after being exposed to it multiple times. The more times we’ve heard something, the truer it seems. The effect is so powerful that repetition can persuade us to believe information we know is false in the first place. Ever thought a product was stupid but somehow you ended up buying it on a regular basis? Or you thought that new manager was okay, but now you participate in gossip about her?

The illusory truth effect is the reason why advertising works and why propaganda is one of the most powerful tools for controlling how people think. It’s why the speech of politicians can be bizarre and multiple-choice tests can cause students problems later on. It’s why fake news spreads and retractions of misinformation don’t work. In this post, we’re going to look at how the illusory truth effect works, how it shapes our perception of the world, and how we can avoid it.

The discovery of the illusory truth effect

“Rather than love, than money, than fame, give me truth.”

— *Henry David Thoreau*

The illusory truth effect was first described in a 1977 paper entitled “Frequency and the Conference of Referential Validity,” by Lynn Hasher and David Goldstein of Temple University and Thomas Toppino of Villanova University. In the study, the researchers presented a group of students with 60 statements and asked them to rate how certain they were that each was either true or false. The statements came from a range of subjects and were all intended to be not too obscure, but unlikely to be familiar to study participants. Each statement was objective—it could be verified as either correct or incorrect and was not a matter of opinion. For example, “the largest museum in the world is the Louvre in Paris” was true.

Students rated their certainty three times, with two weeks in between evaluations. Some of the statements were repeated each time, while others were not. With each repetition, students became surer of their certainty regarding the statements they labelled as true. It seemed that they were using familiarity as a gauge for how confident they were of their beliefs.

An important detail is that the researchers did not repeat the first and last 10 items on each list. They felt students would be most likely to remember these and be able to research them before the next round of the study. While the study was not conclusive evidence of the existence of the illusory truth effect, subsequent research has confirmed its findings.

Why the illusory truth effect happens

“The sad truth is the truth is sad.”

— *Lemony Snicket*

Why does repetition of a fact make us more likely to believe it, and to be more certain of that belief? As with other cognitive shortcuts, the typical explanation is that it’s a way our brains save energy. Thinking is hard work—remember that the human brain uses up about 20% of an individual’s energy, despite accounting for just 2% of their body weight.

The illusory truth effect comes down to processing fluency. When a thought is easier to process, it requires our brains to use less energy, which leads us to prefer it. The students in Hasher’s original study recognized the repeated statements, even if not consciously.

That means that processing them was easier for their brains.

Processing fluency seems to have a wide impact on our perception of truthfulness. Rolf Reber and Norbert Schwarz, in their article “Effects of Perceptual Fluency on Judgments of Truth,” found that statements presented in an easy-to-read color are judged as more likely to be true than ones presented in a less legible way. In their article “Birds of a Feather Flock Conjointly (?): Rhyme as Reason in Aphorisms,” Matthew S. McGlone and Jessica Tofighbakhsh found that aphorisms that rhyme (like “what sobriety conceals, alcohol reveals”), even if someone hasn’t heard them before, seem more accurate than non-rhyming versions. Once again, they’re easier to process.

Fake news

“One of the saddest lessons of history is this: If we’ve been bamboozled long enough, we tend to reject any evidence of the bamboozle. We’re no longer interested in finding out the truth. The bamboozle has captured us. It’s simply too painful to acknowledge, even to ourselves, that we’ve been taken.”

— Carl Sagan

The illusory truth effect is one factor in why fabricated news stories sometimes gain traction and have a wide impact. When this happens, our knee-jerk reaction can be to assume that anyone who believes fake news must be unusually gullible or outright stupid. Evan Davis writes in *Post Truth*, “Never before has there been a stronger sense that fellow citizens have been duped and that we are all suffering the consequences of their

intellectual vulnerability.” As Davis goes on to write, this assumption isn’t helpful for anyone. We can’t begin to understand why people believe seemingly ludicrous news stories until we consider some of the psychological reasons why this might happen. Fake news falls under the umbrella of “information pollution,” which also includes news items that misrepresent information, take it out of context, parody it, fail to check facts or do background research, or take claims from unreliable sources at face value. Some of this news gets published on otherwise credible, well-respected news sites due to simple oversight. Some goes on parody sites that never purport to tell the truth, yet are occasionally mistaken for serious reporting. Some shows up on sites that replicate the look and feel of credible sources, using similar web design and web addresses. And some fake news comes from sites dedicated entirely to spreading misinformation, without any pretense of being anything else.

A lot of information pollution falls somewhere in between the extremes that tend to get the most attention. It’s the result of people being overworked or in a hurry and unable to do the due diligence that reliable journalism requires. It’s what happens when we hastily tweet something or mention it in a blog post and don’t realize it’s not quite true. It extends to miscited quotes, doctored photographs, fiction books masquerading as memoirs, or misleading statistics.

The signal to noise ratio is so skewed that we have a hard time figuring out what to pay attention to and what we should ignore. No one has time to verify everything they read online. No one. (And no, offline media certainly isn’t perfect either.) Our information processing capabilities are not infinite and the more we consume, the harder it becomes to assess its value.

Moreover, we’re often far outside our circle of competence, reading about topics we don’t have the expertise in to assess accuracy in any meaningful way. This drip-drip of information pollution is not harmless. Like air pollution, it builds up over time and the more we’re exposed to it, the more likely we are to end up picking up false beliefs which are then hard to shift. For instance, a lot of people believe that crime, especially the violent kind, is on an upward trend year by year—in a 2016 study by Pew Research, 57% of Americans believed crime had worsened since 2008. This despite violent crime having actually fallen by nearly a fifth during that time. This false belief may stem from the fact that violent crime receives a disproportional amount of media coverage, giving it wide and repeated exposure.

When people are asked to rate the apparent truthfulness of news stories, they score ones they have read multiple times more truthful than those they haven’t. Danielle C. Polage, in her article “Making Up History: False Memories of Fake News Stories,” explains that a false story someone has been exposed to more than once can seem more credible than a true one they’re seeing for the first time. In experimental settings, people also misattribute their previous exposure to stories, believing they read a news item from another source when they actually saw it as part of a prior part of a study. Even when people *know* the story is part of the experiment, they sometimes think they’ve also read it elsewhere. The repetition is all that matters.

Given enough exposure to contradictory information, there is almost no knowledge that we won’t question.

Propaganda

“If a lie is only printed often enough, it becomes a quasi-truth, and if such a truth is repeated often enough, it becomes an article of belief, a dogma, and men will die for it.”

— *Isa Blagden*

Propaganda and fake news are similar. By relying on repetition, disseminators of propaganda can change the beliefs and values of people.

Propaganda has a lot in common with advertising, except instead of selling a product or service, it's about convincing people of the validity of a particular cause. Propaganda isn't necessarily malicious; sometimes the cause is improved public health or boosting patriotism to encourage military enrollment. But often propaganda is used to undermine political processes to further narrow, radical, and aggressive agendas.

During World War II, the graphic designer Abraham Games served as the official war artist for the British government. Games's work is iconic and era-defining for its punchy, brightly colored visual style. His army recruitment posters would often feature a single figure rendered in a proud, strong, admirable pose with a mere few words of text. They conveyed to anyone who saw them the sorts of positive qualities they would supposedly gain through military service. Whether this was true or not was another matter. Through repeated exposure to the poster, Games instilled the image the army wanted to create in the minds of viewers, affecting their beliefs and behaviors.

Today, propaganda is more likely to be a matter of quantity over quality. It's not about a few artistic posters. It's about saturating the intellectual landscape with content that supports a group's agenda. With so many demands on our attention, old techniques are too weak. Researchers Christopher Paul and Miriam Matthews at the Rand Corporation refer to the method of bombarding people with fabricated information as the "firehose of propaganda" model. While the report focuses on modern Russian propaganda, the techniques it describes are not confined to Russia. These techniques make use of the illusory truth effect, alongside other cognitive shortcuts. Firehose propaganda has four distinct features:

- High-volume and multi-channel
- Rapid, continuous and repetitive
- Makes no commitment to objective reality
- Makes no commitment to consistency

Firehose propaganda is predicated on exposing people to the same messages as frequently as possible. It involves a large volume of content, repeated again and again across numerous channels: news sites, videos, radio, social media, television and so on. These days, as the report describes, this can also include internet users who are paid to repeatedly post in forums, chat rooms, comment sections and on social media disputing legitimate information and spreading misinformation. It is the sheer volume that succeeds in obliterating the truth. Research into the illusory truth effect suggests that we are further persuaded by information heard from multiple sources, hence the efficacy of funneling propaganda through a range of channels.

Seeing as repetition leads to belief in many cases, firehose propaganda doesn't need to pay attention to the truth or even to be consistent. A source doesn't need to be credible for us to end up believing its messages. Fact-checking is of little help because it further adds to the repetition, yet we feel compelled not to ignore obviously untrue propagandistic material.

Firehose propaganda does more than spread fake news. It nudges us towards feelings like paranoia, mistrust, suspicion, and contempt for expertise. All of this makes future propaganda more effective. Unlike those espousing the truth, propagandists can move fast because they're making up some or all of what they claim, meaning they gain a foothold in our minds first. First impressions are powerful. Familiarity breeds trust.

How to combat the illusory truth effect

So how can we protect ourselves from believing false news and being manipulated by propaganda due to the illusory truth effect? The best route is to be far more selective. The information we consume is like the food we eat. If it's junk, our thinking will reflect that.

We don't need to spend as much time reading the news as most of us do. As with many other things in life, more can be less. The vast majority of the news we read is just information pollution. It doesn't do us any good.

One of the best solutions is to quit the news. This frees up time and energy to engage with timeless wisdom that will improve your life. Try it for a couple of weeks. And if you aren't convinced, read a few days' worth of newspapers from 1978. You'll see how much the news doesn't really matter at all.

If you can't quit the news habit, stick to reliable, well-known news sources that have a reputation to uphold. Steer clear of dubious sources whenever you can—even if you treat it as entertainment, you might still end up absorbing it. Research unfamiliar sources before trusting them. Be cautious of sites that are funded entirely by advertising (or that pay their journalists based on views) and seek to support reader-funded news sources you get value from if possible. Prioritize sites that treat their journalists well and don't expect them to churn out dozens of thoughtless articles per day. Don't rely on news in social media posts without sources, from people outside of their circle of competence.

Avoid treating the news as entertainment to passively consume on the bus or while waiting in line. Be mindful about it—if you want to inform yourself on a topic, set aside designated time to learn about it from multiple trustworthy sources. Don't assume breaking news is better, as it can take some time for the full details of a story to come out and people may be quick to fill in the gaps with misinformation. Accept that you can't be informed about everything and most of it isn't important. Pay attention to when news items make you feel outrage or other strong emotions, because this may be a sign of manipulation. Be aware that correcting false information can further fuel the illusory truth effect by adding to the repetition.

We can't stop the illusory truth effect from existing. But we can recognize that it is a reality and seek to prevent ourselves from succumbing to it in the first place.

Conclusion

Our memories are imperfect. We are easily led astray by the illusory truth effect, which can direct what we believe and even change our understanding of the past. It's not about intelligence—this happens to all of us. This effect is too powerful for us to override it simply by learning the truth. Cognitively, there is no distinction between a genuine memory and a false one. Our brains are designed to save energy and it's crucial we accept that.

We can't just pull back and think the illusory truth only applies to other people. It applies to everyone. We're all responsible for our own beliefs. We can't pin the blame on the media or social media algorithms or whatever else. When we put effort into thinking about and questioning the information we're exposed to, we're less vulnerable to the illusory truth effect. Knowing about the effect is the best way to identify when it's distorting our worldview. Before we use information as the basis for important decisions, it's a good idea to verify if it's true, or if it's something we've just heard a lot.

Truth is a precarious thing, not because it doesn't objectively exist, but because the incentives to warp it can be so strong. It's up to each of us to seek it out.

50. The Feynman Learning Technique

The Feynman Technique is the best way to supercharge your learning. And it works no matter the subject. Devised by Nobel Prize-winning physicist Richard Feynman, it leverages the power of teaching for better learning.

Learning doesn't happen from skimming through a book or remembering enough to pass a test.

Information is learned when you can explain it and use it in a wide variety of situations.

The Feynman Technique gets more mileage from the ideas you encounter instead of rendering anything new into isolated, useless factoids.

When you really learn something, you give yourself a tool to use for the rest of your life.

The more you know, the fewer surprises you will encounter because most new things will connect to something you already understand.

Ultimately, the point of learning is to understand the world. But most of us don't bother to deliberately learn anything.

We memorize what we need to as we move through school, then forget most of it. As we continue through life, we don't extrapolate from our experiences to broaden the applicability of our knowledge. Consequently, life kicks us in the ass time and again.

To avoid the pain of being bewildered by the unexpected, the Feynman Technique helps you turn information into knowledge that you can access as easily as reaching for a chair.

*

The Feynman Technique

"Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius—and a lot of courage—to move in the opposite direction."

E.F. Schumacher

There are four steps to the Feynman Learning Technique, based on the method Richard Feynman originally used. We have adapted it slightly after reflecting on our own experiences using this process to learn. The steps are as follows:

1. Pretend to teach a concept you want to learn about to a student in the sixth grade.
2. Identify gaps in your explanation. Go back to the source material to better understand it.
3. Organize and simplify.
4. Transmit (optional).

Step 1: Pretend to teach it to a child

Take out a blank sheet of paper. At the top, write the subject you want to master. Now write out everything you know about the subject as if you were teaching it to a child or a rubber duck sitting on your desk.

It's important to remember that you are not teaching to your smart adult friend, but rather a child who has just enough vocabulary and attention span to understand basic concepts and relationships. It has to be simple and clear. There is nowhere to hide in obfuscation.

Or, for a different angle on the Feynman Technique, you could place a rubber duck on your desk and try explaining the concept to it. Software engineers sometimes tackle debugging by explaining their code, line by line, to a rubber duck. It sounds silly, but it's a forcing function to make you walk through your thinking as simply as possible.

It turns out that one of the ways we mask our lack of understanding is by using complicated vocabulary and jargon. The truth is, if you can't clearly and simply define the words and terms you are using, you don't really know what you're talking about.

If you look at a painting and describe it as "abstract" because that's what you heard in art class, you demonstrate no understanding. You're just mimicking what you've heard. You haven't learned anything.

When you write out an idea from start to finish in simple language that a child can understand, you force yourself to understand the concept at a deeper level and simplify relationships and connections between ideas. You can better explain the why behind your description of the what.

Writing helps you think because it gives you nowhere to hide.

Looking at the painting again, you will be able to say that the painting doesn't display buildings like the ones we look at every day. Instead, it uses certain shapes and colors to depict a city landscape. You will be able to point out what these are. You will be able to engage in speculation about why the artist chose those shapes and those colors. You will be able to explain why artists sometimes do this, and you will be able to communicate what you think of the piece considering all of this.

Chances are, after capturing a full explanation of the painting in the simplest possible terms that would be easily understood by a sixth-grader, you will have learned a lot about that painting and abstract art in general.

Some of capturing what you would teach will be easy. These are the places where you have a clear understanding of the subject. But you will find many places where things are much foggy.

Step 2: Identify gaps in your explanation

Areas, where you struggle in Step 1, are the points where you have some gaps in your understanding.

Identifying gaps in your knowledge—where you forget something important, aren't able to explain it, or simply have trouble thinking of how variables interact—is a critical part of the learning process.

Filling those gaps is when you really make the learning stick.

Now that you know where you have gaps in your understanding go back to the source material. Augment it with other sources. Look up definitions. Keep going until you can explain everything you need to in basic terms.

Only when you can explain your understanding without jargon and in simple terms can you demonstrate understanding. Think about it this way. If you require complicated terminology to explain what you know, you have no flexibility. When someone asks you a question, you can only repeat what you've already said.

Simple terms can be rearranged and easily combined with other words to communicate your point. When you can say something in multiple ways using different words, you understand it really well.

Being able to explain something in a simple, accessible way shows you've done the work required to learn. Skipping it leads to the illusion of knowledge—an illusion that can be quickly shattered when challenged.

Identifying the boundaries of your understanding is also a way of defining your circle of competence. When you know what you know (and are honest about what you don't know), you limit the mistakes you're liable to make and increase your chance of success when applying knowledge.

Step 3. Organize and simplify

Now you have a set of hand-crafted notes containing a simple explanation. Organize them into a narrative that you can tell from beginning to end. Read it out loud. If the explanation sounds confusing at any point, go back to Step 2. Keep iterating until you have a story that you can tell to anyone who will listen.

If you follow this approach over and over, you will end up with a binder full of pages on different subjects. If you take some time twice a year to go through this binder, you will find just how much you retain.

Step 4: Transmit (optional)

This part is optional, but it's the logical result of everything you've just done.

If you really want to be sure of your understanding, run it past someone (ideally someone who knows little of the subject).

The ultimate test of your knowledge is your capacity to convey it to another. You can read out directly what you've written. You can present the material like a lecture. You can ask your friends for a few minutes of their time while you're buying them dinner. You can volunteer as a guest speaker in your child's classroom or your parents' retirement residence. All that really matters is that you attempt to transmit the material to at least one person who isn't that familiar with it.

The questions you get and the feedback you receive are invaluable for further developing your understanding.

Hearing what your audience is curious about will likely pique your own curiosity and set you on a path for further learning. After all, it's only when you begin to learn a few things really well do you appreciate how much there is to know.

The Feynman Technique is not only a wonderful recipe for learning but also a window into a different way of thinking that allows you to tear ideas apart and reconstruct them from the ground up. It also allows you to supercharge your learning from others.

Too often, we want to seem smart rather than learn. We nod along even when we don't understand what someone is talking about. This is a missed opportunity for learning. If you're having a conversation with someone and they start using jargon that you don't understand, ask them to explain it to you like you're twelve. Not only will you supercharge your own learning, but you'll also supercharge theirs.

Feynman's approach intuitively believes that intelligence is a process of growth, which dovetails nicely with the work of Carol Dweck, who describes the difference between a fixed and growth mindset.

"If you can't reduce a difficult engineering problem to just one 8-1/2 x 11-inch sheet of paper, you will probably never understand it."

—Ralph Peck

What does it mean to "know?"

Richard Feynman believed that *"the world is much more interesting than any one discipline."* He understood the difference between knowing something and knowing the name of something, as well as how, when you truly know something, you can use that knowledge broadly.

When you only know what something is called, you have no real sense of what it is.

You can't take it apart and play with it or use it to make new connections and generate new insights. When you know something, the labels are unimportant because it's not necessary to keep it in the box it came in.

"The person who says he knows what he thinks but cannot express it usually does not know what he thinks."

—Mortimer Adler

Feynman's explanations—on why questions, why trains stay on the tracks as they go around a curve, how we look for new laws of science, or how rubber bands work—are simple and powerful. He doesn't hide behind abstraction or jargon.

Here he articulates the difference between knowing the name of something and understanding it.

"See that bird? It's a brown-throated thrush, but in Germany it's called a halzenfugel, and in Chinese they call it a chung ling, and even if you know all those names for it, you still know nothing about the bird. You only know something about people: what they call the bird. Now that thrush sings, and teaches its young to fly, and flies so many miles away during the summer across the country, and nobody knows how it finds its way."

Knowing the name of something doesn't mean you understand it. We talk in fact-deficient, obfuscating generalities to cover up our lack of understanding.

51. What Information Do You Need in Order to Change?

“Feedback is an effective tool for promoting efficient behavior: it enhances individuals’ awareness of choice consequences in complex settings.” —“Feedback and Efficient Behavior,” Sandro Casal, Nives DellaValle, Luigi Mittone, and Ivan Soraperra

We all want to improve at something. Skills we’d like to develop, habits we like to change, relationships we’d like to improve—there are lots of areas where we’d love to see positive, meaningful change.

Sometimes though, we don’t know how to keep moving forward.

We do research. We think of strategies. We try to implement a few tactics. And then we get stuck because we aren’t sure if what we’re doing is moving us in the right direction. So we keep on spinning our wheels, running without getting anywhere.

When you’re stuck, you need feedback. Feedback is a valuable source of information that you can use to effect the changes you want. You need information that tells you what you’re doing well and where you’re going wrong. Then you can use that information to plan tactics for bridging the gap between where you are now and where you want to be.

The more feedback you can get, the better. But how do you get good feedback?

Sometimes feedback is obvious, like when someone laughs at one of our jokes. They found it funny, and their reaction emboldens us to later try the joke on someone else.

Sometimes feedback is codified into our professional lives, such as during a formal performance review.

Often though, if we want feedback we have to actively seek it out.

How feedback works in behavior change

“A robust finding in economics, psychology, and behavioral sciences is the systematic failure to act according to rational well-informed preferences. This failure to rationally process and integrate information due to limited cognitive resources may lead to inefficient behavior in many domains of everyday life and may produce costs that, in some cases, can be avoided simply by highlighting the consequences of such behavior.” —“Feedback and Efficient Behavior,” Sandro Casal, Nives DellaValle, Luigi Mittone, and Ivan Soraperra

A really simple example of the effect of feedback on behavioral change is energy consumption. Most people don’t have a deep understanding of their energy usage. In your home, do you use more or less energy than your neighbors? What’s your consumption like compared to the national average? The global average? What activities and habits use the most energy? Studies show that feedback on usage can be used quickly by consumers to make lasting change.

If you decide you want to reduce your energy consumption, research on how to do it is a great place to start. But feedback on the impacts of your subsequent choices is equally important.

Energy companies have started providing consumers with detailed information on their consumption, such as amount used in comparable months, what in the home is using the most energy, and usage according to time of day. Some companies go further by relating energy consumption to local and global effects, like brownouts and light pollution. People can then further adjust their behavior by switching appliances or better insulating their home, and they can stay motivated to stick to the new behavior because of the consistent feedback.

Having direct feedback on the results of your specific actions can reinforce positive changes, help you develop habits, and inspire you to take further action. Feedback also helps you set goals for what you can reasonably accomplish.

Trying to make ongoing systemic changes in life without feedback on those changes is hard. Feedback gives you the information you need to improve. Without it, you may be completely missing the mark of what you want to achieve.

Don't be afraid to ask for feedback

Asking how you could be a better partner, team member, friend, or leader from the people best placed to give you accurate feedback is a requirement for improving. If your actions are eventually going to get you fired, divorced, or ghosted by your close friends, you probably want feedback communicating the steps you're taking toward disaster. Getting useful information in an ongoing, iterative loop gives you the opportunity to discuss solutions and make changes.

Feedback is baked into some professions. Writers have editors. Athletes have coaches. Actors have directors. In a *New York Times* [article](#) about the television show *The Good Place*, the show's creator, Michael Schur, says of actor Kristen Bell, "*She just has a really low center of gravity for how she approaches her job; you can give her forty notes on a line, and she'll go, 'Yep, got it,' and she'll do all forty of those notes at once.*" When you trust the source, it's easier to accept and incorporate feedback.

If you aren't getting enough feedback or you want to augment what feedback you routinely get, hire a coach—an expert who knows how to give useful feedback in the area you want to improve in. No one is so good at something that they have no room for improvement. We can all get better. And if you want to get better, you have to be open to the feedback you receive. You don't have to agree with it, but you do need to hear it. Getting defensive, critical, or shutting down will lead you to miss information and prevent others from attempting to give you feedback in the future.

If you want honest feedback, you have to prepare yourself to listen to things you might not want to hear. When you ask for feedback, explain that you're looking to identify your blind spots and that you're genuinely seeking information that will help you improve. Be as specific as you can. Be gracious with the results, even if they're unpleasant. Remember that [listening to a perspective doesn't mean you endorse it](#).

Of course, not all feedback is good. Sometimes it's just noise. Knowing when to ignore feedback that isn't useful or is badly intentioned can be just as useful as knowing when to seek out the kind of feedback that is instructive. For example, feedback and opinions are not the same thing. Feedback is based on observation and reactions to your specific actions. It does not aim to tell you what you *should* be doing; it simply seeks to enlarge your perspective on what you *are* doing. Opinions are just someone sharing how they feel about a particular aspect of the world – they have nothing to do with you in particular. The person giving you feedback is also indirectly sharing a wealth of information about themselves. Often what we give feedback on is related to what we find important, and what directly connects with our values.

The power of feedback

When you're aware of how powerful strong feedback can be, you may find you'd like to start giving more of it. When giving others feedback, ask yourself what information they might need to make meaningful change. [Giving great feedback](#) isn't about convincing others to do things your way. It's about giving them insight into how to improve on their own methods.

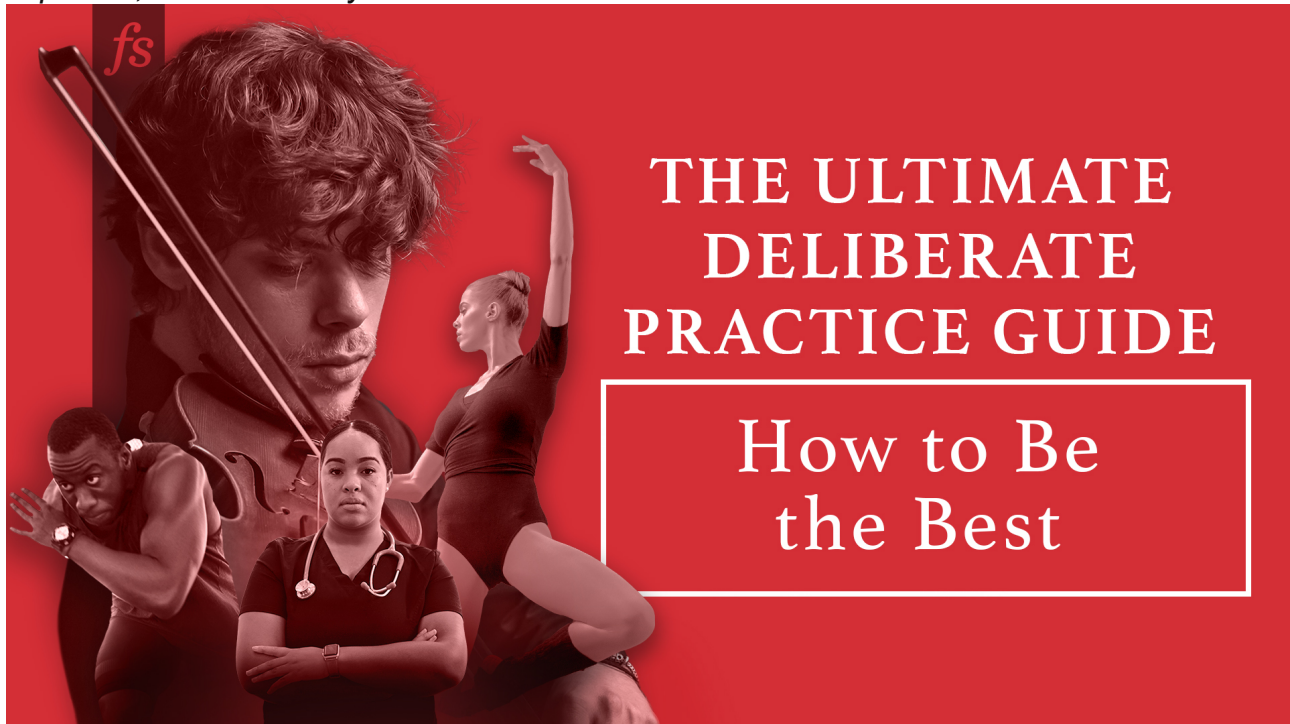
Giving good feedback requires an awareness of both what you're saying, and how you say it. To the first point, make it personal, provide specific examples, and notice how things have changed over time. Reassure the person that you are trying to help them be a better version of themselves, that you are in their corner. Consequently, be aware of your tone. You're a team member, not an accuser. And choose your timing wisely. At the end of a busy work day is probably not the time to give constructive feedback. People need the space to hear and process what you have to say.

We all want to get better at something. Don't underestimate the importance of feedback in helping you reach your goals.

52. The Ultimate Deliberate Practice Guide: How to Be the Best

Everything You Need to Know to Improve Your Performance at Anything—For Beginners and Experts

Deliberate practice is the best technique for achieving expert performance in every field—including writing, teaching, sports, programming, music, medicine, therapy, chess, and business. But there's much more to deliberate practice than 10,000 hours. Read this to learn how to accelerate your learning, overcome the "OK" plateau, turn experience into expertise, and enhance your focus.



What is deliberate practice?

*“Engaged in the creative process we feel more alive than ever, because we are making something and not merely consuming, masters of the small reality we create. In doing this work, we are in fact creating ourselves.” —Robert Greene, *Mastery**

Deliberate practice is what turns amateurs into professionals. Across every field, deliberate practice is what creates top performers and what they use to stay at the top of their game. It's absolutely essential for expert performance.

As a general concept, “practice” means preparing. It's the act of repeatedly performing certain activities with the intention of improving a specific associated skill. We rehearse what to do in low-pressure situations so we'll be better when we use a skill in situations where something is actually at stake, such as in a competition or in the workplace.

Although this definition may seem obvious, it's crucial to distinguish between doing something and practicing it, because they're not always synonymous.

The key distinction between doing and practicing is that we're only practicing something when we do it in a way that makes us better at it—or at least with that intention.

Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them. Unlike regular practice, in which we work on a skill by repeating it again and again until it becomes almost mindless, deliberate practice is a laser-focused activity. It requires us to pay unwavering attention to what we're doing at any given moment and whether it's an improvement or not.

Geoff Colvin summarizes deliberate practice as such in *Talent Is Overrated*:

Deliberate practice is characterized by several elements, each worth examining. It is activity designed specifically to improve performance, often with a teacher's help; it can be repeated a lot; feedback on results is continuously available; it's highly demanding

mentally, whether the activity is purely intellectual, such as chess or business-related activities, or heavily physical, such as sports; and it isn't much fun.

The extraordinary power of deliberate practice is that it aims at constant progress. Practitioners are not content with repeating a skill at the same level. They have metrics for measuring their performance. And they aspire to see those metrics get continuously better. While engaging in deliberate practice, we are always looking for errors or areas of weakness. Once we identify one, we establish a plan for improving it. If one approach doesn't work, we keep trying new ones until something does.

Using deliberate practice, we can overcome many limitations that we might view as fixed. We can go further than we might even think possible when we begin. Deliberate practice creates new physical and mental capabilities—it doesn't just leverage existing ones. The more we engage in deliberate practice, the greater our capabilities become. Our minds and bodies are far more malleable than we usually realize.

Deliberate practice is a universal technique, and you can employ it for whatever you're trying to be the best (or just get a little bit better) at. It's easiest to apply to competitive fields with clear measurements and standards, including music, dance, football/soccer, cricket, hockey, basketball, golf, horse riding, swimming, and chess.

But deliberate practice is also invaluable for improving performance in fields such as teaching, nursing, surgery, therapy, programming, trading, and investing. It can even accelerate your progress in widely applicable skills such as writing, decision-making, leadership, studying, and spoken communication.

The key in any area is to identify objective standards for performance, study top performers, and then design practice activities reflecting what they do. Recent decades have seen dramatic leaps in what people are capable of doing in many fields. The explanation for this is that we're getting better at understanding and applying the principles of deliberate practice. As a field advances, people can learn from the best of what those who came before them figured out. The result is that now average high-schoolers achieve athletic feats and children advance to levels of musical prowess that would have seemed unthinkable a century earlier. And there's little evidence to suggest we've reached the limits of our physical or mental abilities in any area whatsoever.

Many of us spend a lot of time each week practicing different skills in our lives and work. But we don't automatically get better just because we repeat the same actions and behaviors, even if we spend hours per day doing it. Research suggests that in areas such as medicine, people with many years of experience are often no better than novices—and may even be worse.

If we want to improve a skill, we need to know *what* exactly has to change and what might get us there. Otherwise, we plateau.

Some people will tell you it's only possible for anyone to improve at anything through deliberate practice, and any other sort of practice is a waste of time. This is an exaggeration. In reality, regular practice works for reinforcing and maintaining skills. It can also help us improve skills, particularly in the early stages of learning something. However, deliberate practice *is* the only way to:

1. Reach expert-level performance and enjoy competitive success
2. Overcome plateaus in our skill level
3. Improve at a skill much faster than through regular practice

If you're just doing something for fun and don't care about constantly improving at it, you don't need deliberate practice. For example, maybe you like to go for a walk around a local park in the afternoons to clear your head. Although you're practicing that walk each time you go, you probably don't care about increasing your walking speed day by day. It's

enough that the repetitions further ingrain the habit and help maintain a certain level of physical fitness. Not everything in life is a competition! But if you want to keep getting better at something as fast as possible or reach an expert level, deliberate practice is vital. Another important point to note is that deliberate practice isn't just a catchy name we came up with out of thin air. The term is largely attributed to Karl Anders Ericsson, one of the most influential figures of all time in the field of performance psychology. It's something many scientists have studied for decades. Everything we say here is supported by substantial academic research, particularly Ericsson's work. We'll also debunk the numerous myths swirling around deliberate practice as a concept and reveal some of its significant limitations. So if you're looking for quick hacks for overnight success, you might want to look elsewhere. If you want a realistic roadmap for improving your performance, read on.

If we want to improve a skill,
we need to know what exactly
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might get us there.

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The elements of deliberate practice

“Life is not always a matter of holding good cards, but sometimes, playing a poor hand well.” —Jack London

In this section, we'll break down the fundamental elements of deliberate practice and exactly how to incorporate them into your practice sessions. As Ericsson wrote in *Peak*, *“No matter what the field, the most effective approach to improving performance is to follow a single set of principles.”* We'll explain why each component is crucial and how they apply to different fields, and we'll cover multiple ways to implement them depending on your goals.

Deliberate practice is structured and methodical

“Everyone has talent. What's rare is the courage to follow it to the dark places where it leads.” —Erica Jong

As humans, we're wired to want to do the easiest thing at all times in order to conserve energy. Put more simply, it's in our nature to be lazy. When we practice something a lot, we develop habits that become almost effortless to enact. While that's beneficial in many areas of our lives (and helps us survive), it's something we have to overcome in order to engage in deliberate practice. We can't expect constant improvement if we keep repeating the elements of a skill we already know how to do with ease. That's only enough if we're just having fun or want to reinforce our habits.

Deliberate practice is structured to improve specific elements of a skill through defined techniques. Practitioners focus above all on what they *can't* do. They seek out areas of weaknesses impacting their overall performance, then target those. At every stage, they set tailored, measurable goals in order to gauge whether their practice is effective at moving them forwards. Numbers are a deliberate practitioner's best friend.

If you want to reach an expert level of performance, you need to begin practice sessions with a plan in mind. You need to know what you're working on, why, and how you intend to improve it. You also need a way to tell if your improvement efforts aren't working and if you need to try a new tactic. Once you reach your goal for that particular component of the skill, it's time to identify a new area of weakness to work on next.

Having lots of little, realistic goals with a game plan for achieving them makes deliberate practice motivating. There's a sense of ongoing movement, yet the next step is always a realistic stretch. Day by day, the gains from deliberate practice may feel modest. But when we look back over a longer period of time, small bits of progress compound into gigantic leaps.

How to implement this: Take the skill you're aiming to improve and break it down into the smallest possible component parts. Make a plan for working through them in a logical order, beginning with the fundamentals, then building upon them. Decide which parts you'd like to master over the next month. Put your practice sessions in your calendar, then plan precisely which parts of the skill you're going to work on during each session.

Don't expect your plan to be perfect. You'll likely need to keep modifying it as you discover new elements or unexpected weaknesses. The most important thing is to always go into practice with a plan for what you're working on and how. Knowing what you're doing next is the best way to stay on track and avoid aimless time-wasting. That means seeking to keep figuring out what separates you from the next level of performance so you can concentrate on that.

Deliberate practice is challenging and uncomfortable

"One must develop an instinct for what one can just barely achieve through one's greatest efforts." —Albert Einstein (attributed)

Imagine the world from the perspective of a baby learning to walk for the first time. It's not usually an easy process. They need to develop a lot of new skills and capabilities. They need to build enough muscular strength to stand upright without support. And they need to learn how to coordinate their limbs well enough to move around. Along the way, a baby needs to develop numerous sub-skills, such as how to grip supports to pull themselves up. It likely takes thousands of attempts to master walking—as well as numerous, falls, collisions, and other mishaps. We might not remember the process as adults, but a baby learning to walk needs to spend many hours challenging themselves and moving incrementally out of their comfort zone.

If we want to use deliberate practice, we could do with learning a thing or two from babies. Deliberate practice isn't necessarily fun while we're doing it. In fact, most of the time it's a process of repeated frustration and failure. We have to fall down a dozen times for every step we take. That's the whole point.

Seeing as deliberate practice requires us to keep targeting our weakest areas, it means spending time doing stuff we're not good at. In the moment, that can feel pretty miserable. But the quickest route to improvement involves stepping outside of our comfort zones.

The reason why people who have spent decades doing something are not necessarily better than newbies is that they're liable to get complacent and stop pushing themselves. We need to keep attempting to do things that feel out of reach at the moment.

In his studies of elite violinists, Ericsson asked them to rate different practice activities by how enjoyable they were and how much they contributed to improving performance.

Invariably, there was an inverse correlation between the usefulness of an activity and its enjoyability. As Ericsson puts it in *Peak*:

The reason that most people don't possess these extraordinary physical capabilities isn't because they don't have the capacity for them, but rather because they're satisfied to live in the comfortable rut of homeostasis and never do the work that is required to get out of it. They live in the world of "good enough." The same thing is true for all the mental activities we engage in.

Elsewhere in the book, he writes *"This is a fundamental truth about any sort of practice: If you never push yourself beyond your comfort zone, you will never improve."* The interesting part is the more time you spend deliberately practicing, the more comfortable you'll become with being uncomfortable.

Daniel Coyle writes in *The Little Book of Talent*:

There is a place, right on the edge of your ability, where you learn best and fastest. It's called the sweet spot. ... The underlying pattern is the same: Seek out ways to stretch yourself. Play on the edges of your competence. As Albert Einstein said, "One must develop an instinct for what one can just barely achieve through one's greatest efforts." The key word is 'barely.'

A quick way to assess if you're doing deliberate practice or just regular rote practice is to ask yourself if you ever feel bored or zone out during practice sessions. If the answer is yes, you're probably not practicing deliberately.

Deliberate practice isn't boring. Frustrating, yes. Maddening, yes. Annoying, even. But never boring. As soon as practicing a skill gets comfortable, it's time to up the stakes. Challenging yourself is about more than trying to work harder—it means doing new things. Pushing ourselves just beyond the limits of our abilities is uncomfortable, yet it's how we do our best—and indeed, it can be the source of some of our greatest moments of satisfaction. According to psychologist Mihaly Csikszentmihalyi, we often experience happiness as a result of entering a "flow" state, which occurs when we intensely focus on an activity that is challenging yet achievable. During moments of flow, we become so immersed in the activity that we lose any sense of time or of ourselves.

Noel Tichy, professor at the University of Michigan business school and the former chief of General Electric's famous management development center at Crotonville, puts the concept of practice into three zones: the comfort zone, the learning zone, and the panic zone.

Most of the time when we're practicing, we're really doing activities in our comfort zone. This doesn't help us improve because we can already do these activities easily. On the other hand, operating in the panic zone leaves us paralyzed, as the activities are too difficult and we don't know where to start. The only way to make progress is to operate in the learning zone, which are those activities that are just out of our reach.

Repetition inside the comfort zone does not equal deliberate practice. Deliberate practice requires that you operate in the learning zone and you repeat the activity a lot with feedback.

How to implement this: Each time you practice a component of a skill, aim to make it 10% harder than the level you find comfortable.

Once per month, have a practice session where you set yourself an incredibly ambitious stretch goal—not impossible, just well above your current level. Challenge yourself to see how close you can get to it. You might surprise yourself and find you perform far better than expected.

A common deliberate practice mistake is to plan a long practice session, then adjust the intensity of your practice to allow you to engage in a skill for the whole time. It's far more effective to engage in "sprints." Practice with the most intense focus you can manage for short periods of time, then take breaks. Seeing as you learn most when you stretch yourself beyond your current capabilities, shorter, more challenging practice periods are the way to go.

Deliberate practice requires rest and recovery time

“There is a time for many words, and there is also a time for sleep.” —Homer, The Odyssey

Seeing as deliberate practice is so challenging, it’s impossible to do it all day long. Across fields, top practitioners rarely spend more than around three to five hours per day on deliberate practice, at the high end. They may work for more hours than that per day, but few can sustain the mental energy to engage in deliberate practice for eight hours a day. Additional hours often result in diminishing negative returns, meaning more practice makes performance worse because it results in burnout. Geoff Colvin writes:

The work is so great that it seems no one can sustain it for very long. A finding that is remarkably consistent across disciplines is that four or five hours a day seems to be the upper limit of deliberate practice, and this is frequently accomplished in sessions lasting no more than an hour to ninety minutes.

Ericsson’s studies of elite violinists found they often took afternoon naps and slept an average of eight hours per night, considerably more than the average person. They were highly aware of the importance of sleep.

Even fitting in a single hour per day of deliberate practice is ample time to make substantial improvements, especially when we’re consistent with committing to it over the long haul. Continuous investments in success compound. In the long run, commitment pays off.

Not only do most deliberate practitioners not spend all day at it, they also devote a lot of time to recuperation and recovery. They sleep as much as their bodies need. They nap if necessary. They take frequent, refreshing breaks. Most of us understand that rest is necessary after physical activity. But we can underestimate its importance after mental activity, too. Deliberate practice needs to be sustainable for the long term. How long a person keeps at a skill is often far more important than how many hours a day they spend on it.

When you’re practicing deliberately, truly practice. When you’re recuperating, truly relax. No one can spend every waking hour on deliberate practice.

Sleep is a vital part of deliberate practice. Being asleep doesn’t mean you’re not still improving your skill. We consolidate memories at night, moving them from short-term to long-term memory. And we can’t exactly benefit from deliberate practice sessions if we don’t remember what we learn each time. Not only that, but sleep deprivation also results in a plethora of negative cognitive effects that impact performance. If we skimp on sleep, we’re likely to forget far more of what we learn during deliberate practice sessions, rendering them less useful.

When you’re not engaging in deliberate practice, your brain is still at work. During deliberate practice, we’re in focused mode. When we let our minds wander freely while at rest, we’re in diffuse mode. Although that time feels less productive, it’s when we form connections and mull over problems. Both modes of thinking are equally valuable, but it’s the harmony between them that matters. We can’t maintain the effort of the focused mode for long. At some point, we need to relax and slip into the diffuse mode. Learning a complex skill—a language, a musical instrument, chess, a mental model—requires both modes to work together. We master the details in focused mode, then comprehend how everything fits together in diffuse mode. It’s about combining creativity with execution. How to implement this: Make a list of activities you can engage in without too much conscious thought, letting yourself daydream while you do them. Common examples include going for a walk, washing the dishes, taking a shower, free-writing in a journal, playing with a toy like Lego, driving a familiar route, gardening, cooking, listening to music, or just gazing out the window. When you feel yourself getting tired or hitting a roadblock during deliberate practice, don’t keep pushing for too long. You want to be stretching yourself, not exhausting yourself. Instead, switch to one of those more relaxing activities

for at least five minutes. You'll likely come back to practice with new connections or at last feeling refreshed.

When you're practicing deliberately, truly practice. When you're recuperating, truly relax. No one can spend every waking hour on deliberate practice.



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Deliberate practice involves constant feedback and measurement

"Deliberate practice is hard. It hurts. But it works. More of it equals better performance and tons of it equals great performance." —Geoff Colvin, *Talent Is Overrated*

Practicing something without knowing whether you are getting better is pointless. Yet that is what most of us do every day without thinking.

As we saw before, deliberate practice involves continuously stretching yourself to improve on weak areas of a skill. For that to work, practitioners require constant feedback about their current level of performance so they can identify what works for making it better. What gets measured gets managed. To engage in deliberate practice, you need a way of measuring the most instructive metrics related to your performance. Seeing how those metrics change is the sole way to know if practice is working or not. Top performers across fields tend to spend time examining their past performance with care to identify areas for improvement. For example, a tennis player might film themselves playing a match so they can go through the footage frame by frame afterward. This provides valuable feedback, because they can figure out what might have held them back during weaker moments. In fields such as sports and chess, measuring performance tends to be straightforward. In other areas such as business, measurements are harder to take, and there may be no established markers of success. The influence of random factors may also be stronger, making it less clear whether technique changes are actually having an influence or not. When you engage in deliberate practice, it's always important to be aware of how strongly correlated your practice and your performance are likely to be.

When measuring your performance, beware of vanity metrics. These are numbers that are easy to calculate and feel good to boost. But they don't actually move the needle towards the real improvements in performance that help you reach your goals. For example, let's say you're using deliberate practice to improve the skill of email marketing, as part of the wider goal of getting more customers for your business. The number of email subscribers is a vanity metric; the number of paying customers is a useful metric. It's completely possible to increase the former without a corresponding increase in the latter.

How to implement this: Identify the most significant metrics related to performance in your chosen skill and keep a record of them each time you practice. It's easy to fool yourself

without a clear record of how you're doing. You might want to break the skill down into a few different parts to measure it, but make sure you're not fixating on vanity metrics. Deliberate practice is most effective with the help of a coach or some kind of teacher *"The best teacher is not the one who knows most but the one who is most capable of reducing knowledge to that simple compound of the obvious and wonderful."* —H.L. Mencken (attributed)

Deliberate practice is most effective when conducted with some kind of coach who can give feedback, point out errors, suggest techniques for improvement, and provide vital motivation. Although mastering any skill requires a lot of time engaging in solitary practice, working with a coach at least some of the time is incredibly valuable. In some fields such as sports and music, it's common for a coach to be present all of the time. But most top performers benefit from a combination of coaching and solitary practice.

When we look at the lives of people who achieved great things, we often find that those who did so at a young age or in a shorter time than expected benefited from having fantastic teachers. For example, physicist Werner Heisenberg had the epiphany that led to the formulation of matrix mechanics a mere five years after commencing serious study of physics. But he no doubt benefited from the mentorship of Niels Bohr and Max Born, two of the foremost physicists at the time.

Even people at the most elite levels of performance across fields can benefit from specialist coaching. Engaging in something and teaching that thing are separate skills in themselves. The best practitioners are not always the best teachers because teaching is a skill in itself.

Ericsson explained that *"the best way to get past any barrier is to come at it from a different direction, which is one reason it is useful to work with a teacher or coach."* We often make the same mistakes again and again because we simply don't realize what we're doing. Our performance falls into ruts and we can't figure out why we're running into the same problem yet again.

A coach can see your performance from the outside, without the influence of overconfidence and other biases. They can identify your blind spots. They can help you interpret key metrics and feedback.

Ericsson went on to say that *"even the most motivated and intelligent student will advance more quickly under the tutelage of someone who knows the best order in which to learn things, who understands and can demonstrate the proper way to perform various skills, who can provide useful feedback, and who can devise practice activities designed to overcome particular weaknesses."* An experienced coach will have worked with many people on the same skill so they'll be able to advise on the best ways to structure practice. They'll know when you're just repeating what you find easy, and they'll be able to push you to the next level.

Teachers or coaches see what you miss and make you aware of where you're falling short. Geoff Colvin writes:

In some fields, especially intellectual ones such as the arts, sciences, and business, people may eventually become skilled enough to design their own practice. But anyone who thinks they've outgrown the benefits of a teacher's help should at least question that view. There's a reason why the world's best golfers still go to teachers.

But what if you don't have access to a coach? What if you don't have the means to hire one or one isn't available for your particular skill? In that case, it's still possible to apply the same principles that make a coach useful by yourself. Top performers across fields build the skill of metacognition, essentially making it possible for them to coach themselves.

Colvin explains:

The best performers observe themselves closely. They are in effect able to step outside themselves, monitor what is happening in their own minds, and ask how it's going.

Researchers call this metacognition—knowledge about your own knowledge, thinking

about your own thinking. Top performers do this much more systematically than others do; it's an established part of their routine.

...A critical part of self-evaluation is deciding what caused those errors. Average performers believe their errors were caused by factors outside their control: my opponent got lucky; the task was too hard; I just don't have the natural ability for this. Top performers, by contrast, believe they are responsible for their errors. Note that this is not just a difference of personality or attitude. Recall that the best performers have set highly specific, technique-based goals and strategies for themselves; they have thought through exactly how they intend to achieve what they want. So when something doesn't work, they can relate the failure to specific elements of their performance that may have misfired.

How to implement this: Don't expect the same teacher to suit you forever. We usually need different teachers as our skill level progresses because we outgrow them. One attribute of a good teacher is that they know when to tell a student to move on. As we reach expert levels of performance, we need teachers who are themselves experts. If they're always a step ahead, we can learn from their mistakes instead of making our own.

You get the best results from working with a coach if you show yourself to be receptive to constructive criticism, even if it's uncomfortable to hear. If you respond badly, you disincentivize them from telling you what's most useful to know. Top performers know the goal is to get better, not just to hear you're already great.



Deliberate practice requires intrinsic motivation

Persisting with deliberate practice despite its innate difficulty and discomfort requires a lot of motivation. But that motivation needs to be intrinsic, meaning that it comes from inside us because we find an activity enjoyable for its own sake. This is in contrast to extrinsic motivation, where we participate in an activity to gain an external reward or avoid a negative consequence. Yet another reason why rest is important for deliberate practice is because it helps sustain motivation.

Although deliberate practice can lead to external rewards for using a skill (such as winning a competition or getting a promotion), this should not be the sole reason for practicing it. Extrinsic motivation is unlikely to be enough to get us through the long period of struggle necessary to master a skill. Becoming proficient at anything means spending time failing repeatedly at it, during which there are few external rewards. But if we enjoy getting better for its own sake, we have more of a chance of persevering until our practice starts paying off. We can navigate obstacles because we want to see where the road might take us—the obstacles aren't roadblocks.

If you want to use deliberate practice to master a skill, you need to be willing to keep practicing it no matter what. Although brute force and rewarding yourself can be effective in the short run, it won't work forever. If you're planning to engage in deliberate practice to reach expert-level performance, make sure it's a prospect you feel excited about even if it won't always be fun.

Extrinsic motivation isn't always ineffective, however. People who engage in consistent, sustainable deliberate practice tend to be adept at knowing when and how they need to employ external incentives. It's important to reward yourself when you make progress in your practice and reflect on how far you've come, not just how far is left to go.

The need for intrinsic motivation is one reason why children who are pushed to develop a skill from a young age by their parents don't always end up reaching a high level of performance and often quit as soon as they can.

How to implement this: Make a list of the reasons you want to work on a skill and the benefits getting better at it might bring. Before you begin a deep practice session, reread the list to remind you of why you're bringing your full focus to something difficult. You could also list some of the benefits you've experienced from it in the past or include quotes from

top performers in your field you find inspiring. It might feel cheesy, but it can provide a powerful boost during particularly difficult practice moments. Try to focus on intrinsic reasons and benefits, such as feeling fulfilled.

Keep a “motivation diary” for one week (or longer if possible.) Try setting an alarm to go off every fifteen minutes during each practice session. When the alarm sounds, score your motivation level out of ten (or whichever scale you prefer.) At the end of the week, review your notes to look for any patterns. For example, you might find that you begin to feel demotivated once you’ve been practicing for more than an hour, or that you feel more motivated in the morning, or some other pattern. This information could be enlightening for planning future deliberate practice sessions, even if it may disrupt your focus at the time. Another method is to simply take notes each day, documenting your current level of motivation to work on your chosen skill. Pay attention to any recurring influences. For example, you might feel more motivated to improve your skill after speaking with a more proficient friend, but less motivated after a bad night’s sleep.

One potent option for sustaining motivation is to find someone who can be a reliable cheerleader for you. In an Ask Me Anything session for Farnam Street members, Tesla co-founder Marc Tarpenning explained that having a cofounder is vital for entrepreneurs because partnering with someone else helps sustain motivation. It’s rare that both founders feel demotivated on the same day. So if one is struggling, the other can provide the encouragement needed to stay resilient. Having someone to provide extrinsic motivation when you need it can help you persevere at deliberate practice. Your cheerleader doesn’t necessarily need to be working on the same skill themselves. They just need to understand your reasons and be willing to remind you of them when you start to doubt whether the hard work is worthwhile.

Deliberate practice takes time and can be a lifelong process

Although deliberate practice tends to result in much faster progress than normal practice, truly mastering a skill is a lifelong process. Reaching the top of a field can take years or even decades, depending on its competitiveness. As the bar for success in many areas keeps rising, more deliberate practice is required to stand out.

When we applaud the top people in any field, we often fail to appreciate that their success almost always came after many years of deliberate practice, which Robert Greene refers to in *Mastery* as “a largely self-directed apprenticeship that lasts some five to ten years [and] receives little attention because it does not contain stories of great achievement or discovery.” They may have ultimately benefited from a lucky break, but their extensive preparation meant they were ready for it. Great achievements tend to come later in life or even near the ends of careers. Those who succeeded young started very young.

Throughout Ericsson’s decades of research, he searched high and low for an example of a true prodigy: someone born with an innate, remarkable talent. He never found a single proven example. Instead, he discovered that people labeled as prodigies invariably put in enormous amounts of deliberate practice—they just often obscured it on purpose or started at a young age.

Although innate differences count when beginning to learn something (and people who begin with advantages may be more likely to persist), in the long run, deliberate practice always wins out.

David Shenk writes in *The Genius in All of Us*: “Short-term intensity cannot replace long-term commitment. Many crucial changes take place over long periods of time.

Physiologically, it’s impossible to become great overnight.”

According to psychologist John Hayes, creative genius tends to come after ten years of studying relevant knowledge and developing skills. Hayes referred to this as the “ten years of silence.” In a study of seventy-six composers with sufficient biographical data available listed in *The Lives of the Great Composers*, Hayes found they almost always created their first notable works (defined as being those for which at least five different recordings were

available at the time) at least ten years after commencing a serious study of music. Just three of the five hundred works Hayes included in his sample were composed after less than a decade of preparation—and those were produced in years eight or nine. In additional studies, Hayes found similar patterns for painters and poets.

Later research reinforces Hayes' findings, and any casual survey of the lives of people widely considered to be geniuses tends to show a similar pattern. Making a breakthrough takes time. When it seems like someone was an overnight success, there's almost always a long period of silent deliberate practice preceding it. Innate talents are just a starting point. If we want to master a skill, we need to commit to working on it for a lengthy period of time, likely with few rewards. While there are no assurances that with struggle comes reward, without it the odds are lower.

Not only do world-class performers spend a long time getting good at their core skill, those in creative fields tend to produce an enormous quantity of work before gaining recognition. For every piece of work we're familiar with, there are likely dozens or even hundreds of others few people remember or ever saw.

For example, British prime minister Winston Churchill was known for his masterful public speaking. One of his best-known speeches "We Shall Fight on the Beaches," given in June 1940, displayed the extent of his command of oration and helped build morale at the time. But it's hard to overstate how prolific Churchill was as a speaker, giving an estimated 3,000 speeches during his political career. For every speech—an average of one per week between 1900 and 1955—he used deliberate practice to prepare. He engaged in focused rehearsals in front of a mirror, taking notes as he went to inform modifications. Churchill also left nothing to chance, planning his pauses and movements in advance. As well as devising his own techniques for added impact, he memorized the works of some of history's most inspiring orators.

Although he doubtless began with a degree of innate talent (his father, Randolph Churchill, was also an admired orator), Churchill clearly used extensive deliberate practice to build upon it. While this impressive resume and history solidified his place on the throne of oratorical excellence, it's important to note that he wasn't a "born speaker"—in fact, he made many mistakes. And he learned from them. If you want to produce a masterpiece, you need to accept that you'll make a lot of less remarkable work first.

Deliberate practice requires intense focus

"You seldom improve much without giving the task your full attention." —Karl Anders Ericsson

The deeper we focus during deliberate practice sessions, the more we get out of them. Intense focus allows us to increase skills and break through plateaus. Developing your attention span can have a huge impact on your life. When asked about his success, Charlie Munger once said, *"I succeeded because I have a long attention span."*

The authors of *The Game Before the Game* write, *"If you can pay attention for only five minutes in practice, then take a break every five minutes. If you can pay attention for only twenty balls, don't hit fifty. To be able to practice longer and maintain the quality of the practice, train yourself to pay attention for longer periods of time....Productive practice is about how present you can stay with your intention and is measured in the quality of the experience as opposed to the quantity of time used."*

A benefit of getting constant feedback is that it shows you what moves the needle towards improved performance and what is just running in place. Certain practice activities can feel good without having any impact. Top performers prioritize knowing what to prioritize. They always start with the most important thing because anything else is a distraction.

Intense focus is a multiplier of everything else. Keeping an eye on key metrics enables top performers to identify and systematically remove distractions from their lives. To be the best, you need to focus on both the micro and macro level. You need to pay full attention to what you're doing in the current practice sessions, and you need to know how it fits into

the bigger picture of your desired trajectory. Deliberate practice is part of the exploit phase of selecting opportunities.

As the authors of the *International Handbook of Research in Professional and Practice-Based Learning* write, “*Practicing the right things is at the core of the theory of deliberate practice.*”

How to implement this: Put the big rocks in first. You can do anything, but you can’t do everything. Figure out which practice activities have the biggest influence on your performance and plan to engage in those first before you even consider activities that offer marginal gains.

Deliberate practice leverages the spacing effect

One reason why consistent deliberate practice sessions over the course of years are more effective than longer sessions for a shorter period of time relates to the spacing effect. We can’t approach learning a skill through deliberate practice in the same way we quite likely approached studying for tests in school. If we better understand how our minds work, we can use them in the optimal way for learning. By leveraging the spacing effect, we can encode valuable knowledge related to our particular skill for life during practice sessions. Memory mastery comes from repeated exposure to the same material. The spacing effect refers to how we are better able to recall information and concepts if we learn them in multiple sessions with increasingly large intervals between them. The most effective way to learn new information is through spaced repetition. It works for learning almost anything, and research has provided robust evidence of its efficacy for people of all ages—and even for animals.

Spaced repetition is also satisfying because it keeps us on the edge of our abilities (which, as we saw earlier, is a core element of deliberate practice.) Spaced sessions allow us to invest less total time to memorize than one single session, whereas we might get bored while going over the same material again and again in a single session. Of course, when we’re bored we pay less and less attention. The authors of *Focused Determination* put it this way:

There is also minimal variation in the way the material is presented to the brain when it is repeatedly visited over a short time. This tends to decrease our learning. In contrast, when repetition learning takes place over a longer period, it is more likely that the materials are presented differently. We have to retrieve the previously learned information from memory and hence reinforce it. All of this leads us to become more interested in the content and therefore more receptive to learning it.

We simply cannot practice something once and expect it to stick.

By engaging in deliberate practice on a regular basis, even if each practice session is short, we leverage the power of the spacing effect. Once we learn something through spaced repetition, it actually sticks with us. After a certain point, we may only need to revisit it every few years to keep our knowledge fresh. Even if we seem to forget something between repetitions, it later proves easier to relearn.

How to implement this: Forget about cramming. Each time you’re learning a new component of a skill, make a schedule for when you’ll review it. Typical systems involve going over information after an hour, then a day, then every other day, then weekly, then fortnightly, then monthly, then every six months, then yearly. Guess correctly and the information moves to the next level and is reviewed less often. Guess incorrectly and it moves down a level and is reviewed more often.



The history of deliberate practice

Karl Anders Ericsson: The expert on expertise

“*Learning isn’t a way of reaching one’s potential but rather a way of developing it.*” —Karl Anders Ericsson, *Peak*

The concept of deliberate practice is attributed to Florida State University psychologist Karl Anders Ericsson, who along with his collaborators performed pioneering research in the field of expert performance. Ericsson spent decades seeking to answer the question of what it takes to become really good at something difficult. His research often focused on medicine, music, and sports.

Ericsson's interest in expert performance kicked off in the late 1970s, when he began working with psychologist Bill Chase at Carnegie Mellon University to study short-term memory. Together, they began a series of experiments to see how many random digits it's possible to memorize after hearing them once. Ericsson and Chase used an undergrad named Steve Faloan as their guinea pig. For a few hours each week, they read out numbers and Faloan repeated as many as he could recall.

Although the experiment might sound dull, they uncovered something intriguing. In a 1982 paper entitled "Exceptional Memory," Ericsson and Chase summarized their findings. Previously, researchers believed the average person could hold just seven random digits in their short-term memory. Yet with careful practice, Faloan began to remember more and more numbers. At his peak and after 200 hours of practice, he could recall 82 digits. To assess if this was a fluke, Ericsson tried the same with a friend, Dario Donatelli. Five years later, Donatelli could recall 113 digits. Both he and Faloan went far beyond what seemed to be an immovable ceiling on human performance and blew past existing world records. The experience of seeing two people who started off with ordinary memories enhance their capabilities in such a drastic way inspired Ericsson to further study the effects of practice on skills. Could it be that extraordinary abilities came from extraordinary practice, not just innate ability?

Through his studies of expert performers in a range of fields, Ericsson concluded they practiced their skills in a fundamentally different way than amateur practitioners. Ericsson described this kind of practice as "deliberate" due to its methodical, hyper-conscious nature. He argued that experts become experts largely as a result of the way they practice. They may benefit from innate advantages, but their talents themselves are not innate. Ericsson also believed that the standards in many additional fields could be improved far beyond their current level if practitioners employed the principles of deliberate practice. Indeed, many fields have seen remarkable increases in their standards for high performance over time. Today, high-schoolers manage athletic feats that were once Olympic level and children play music once considered world-class. This is possible because of better training and knowledge of what it takes to be the best. The more we improve how we train, the more we expand our range of possible performance.

In 2016, Ericsson published *Peak: Secrets from the New Science of Expertise*, a popular science book condensing his learnings from thirty years of research. He also co-edited the 2006 *Cambridge Handbook of Expertise and Expert Performance*.

Malcolm Gladwell: The 10,000 hour rule

The widespread awareness of Ericsson's work outside the scientific community is in part a result of Malcolm Gladwell's 2008 book, *Outliers: The Story of Success*. In the book, Gladwell attributed unusual success in different fields to a mixture of lucky factors (such as when or where a person was born) and around 10,000 hours of practice. He based this figure on research, including Ericsson's, that suggested top performers tended to have put in about that amount of time before reaching peak performance.

Gladwell showed how the success of Bill Gates, the Beatles, and other outstanding performers is not so much to do with what they are like but rather where they come from. "The people who stand before kings may look like they did it all by themselves," Gladwell writes. "But in fact they are invariably the beneficiaries of hidden advantages and extraordinary opportunities and cultural legacies that allow them to learn and work hard and make sense of the world in ways others cannot."

The so-called “10,000 hours rule” caught on. It’s a catchy idea, and many people took it to mean that anyone can master anything if they just put the time in. Ericsson himself disputed Gladwell’s representations of his research, which led to the widespread belief that the time someone spends practicing predicts their success, without emphasizing the quality of their practice.

Although the backlash against Gladwell’s calculation has arguably been exaggerated, it’s important to stress that research into deliberate practice emphasizes quality of practice, not quantity. It’s all too possible to spend 10,000 hours engaging in a skill without serious improvements. For example, most of us spend hours per day typing, yet we don’t see continuous improvements in speed and quality because we’re not using deliberate practice.

The useful takeaway from the “10,000 hours rule” is simply that it takes a lot of work to become the best. There’s no magic number of practice sessions, and everyone’s path will look different. Just because successful people in a given field have spent around 10,000 hours practicing their key skill, that doesn’t mean every person who practices that skill for 10,000 hours will become successful.

The limitations and downsides of deliberate practice

Part of us wants to believe expert performance is something innate and magical so we can recuse ourselves from hard work. The other part of us wants to believe that it’s something earned through blood, sweat, and tears—that we too could achieve amazing performance, if only we could devote ourselves to something.

Deliberate practice, in reality, is far more complex and nuanced than many people would have you believe. It’s not a panacea, and it won’t solve all of your work- and art-related problems. Let’s take a look at some of the limitations of deliberate practice.

First of all, deliberate practice is a necessary but insufficient part of becoming a world-class performer. You can’t rise to the top without it. But it’s not enough on its own to be the absolute best in any field. Once you reach higher echelons for any skill, everyone is engaging in a lot of deliberate practice.

If you’re aiming at expertise or just really good performance, deliberate practice will most likely get you there. But the higher you rise, the more luck and randomness end up mattering. However much you engage in deliberate practice, you can’t control the chance events (good or bad) that dictate a great deal of life.

When we look at the lives of top performers, they often benefited from specific backgrounds or opportunities, in addition to engaging in deliberate practice. For example, if you’re trying to become a champion chess player, it’s a big boost if your mother was a champion chess player. Not only will you have potential genetic advantages, you’ll have also likely grown up hearing about chess, been encouraged to practice it from a young age, and have someone to turn to for advice.

Seeing as it takes years of consistent deliberate practice to master a skill, people who begin early in life have an advantage over those who start later on. That doesn’t mean you can’t become exceptional at something you discover well into adulthood (just look at [Julia Child](#) or check out the book [Guitar Zero](#)). But it does mean that people who begin deliberate practice as kids are more likely to enjoy the success that makes it possible to keep committing to it. If you’re trying to master a skill while also having to work an unrelated job, care for your family, and deal with the other myriad responsibilities of adult life, you likely will have less room for it than a ten-year-old.

People who discover they want to master a skill or are encouraged to do so by others early in life have an advantage. Once the opportunity for practice is in place, the prospects of high achievement take off. And if practice is denied or diminished, no amount of talent is going to get you there.

In addition to lucky circumstances, high performers benefit from a combination of deliberate practice and innate talents or physical advantages. However much you practice, certain physical limitations are insurmountable. For example, if you're 165 centimeters tall, you're unlikely to become a professional basketball player. There are some physical abilities, such as particular kinds of flexibility, that can only be developed at a young age when a person's skeletal structure is still forming. It's important to be realistic about your starting point and be aware of any limitations. But that doesn't mean you can't develop workarounds or even use them to your advantage.

Another downside of deliberate practice is that the level of focus it requires can mean practitioners miss out on other parts of life. Top performers often devote almost every waking hour to practice, recuperation from practice, and support activities. For example, a professional dancer might spend several hours a day on deliberate practice with all of the remaining hours going toward sleep, low-impact exercise, stretching, preparing nutritious food, icing his feet, and so on. There is enormous satisfaction in the flow states produced by deliberate practice, but practitioners can absolutely miss out on other sources of happiness, such as spending time with friends.

Deliberate practice is part of the exploit phase of new opportunities. Yet sometimes we can end up having too much grit. We can keep persevering with the skill we're practicing right now, remaining overly passionate, past the point where it serves us. We can wear ourselves out or get hurt or fail to realize when it's no longer worth practicing a skill. For example, a new technology might mean our skill is no longer valuable. If we keep on deliberately practicing due to sunk costs, we'll be unlikely to see many long-term benefits from it. A crucial skill in life is knowing when to pivot. Focusing too much on our goals can blind us to risks.

In some fields, expertise is hard to quantify or measure, which makes it less clear how to structure practice. There may be no single target to hit or universal rule for what improves performance.

A final limitation to keep in mind is that, as Ericsson explained, *"the cognitive and physical changes caused by training require upkeep. Stop training and they go away."* If someone can't practice for a period of time, such as due to an injury or having a child, they're likely to see the skills they developed through deliberate practice deteriorate.



Summary

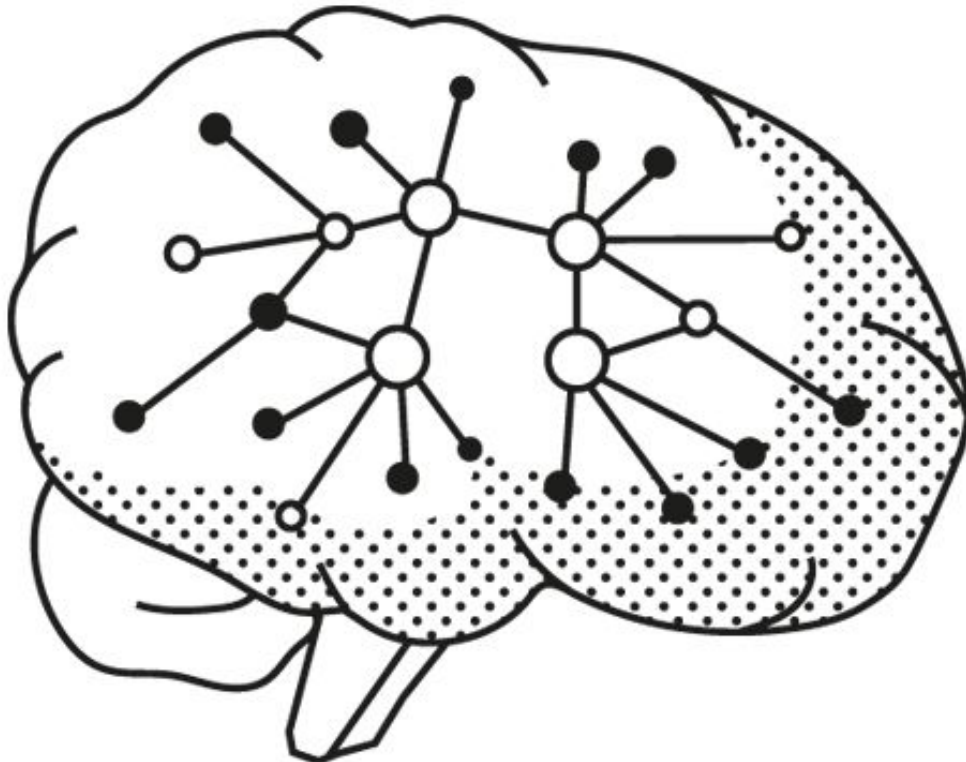
Deliberate practice isn't everything, but if you want to keep improving at a skill or overcome a plateau, you'll benefit from incorporating the principles mentioned in this article. To recap:

- Deliberate practice means practicing with a clear awareness of the specific components of a skill we're aiming to improve and exactly how to improve them.
- The more we engage in deliberate practice, the greater our capabilities become.
- Our minds and bodies are far more malleable than we usually realize.
- Deliberate practice is structured and methodical.
- Deliberate practice is challenging because it involves constantly pushing yourself out of your comfort zone.
- Deliberate practice requires constant feedback and measurement of informative metrics—not vanity metrics.
- Deliberate practice works best with the help of a teacher or coach.

- Continuing deliberate practice requires a great deal of intrinsic motivation.
- Deliberate practice requires constant, intense focus.
- Deliberate practice leverages the spacing effect—meaning a consistent commitment over time is crucial.
- If you're content with your current level of skill or just doing something for fun, you don't necessarily need to engage in deliberate practice
- Deliberate practice is best suited to pursuits where you're actively aiming for a high level of performance or to break beyond some kind of supposed limit.

53. Accelerated Learning: Learn Faster and Remember More

You can train your brain to retain knowledge and insight better by understanding how you learn. Once you understand the keys to learning, everything changes—from the way you ask questions to the way you consume information. People will think you have a superpower.



Learning is the act of incorporating new facts, concepts, and abilities into our brains. We start learning in the womb and we never stop; we are always developing new competencies. Every new bit of knowledge we acquire builds on what we already know and gives us a fuller, richer picture of the world. And the more developed our understanding of the world is, the easier it is for us to adapt and pivot when our circumstances change.

We know from biology that organisms that can adapt to their constantly changing environment survive and thrive. Those that can't eventually go extinct. The same is true for us in our life and work. We all know the person at work that hasn't adapted to the changing times. Their unwillingness to stretch themselves and learn something new makes it seem like they are moving backwards.

People can end up stuck with a static amount of knowledge because we don't just passively absorb new ideas and information. Learning something new requires active engagement. At FS, we see learning as part of our daily job. We get better to help you get better, and we give you the tools to learn.

The greatest enemy of learning is what you think you know. When you think you know something, learning something new means you might have to change your mind, so it's easy to think there's no room for new ideas. But not wanting to change your mind will keep you stuck in the same place. Overcoming our egos can be one of the big challenges of learning. Therefore, being willing to admit when you're wrong and adjust your thinking is the thing that will help you learn the most. The first step to learning is recognizing your ignorance and deciding to do something about it.

At FS, we believe that thriving in life means relentless lifelong learning. Things change quickly, and you can't coast on what you already know. The best approach you can take towards learning is one that helps you go to bed a little bit smarter each day.

WHY WE'RE BAD AT LEARNING

One reason why we're bad at learning is that we bring a lot of baggage to it—baggage we often pick up early in life and then struggle to let go of later. If you can let go of assumptions about what you *should* do, you can learn much more effectively. One major piece of baggage we accrue is the belief that if we're not visibly active, we're not learning. This is incorrect. Learning requires time to reflect. It requires discussing what you've learned and letting your mind wander. You need to let go of trying to *look* smart, and focus instead on trying to *be* smart.

We sometimes struggle with learning because we expect it to be easy. We'd all like to find a silver bullet: a quick, easy shortcut to picking up whatever we want and never forgetting it. The internet teems with blog posts promising you can learn a language in a week or to code in a month or how to play the violin overnight. This is all bull. Learning isn't just knowing something for a day. It's deep wisdom that allows you to create, innovate, and push boundaries.

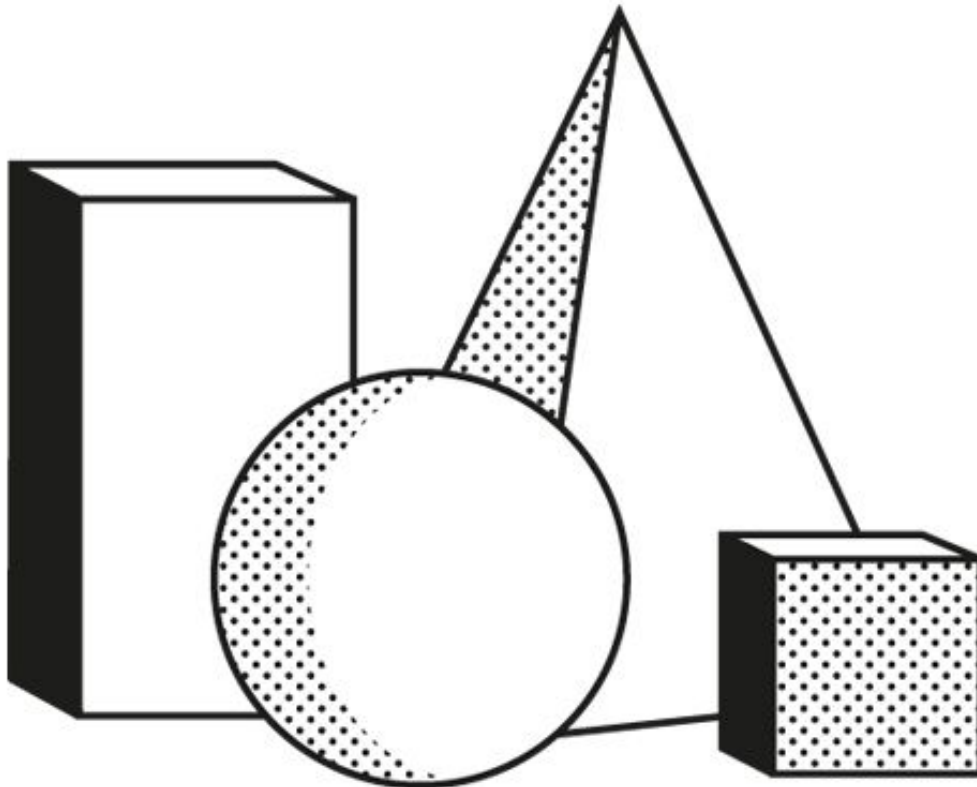
Another reason we're bad at learning is that the modern world erodes our attention spans by training us to be in a constant state of distraction. It might feel good in the moment to jump to the latest ping on your phone, but learning requires deep focus. When you're in a distracted state, new information can't fix itself in your mind, and you end up with gaps in your understanding. Focusing is an art—through experimentation and creativity, you can build systems that let you give your full attention to whatever you're learning.

When we talk about accelerated learning at FS, we don't mean you can overcome the need for hard work. We mean it's possible to find ways of learning that give you tangible results, instead of using ones that waste time or get you nowhere. But no matter what, you still need to do the work. Learning should be difficult, but that doesn't mean it can't be fun. In fact, you enhance your skills the most when you stretch yourself to the limits of your abilities. Pushing yourself to the point that feels challenging yet doable is the foundation of deliberate practice, the technique elite people in every field use to grow their expertise. Outside of your intellectual comfort zone is where you experience the greatest learning. For this reason, having a lot of helpful guidance early on can be counterproductive if it eliminates the all-important struggle to master new material.

You might fail if you move beyond what you find comfortable. You might apply new knowledge incorrectly or misunderstand the key points of an argument in a new field. This is painful. It also offers the opportunity to learn from your failures. We all hate looking dumb, but you can't let failure dissuade you from trying to expand your circle of competence.

TWO MAIN SOURCES OF LEARNING

There are two main places we can learn from: our own experience and history, or the experience of others. Exploring the distinction between the two can show us the best ways to learn from each of them.



Learning from history

You can learn from the experiences of others by studying history and applying its lessons to the present. History tends to repeat itself, so the dilemmas and decisions you face today often have historical antecedents. Studying the past helps us know how to shape the future. History is one of our biggest sources of fundamental knowledge.

Any time you learn from the past, remember that knowledge collapses over time. Much of what you know today will one day prove false, just like much of what people knew a century, fifty years, or even a decade ago has since proved false. Facts have a half-life, one that can be especially short in fields like medicine and the social sciences.

It is a mistake to think we have reached the endpoint of human knowledge, or that anything you learn now will be true forever. When you learn from history, you draw from lessons shaped by the perspective of the person who captured what happened. Thus,

historical knowledge is something to continuously update as you learn both from what happened and how you choose to look at it.

Learning from experience and reflection

In addition to reading, direct experience is the other main way we learn.

Double loop learning is a way of updating your opinions and ideas in response to new evidence and experience. When you keep repeating the same mistakes, you're using single loop learning. It doesn't get you far. When you reflect on experiences, collect new data, and make an active effort to seek out feedback, you're using double loop learning. Reflection allows you to distill experience into learning. Don't just "do," think about what you're doing and what you've done. High performers make adjustments based on both their successes and failures.

LEARN BETTER

We recommend the following two proven techniques for improving your learning.

The Feynman Technique

If you want to supercharge your learning, the single most effective technique we've uncovered for absorbing new concepts comes from the famed Nobel Prize-winning physicist Richard Feynman. The Feynman Technique ensures you understand what you learn. It includes the following four steps:

1. Choose a concept you wish to learn about.
2. Pretend you are teaching it to a child—a sixth-grader, specifically. Write your explanation down or say it out loud.
3. Identify any gaps in your understanding that might show up when you try to simplify the concept; go back to the source material to find the information you need.
4. Review and simplify your explanation again.

It works because writing out a concept in language a child would understand forces you to understand it at a deeper level. Sometimes we use jargon and complicated language to hide what we don't understand. The Feynman Technique lays bare the true extent of our knowledge.

Similarly, asking better questions is a route to faster learning. The most mundane questions—the ones a sixth-grader might ask—can sometimes teach us the most because they require an explanation that digs into the details.

How do you know if you've truly learned a new concept? Feynman proposed a simple alternate test: try to rephrase it in your own language without using its actual name. For instance, describe what enables a dog to run without using the word "energy."

Spaced repetition

Rote memorization doesn't work. Period. The key to effective learning is spaced repetition, a technique that works *with* the way your brain naturally retains information, not against it. Spaced repetition involves revising information at increasing intervals. This reflects and combats the fact that once you learn something you gradually forget it, with the forgetting happening fast at first, then leveling off. Using spaced repetition, you remind yourself of information often at first, then less often.

Memory mastery comes from repeated exposure to new material. In order to learn something, you need to retrieve it from memory again and again. Retrieval makes information stick even better than re-exposing yourself to the original material.

ARTICLES ON ACCELERATED LEARNING

- The more we learn about the world, the more we can learn about ourselves, according to Nietzsche.

- “Knowledge makes everything simpler”: advice for learning from executive and technologist John Maeda, including why you should teach yourself the basics and why metaphors are powerful for transferring information across contexts.
- Charles Darwin may not have had an unusually high IQ, but he was able to outpace other thinkers by learning how to balance out his deficiencies.
- Ken Iverson, the former CEO of Nucor Steel, believed MBAs should focus on teaching students how to understand and lead people above all else.
- Harvard biologist/psychologist Steven Pinker’s career is a testament to the benefits of multidisciplinary thinking. Here’s what he believes students should learn as part of a thorough education.
- In a charming letter to his son Hans, Albert Einstein said the best way to learn is to enjoy something to the point where you don’t even notice the time passing.
- Even the most skilled teachers struggle to overcome the reality that we forget most information shortly after being exposed to it. Effective learning requires building your own understanding, with the guidance of an expert teacher.
- Chess and martial arts genius Josh Waitzkin teaches us that the art of learning requires first mastering the fundamentals by breaking a skill down into blocks.
- “Mozart’s Brain and the Fighter Pilot” shows us that we get smarter by exercising our cognitive powers in the same way that we get stronger by exercising our muscles.
- Never learning to paint via the conventional route helped Vincent van Gogh approach his work in a unique way, noticing details a trained artist might not have.

THE BEST BOOKS ON LEARNING

- *The Art of Learning: An Inner Journey to Optimal Performance*, Joshua Waitzkin
- *The Laws of Simplicity*, John Maeda
- *Make It Stick: The Science of Successful Learning*, Peter C. Brown, Henry L. Roediger III, and Mark A. McDaniel
- *Mindshift: Break Through Obstacles to Learning and Discover Your Hidden Potential*, Barbara Oakley
- *Ultralearning: Master Hard Skills, Outsmart the Competition, and Accelerate Your Career*, Scott H. Young
- *Mastery*, Robert Greene
- *Brain Rules: 12 Principles for Surviving and Thriving at Work, Home, and School*, John Medina
- *Deep Work: Rules for Focuses Success in a Distracted World*, Cal Newport
- *Mindset: The New Psychology of Success*, Carol S. Dweck
- *The Talent Code*, Daniel Coyle

CONCLUSION

Learning isn't something you do at the behest of someone else. You're responsible for it. According to the prolific author Louis L'Amour, all education is self-education. If you don't take charge of your learning, no one else will. Maya Angelou and George Washington took the same view. It's up to you to build the habit of lifelong learning.

USE Feynman Technique

Feynman Technique

- I. **Choose a Concept, Idea, topic to Learn. Select a Topic You are interested in learning about and write it at the top of the blank page in the Notebook or Paper.**
 - A. Choose your topics carefully: Not everything that you study suits this technique. Usually abstract complex ideas are best understood by Feynman technique but ideas that are evidence-based/observational might not really be suited for this.
 - B. Selecting a concept to study compels you to be intentional about what you don't know. It also forces you to choose a topic that's small enough that it could reasonably fit onto one or several pages.
 - C. **You face what you don't know.** By writing a topic down on a blank page, you acknowledge you're starting from scratch or at least filling in some blanks. In doing so, take the initial step in the process.
 - D. **You need to be specific.** Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.
- II. **Use It For Real.**
 - A. Use it for real: perfectly suitable for weekly tech-talks, lectures, paper-reading, Study, Bible Study, Sermon or any type of study, deep work and deep study sessions.

III. Study The Topic By Reading, Listening, Watching and Communicating.

- A. You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.
- B. Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.
- C. Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.
- D. Make it your own.
 - Start with not knowing.
 - Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
 - Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.
- E. Take Notes On the Topic From Study.
- F. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.
- G. Don't write notes on notes: Life is short.
- H. Cornell Notes.
 - How Will I Take Notes and Cornell Note Take Method Pages 79-82.

IV. Simplify The Topic For Myself First.

- A. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- B. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- F. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to *obtain understanding*, not something you do once you already understand.

V. Reflect, Refine, and Simplify

- A. Only when you can explain the subject in simple terms do you understand it.
- B. Simple is beautiful.
- C. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- D. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- E. Go back to the source material, reviewing the parts you don't quite understand yet.
- F. Repeat until you have a simple explanation.

VI. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

A. Step 1- Use The Chosen Rules of Reading Method For Analysis, Syntopicon, Research, Investigative Journalism or Mixed Method and Follow Each Steps Of The Method Until Finish All Steps, While Re-listen Lectures, Read Books or Lecture Notes 1-100 Times For Each Step.

B. Step 2- Following Rules of Reading Methods:

C. VERY VERY FAST Reading- Skimming. Pages 47-51.

D. VERY FAST READING- Entertainment.

VII. Method 1-Speed Reading. FAST Reading. Pages 59-64.

E. FAST READING: Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.

II. Method 2-Use 80/20 Principle For Reading. Pages 68.

III. Method 3-Preview, Question, Read, Summary, Test (PQRST). Page 69.

IV. Method 4-Flip Through Pages and Analyse. Page 70.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.

VI. Method 6-Devotional Bible Read. Pages 73-74.

F. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- I. Method 1-Chapter Summary Method. Pages 143-147.**
- II. Method 2-Character Quality Method. Pages 148-160.**
- III. Method 3-Thematic Method. Pages 161-163.**
- IV. Method 4-Biographical Method. Pages 164-176.**
- V. Method 5-Topical Method. Pages 177-180.**
- VI. Method 6-Word Study Method. Pages 181-189.**
- VII. Method 7-Book Background Method. Pages 190-194.**
- VIII. Method 8-Book Survey Method. Pages 195-205.**
- IX. Method 9-Chapter Analysis Method. Pages 206-215.**
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- XII. Method 12-Book Synthesis Method. Pages 235-238.**
- XIII. Method 13-Theological Study Method of Bible Study. Pages 239-245.**
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- XVII. Method 17-Inductive Bible Study Method. Pages 269-296.**
- XVIII. Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- XIX. Method 19-Theological Group of Principles. Pages 303-306.**
- XX. Method 20- How To Read A Book Pages 307.**

G. VERY VERY SLOW READING- COMPLEX TEXT. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- I. Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- II. Method 22-How To Read A Book For Various Books. Pages 342-600.**
- III. Method 23- Syntopicon Pages 601-642.**
- IV. Method 24-The Craft of Research. Pages 644-882.**
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- A. Learning should be iterative. More often than not, learning something challenging takes several attempts. With the Feynman Technique, returning to the source material is an explicit part of the learning process. When gaps in our knowledge arise and our explanations aren't quite right, revisiting our primary and secondary sources can help solidify what we're learning.
- B. Getting it right will likely take several iterations. That's a good thing; the more you refine your explanations, the more your understanding will deepen. Learning becomes an iterative process. Rather than viewing learning as one-and-done, this step gives you permission to continuously refresh your knowledge.
- C. You're actively engaged. Using sources to polish our own explanations and models is an active process. When we learn passively, committing details to memory is more challenging. When we're actively part of creating our own summaries and reasoning, drawing intentionally from original information to fill our blind spots, we can more readily commit knowledge to our long-term memory.
- D. You expand your knowledge base. Paradoxically, the more we learn, the more *our capacity* to learn increases. Looking through a chapter of a textbook might feel like a different language the first time around. The second time it becomes more clear. The third time, with a strong base already, we pick up nuances we couldn't have possibly seen before.

VIII. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- A. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies..Why this step works:
- B. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- C. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

IX. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself. Alternately, actually teach it to someone else.

- A. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, *we've taken notes*.
- B. Remove any jargon or complexity.
- C. Only Use Simple Words. The words a child would understand.
- D. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- E. But true understanding requires a more active process like *teaching*. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
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- G. **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught them in their own words. If they can't do this, your explanation is too complex — simplify it and use plain language.
- H. **You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes

you to tackle even more challenging subjects knowing you have a solid framework for learning.

X. Reflect, Refine, and Simplify.

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IX. Organize and Review

- A. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about?
- B. When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year.

Trust the Quiz-and-Recall Method

Whether it's philosophy or calculus, the most effective way to imprint a concept is to first review it and then try to explain it, unaided, in your own words. If you can close your eyes and articulate an argument from scratch, or stare at a blank sheet of paper and reproduce a solution without a mistake, then you have fully imprinted that concept. It's not going anywhere. The same is not true if you merely read over something. Passively reviewing a concept is not the same as actively producing it. Most students make the mistake of relying only on passive review; they read and reread their notes and assignments, and assume that the more they read, the more they will remember. But as Ryan from Dartmouth warns: "Simply reading it over doesn't work. You have to make the extra effort to get it into your head."

Using the Quiz-and-Recall Method for Nontechnical Courses

To apply the quiz-and-recall method to nontechnical course material, you first need to construct a practice quiz for each chapter in your study guide. Fortunately, the questions for these quizzes already exist, since, if you've followed the advice of Steps #1 and #2, all of your notes should be in a question/evidence/conclusion format.

Therefore, the quiz for any given chapter can simply contain all of the questions from the notes you took for that chapter. You can be flexible here. If your notes contain some really broad questions—for example, an entire lecture that deals with only one idea—break them up into several smaller questions that, together, cover all of the relevant points. On the other hand, if your notes have a bunch of really small questions, you can combine some into larger questions to save space and time. This process is not an exact science; your goal is simply to produce practice quizzes that cover all the material contained in each corresponding chapter. If you can answer all the questions, then you understand all the big ideas. Once you've built your practice quizzes, go through them one by one. For each question, try to articulate the matching conclusion and provide some highlights from the supporting evidence. You don't have to reproduce the material in your notes word for word, but you do need a reasonable summary of the big idea and its support. Here's the important part: Don't do this only in your head! If you're in a private location, say your answers out loud using complete sentences.

However, if you are forced to review with other people around and you need to be quiet, then you can write out your answers. “The physical act of writing and the manipulation of the material in my mind was usually enough to keep things straight,” explains Melanie, a straight-A Dartmouth student. You don’t have to format these responses perfectly with correct spelling and grammar, but they must contain all of the pertinent information. No shortcuts. If you don’t say or write it, don’t consider it fully reviewed. Next, put little check marks on your quizzes next to any questions that you had trouble answering. Glance through your study guide to remind yourself of the right answers to these questions. Take a quick break.

Now, repeat the first step, except this time you need to answer only the questions that you marked during your first run-through. Put a new check mark next to the questions that you still have trouble with. Once again, look through your notes to get the right answers, and then take a quick break. Then go back to the practice quiz and try to answer the questions that you marked on your second run-through. You get the idea. Repeat this pattern until you complete a run-through without adding any new check marks. At this point, you’re done!

Using the Quiz-and-Recall Method for Technical Courses

The quiz-and-recall method is easily applied to technical courses. You already constructed your mega-problem sets; now you simply need to solve them. Start with the technical explanation questions—thinking about the general concepts first will make it easier to solve the specific sample problems that follow. As with nontechnical courses, try to provide an articulate answer for each problem, and if possible, give your explanation out loud, as if lecturing to a class. Otherwise, write out your answers clearly. Don't skip any important details. Once you're done with the technical explanation questions, move on to the sample problems. Try to answer each. Again, don't do this in your head. "I don't just read the material," explains Worasom, a straight-A student from Brown. "I write the important equations and concepts out by hand." Your solutions don't need to be as detailed as if this was a real assignment, but they should clearly demonstrate that you know what you're doing. If you can't explain exactly how you got from the question to the answer, then you don't yet understand this problem. Be honest with yourself: If you're just regurgitating memorized solutions, you aren't prepared to handle new questions on a test.

Memorize over Time

If you have material that must be truly memorized— dates, artists, chronologies, formulas—there are, unfortunately, no real shortcuts. You just have to keep working with your flash cards until you have no trouble providing the right answer, even after you shuffle the cards into a random order.

Memorization is particularly dependent on your available mental energy. It doesn't work if you try to commit items to memory for eight hours straight, but it does work if you memorize only an hour at a time and only one or two hours a day. So separate the task of memorizing from your other review. Spread the work out over many days, and never dedicate too much time to any one sitting with your flash cards. Melanie from Dartmouth recalls how some of her peers would "review their flash cards at any opportunity—eating dinner, waiting in line at an e-mail terminal," which is the most effective way to get through this tedious task and commit the necessary items to memory.

Step 5 Invest in “Academic Disaster Insurance”

Straight-A students have a knack for avoiding rogue questions. It's as if they invest in some sort of academic disaster insurance: protection against the unexpected return of those obscure topics that slip by when you doze off for a moment in class. In reality, this insurance policy is nothing more than a simple strategy: Eliminate your question marks. This technique can be employed throughout the term and, over time, significantly reduce the chance that you will be baffled by an unexpected exam question.

Eliminate Your Question Marks

In Step #1, we covered smart techniques for taking notes in class. If you remember, this strategy suggests that you put a question mark in your notes for any topic that flies by without you really understanding the conclusion. This will occur occasionally in both technical and nontechnical courses—sometimes as the result of your attention wandering and sometimes as the result of the professor heading off on a tangent and not offering a satisfactory explanation.

These question marks are dangerous. As Christine from Harvard puts it, by skipping a point made in a lecture, “you’re gambling with the possibility of being truly in the dark on the exam.” The scenario is simple. During the semester a few topics slip past your attention in class, so you end up with a handful of question marks in your notes. When it comes time to study, you have more than enough big ideas that you do understand, and that you need to review, so the occasional question-marked topic gets ignored. You enter the exam feeling prepared, and then, as luck would have it, you find yourself face-to-face with a big essay question covering one of those bypassed concepts. Whoops. To prevent this from happening, you need to eliminate these question marks. The key is to start this process well before the exam. If you leave all of these question marks unanswered until you start studying, you will end up spending many extra hours looking up the required explanations. Learning a large quantity of material from scratch during the review process is a mistake made by average students—and you should avoid this. Instead, try to knock off question marks as soon as they arrive. By the time you begin studying you should, as

Robert, a straight-A student from Brown, explains, “have at least a vague understanding of every topic that will be covered on the exam.” The following four tactics, if used regularly, will help you achieve this goal. They provide a solid defense against unclear ideas and will allow you to start the study process with an explanation in mind for all relevant topics.

- Ask questions during class. “When in doubt, I just ask questions in class for more clarification,” explains Worasom from Brown. If a topic slides by you, raise your hand and ask for a clarification. The more question marks you eliminate on the spot, the less work you will have to do later.
- Develop the habit of talking to your professor briefly after class. “Talk to the professor after class, or send him an email asking for clarification about questions that arose during his lecture,” suggests Jason from Penn. There is nothing unusual about this. Most professors will stick around for five or ten minutes after the bell to answer final questions. Take advantage of this time. When the class ends, head over to the professor and see how many of the question marks of the day you can get eliminated. You should then immediately correct your notes before you forget the explanations. Will this turn you into a brown noser? No! The brown nosers are those who come up to the professor only to tell him what parts of the lecture they found interesting, or to offer up some of their own “brilliant” thoughts on the topic. You, on the other hand, have a list of focused questions that you want answered, which makes you seem smart, not snivelling.
- Ask classmates. If you’re still unclear, James, a straight-A student from Dartmouth, recommends that you “talk with other people about the topic.” Send an e-mail or corner them in the hall soon after the lecture. If they understand the topic, it will take them only a few minutes to explain it to you while it’s still fresh in their minds.
- Come prepared to exam review sessions (if offered). Many classes offer a formal review session the week before the exam. Go to these. Before you arrive, jot down all of the topics from your notes that you are still unsure about. Then, during the session, try to get all of them answered. Don’t be worried about having a lot to discuss. More often than not, review sessions suffer from too few student questions, so your professor or TA will appreciate your preparation.

The goal of these defensive tactics is to eliminate your question marks without adding any study time. If, however, despite your best attempts, some of these unclear topics persist until your review, your last-ditch defense is to skim. You probably won’t have time at this

defense is to skim. You probably won't have time at this point to look up detailed explanations from scratch for every leftover question mark. And, even if you did, the effort would be way too time consuming (remember: Straight-A students avoid long study hours), so skim over just enough material to have something to say for each of these points. On the off chance that one of these lingering question-marked topics comes up on the exam, at least you won't leave a blank page. But this situation can still be dangerous, so follow the first four strategies to reduce the topics you don't understand as much as possible before your studying begins.

Step 6 Provide “A+” Answers

Even the most prepared student can bomb an exam due to poor test taking skills. The potential pitfalls during an exam are numerous, but the most common are: (1) running out of time and (2) providing answers that, although detailed, don't fully answer all parts of the question being asked. In fact, these two dangers work together in a devilish counterbalance, making them particularly hard to conquer. That is, if you try to avoid spending too much time on questions, then you are likely to provide time on questions, then you are likely to provide

incomplete answers. On the other hand, if you try to provide detailed answers, then you are likely to run out of time.

The situation sounds dire, but it's not. With the right strategy, you can eliminate these fears and ensure that your grade properly reflects your level of preparation. Straight-A students recognize this point, and when asked about test-taking, they provided detailed responses, proving that for them, this final step is no mere afterthought. They treat the test-taking process with great respect, and this attention is reflected in their consistently high grades. Their advice has been culled into five key strategies. Together, they provide a comprehensive test-taking system, finely tuned through experience to maximize performance. Follow these rules on every exam, and you'll be able to transform yourself into a test-taking machine—cool, confident, and ruthlessly efficient as you move from question to question, providing the best possible answers.

Strategy #1: Review First, Answer Questions Later

“I always read through the entire exam first,” explains Robert from Brown. This is good advice—for any exam, your first step should always be to review all of the questions. If it’s an essay exam or a technical exam with a relatively small number of questions, then read each prompt carefully. If the exam is multiple choice or contains many questions, skim through quickly and get a feel for which topics are covered. This review familiarizes you with the length and relative difficulty of what lies ahead. It also primes your brain for the topics you’ll need to address. “Always scan all the questions,” explains Anna from Dartmouth. “This allows your mind to think about all of them, even while you are focusing on one in particular.” In other words, while you toil away on an early question, another part of your brain, working in the background, will begin to retrieve information relating to the topics still to come. This actually happens, and it helps you answer the later questions more quickly.

Finally, and perhaps most significantly, this first step also helps you relax. Stress proliferates in a classroom right before an exam is distributed. It’s a make-or-break situation. Months of effort have led up to this single moment, and you have only a scant hour or two to prove what you know and secure your final grade. You begin to question yourself. Did you study everything you needed to? Have you forgotten important ideas? What if the to? Have you forgotten important ideas? What if the exam focuses on a subject you know nothing about? If you left it blank, what would happen then? Just thinking about this situation is enough to make most undergrads sweat.

However, by taking the first few minutes to carefully review the exam, you break this mounting tension. It gives you something productive to do that doesn’t involve actually answering questions. Once you complete this task and build a better idea of what to expect, the exam becomes less menacing. You’ve seen the questions, and (hopefully) none seem impossible. You begin to say to yourself: Okay, maybe this isn’t all that bad. Your confidence rises, your heart rate lowers, and your stress begins to dissipate. Now you can turn your full attention to providing standout responses.

Strategy #2: Build a Time Budget

At any given point during an exam, you should know the maximum number of minutes you have to spend on the current question before moving on to the next. As Doris from Harvard puts it: “I lay down very strict time limits for myself on each question.” This strategy goes a long way toward avoiding time trouble; it keeps your attention focused and prevents you from spending too much time on any particular question. The key to maintaining this keen awareness is to build a time budget. First, take the time allotted for the exam and subtract ten minutes. Next, divide this amount by the number of questions. The result is how long you have to spend on each prompt.

What should you do with this information? For an exam with a small number of questions, mark right on the test pages the time when you should begin and finish each one. For an exam with many questions, divide the exam into equal fourths, then jot down the time you should begin and end each section. In both cases, these recorded times will keep you updated on how close your current progress matches your predetermined schedule. Why do we subtract ten minutes in the first step? This provides a safety buffer. You want a few extra minutes available here and there to be able to double check your answers when you are finished, or go back and add more insights to questions on which you were rushed

Strategy #3: Proceed from Easy to Hard

Straight-A students almost never answer exam questions in the order that they are presented. Years of informal experimentation by successful students have demonstrated that the most effective way to tackle an exam is to answer the easiest questions first, and this is exactly what you should do. Start with the most approachable questions before moving on to the more forbidding. Don't worry if this has you skipping around all over the exam—in most cases the provided order is irrelevant. The advantage of this approach is that it first focuses your energy on the questions you know the most about, ensuring that you get maximum points on these. It also gives you a better chance of conquering the more difficult ones. “I always skip a question if it does not come to me immediately,” explains Ryan from Dartmouth. “This keeps my mind clear to answer other questions and hopefully something will jog my memory.” When you come across something hard early on in the exam, your natural instinct is to panic. You have so many more questions to finish, and you can almost feel the minutes ticking away as you stare blankly at this one particular

roadblock. It can be tough to get your focus back to wring out as many points as possible from the easier questions that follow. If, instead, you tackle this same roadblock at the end of the exam, you'll find that the situation seems less dire. You've answered everything else, so all that's left to do is working out this final puzzler. More often than not, you will find the mental block diminished. Without the pressure of other questions looming in the background, you can take a more relaxed approach. You might not know the best answer, but you can spend some time to devise a reasonable answer. Because you have nothing else left to finish, you can spend the remainder of the time polishing this answer, thinking, and repolishing. The result is the strongest possible outcome given your state of preparation.

Strategy #4: Outline Essays

When facing an essay question, don't just start writing and see what happens. This approach leads to rambling answers and missed concepts. Instead, your first step should be to jot down a quick outline. This might seem like a waste of time, but in truth it can be invaluable.

First, reread the question carefully. As Matthew from Brown explains: "Usually, you can isolate three or four mini-questions from a single essay question." Underline each of these mini-questions; this will help you flesh out your outline and avoid an incomplete answer. "Then, outline on paper (not in your head) the way that you will use what you know to answer these mini-questions," continues Matthew. To do so, use the margin of the exam to jot down all of the points you can recall that are relevant to the question. Record only a few key words for each point to save time and space. For example, if you want to mention an argument made by an author named Robert Caro dealing with Lyndon Johnson's views on race relations, you might jot down: "Caro—race." Next, go back and check the question parts you underlined in the first step. Make sure each is adequately addressed by the points you just noted in the margin. When you're sure that you have identified all the relevant information for the essay, number these points in the order that you want to present them. Only now should you begin writing your essay. Follow your outline, and the writing will proceed smoothly. You should be able to quickly produce a solid response that draws on everything you reviewed and addresses all parts of the question asked.

Strategy #5: Check Your Work

Advice and go back and check your work. You will be surprised by how many times this final review turns up a mistake in a technical problem or an important concept that you forgot to mention in an essay. If, after your first round of review, you still have time left over, then go through and check again. If there is a problem you feel particularly shaky on, use this time to go over it in detail, augmenting the answer wherever appropriate. Don't worry about using carets and arrows to add in new phrases and facts to your essays, or to point out added steps in your technical problems. Neatness doesn't count on exams; it's the content that matters. It's tempting to relax after finishing your exam, perhaps walking proudly to the front of the classroom and handing it in before anyone else. But aside from the wistful stares of your classmates, this strategy is ill conceived. Double checking your work up to the last minute can make the difference between an above-average student and an academic star.

Part Two Cheat Sheet

Step #1. Take Smart Notes

- Always go to class and try to take the best notes possible.
- For nontechnical courses, capture the big ideas by taking notes in the question evidence/conclusion format.
- For technical courses, record as many sample problems and answers as possible.

Step #2. Demote Your Assignments

- Work a little bit each day on your assignments; avoid suffering from day-before syndrome.
- Read only the favored sources on the syllabus in detail. To decide how much time to spend on supplemental sources, remember the importance hierarchy: – readings that make an argument are more important than – readings that describe an event or person, which are more important than – readings that only provide context (i.e., speech transcripts, press clippings).
- Take reading notes in the question/evidence/conclusion format.
- Work in groups on problem sets, solve problems on the go, and write up your answers formally the first time.

Step #3. Marshal Your Resources

- Figure out exactly what the test will cover.
- Cluster your notes for nontechnical courses.
- Build mega-problem sets for technical courses.

Step #4. Conquer the Material

- Embrace the quiz-and-recall method. It's the single most efficient way to study.
- Spread out memorization over several days. Your mind can do only so much at a time.

Step #5. Invest in "Academic Disaster Insurance"

- Eliminate the question marks for topics covered in class or from the reading that you don't understand.

Step #6. Provide “A+” Answers

- Look over the whole test first.
- Figure out how much time you have to spend on each question (leaving a ten-minute cushion at the end).
- Answer the questions in order of increasing difficulty.
- Write out a mini-outline before tackling an essay question.
- Use any and all leftover time to check and recheck your work.

Essay and Papers

Paper writing is hard, but the good news is that it doesn't have to be as hard as most students make it. Let's begin by taking a closer look at the paper-writing process itself, which can be broken down into three separate components:

1. Sifting through existing arguments.
2. Forming your own argument.
3. Communicating your argument clearly.

The sooner you dispel the notion that writing is the most important part of paper writing, the easier it will become for you to reap the benefits of the straight-A approach.

Research Papers vs. Critical Analysis

Essays

Writing assignments come in many varieties. Some require a lot of original research, whereas others require only a critical discussion of a topic introduced in class. Some have ulcer-inducing length requirements, whereas others ask for only a handful of pages. We capture these differences with the simple classification scheme of research papers versus critical analysis essays. Some assignments, of course, may fall outside of these two descriptions, but, for the most part, they capture the major variations in paper writing. All of the advice that follows explicitly describes which of these two types it applies to.

Research Papers

A research paper requires you to choose a topic within provided parameters and then devise an original thesis relevant to your chosen topic. For example, the broad parameters for your topic choice might be “anything involving the British Empire,” the specific topic you choose from within these parameters might be “public schools and the British Empire,” and the thesis you choose might be “the public school system in nineteenth-century England had a curriculum specifically tailored to the requirements of the British Empire.”

Research papers require original research to support your original thesis, and, accordingly, their page lengths are long and their due dates are generally a ways off from when they are assigned. If you spread out the work appropriately and choose the right topic, research papers can provide a rewarding intellectual challenge. Proposing and supporting an original argument is exciting. However, if left until the last minute, these assignments can become a nightmare. More than a few students have suffered a nervous breakdown from the stress of tackling a major research paper at the last moment. So for these assignments in particular, take careful note of the scheduling recommendations that follow.

Critical Analysis Essays

Critical analysis essays are the bread and butter of most liberal arts classes. These essays are short, and they typically require you to analyze one or more of your class reading assignments. They are often set up as a comparison, for example: “How do Nordlinger and Hopkins differ in their approach to understanding American Isolationism. What cultural and theological sources account for these differences?” Critical analysis essays differ from research papers in several significant ways: Topics are provided in advance, your thesis is nothing more than a specific answer to the question asked in the assignment, and there is little-to-no original research required. Not surprisingly, these essays require less time to complete than research papers. Their goal is to test your understanding of the material presented in class, not to seek out and present new ideas. Don’t get the wrong idea—these essays are not necessarily easier than research papers. College writing assignments follow a simple rule: The required precision of your thinking works in direct proportion to the constraint of the material. That is, the more specific the assignment, the more subtle and detailed your thinking must be. So beware. If your assignment covers only one chapter, then you’re going to need to understand every word of that chapter and be able to articulate your analysis with precision.

Step 1 Target a Titillating Topic

Remember: A topic does not equal a thesis. A topic describes an interesting subject or area of observation. A thesis presents an interesting, specific argument about that subject or observation. Let's look at some examples. As mentioned, for a critical analysis essay, the topic is provided, so this step won't be applicable. For a research paper, however, you get to choose the topic—so we'll focus on the specific case of research paper topic selection for the remainder of this section.

Choosing a Research Paper Topic

Typically, the professor will provide some loose parameters. For an art history course, these might be: parameters. For an art history course, these might be: "Any artist covered in the class so far." For a political science class they might be: "Economic policy and Latin America." The key is to choose a topic, within the constraints of the assignment, that excites you. All work that follows on your paper will stem from this topic; if you are not intrigued by the idea, then the paper-writing process will be tedious. If, on the other hand, you are fascinated, or at least curious, then the process will be that much easier. The best way to identify a titillating topic is to start looking for one early. "I work on topic ideas in my head and on scraps of paper beginning anywhere from a week to a month in advance of the actual deadline for a paper," explains Doris, a straight-A Harvard student. Follow this approach. On the very first day of class, read the description of the research paper(s) that will be assigned. The syllabus should describe each paper's topic parameters, and the professor will usually discuss these assignments briefly early on in the term. Once you know the parameters for the paper, you should constantly be on the lookout for a particular subject or observation that interests you. If one reading assignment really grabs your attention, jot down the topic so you'll remember it later. If a professor poses an interesting question during class, or piques your curiosity by describing a compelling open area of research, make a note of it. As Sean, a straight-A student from Yale, explains: "Keep an eye out for concepts that interest you in the readings and lectures. If there's something that grabs you, it will probably make a good topic." If you have trouble finding a topic in advance, you have two options. First, as Chien Wen, a straight-A student from Dartmouth, advises: "Approach your professor with some ideas you have and let him recommend some appropriate readings." Professors know their field well, so they should have no trouble pointing you toward some resources to help flesh out your initial thoughts. Second,

as Chien Wen also advises: “Read your primary sources carefully.” Grab a textbook or similar general source from the class, and then skim through and look for angles that catch your attention, passages that make you ask “why,” or descriptions of competing arguments debating an interesting subject. “Be imaginative and intuitive—look for unusual connections between individuals, ideas, and broader themes,” says Chien Wen. In general, the more care you take during this first step, the easier the rest of the paper-writing process will be, so take your topic choice seriously.

Step 2 Conduct a Thesis- Hunting Expedition

You need to construct a thesis that makes a compelling argument concerning this topic. Once again, for a critical analysis essay, most of the work toward constructing your thesis has already been done for you. Typically, the essay prompt will contain a specific question (i.e., “How do the two arguments differ?” or “Why does the author say this?”), and your thesis is a summary of your answer. For a research paper, on the other hand, you might be dealing with a very broad topic that requires significant digging to find an interesting and supportable idea that can be expanded to fit the required page limit. In both cases, some initial research is required. A thesis devised from scratch is dangerous. Without some initial exploration, you have no idea whether or not your idea is viable, and there are few experiences worse than being forced to restart a paper after many hours of work. At the same time, however, you don’t want to dedicate days to intensively reading every book in the field in search of a perfect thesis, because this would be inefficient. For a critical analysis essay, the solution is simple: Review both the reading notes and lecture notes that relate to the essay prompt. And that’s it! This should provide a rough idea of how you are going to answer the question posed by the assignment. Therefore, your thesis has been found. Even though it’s simple, don’t skip this step for critical analysis essays. The earlier you develop an idea of what you are going to say, the more time you have to refine the nuances of your argument. For research papers, on the other hand, the task of finding a thesis is more complicated. No sources have been preselected for you, and no specific question has been provided. All you have is a general topic that you thought up yourself. Now you must wade into a vast sea of knowledge and somehow find enough material to devise a strong thesis—while avoiding drowning in the sheer volume of available information. Not surprisingly, the straight-A students interviewed for this book have mastered the art of conducting research paper thesis-hunting expeditions. Their goals are twofold: (1) find an interesting thesis that can be supported within the scope of the assignment; and (2) minimize the time required to conduct this search. Accomplishing both of these goals sounds hard, but straight-A students get it done. What’s their secret? One simple phrase: Start general, then move one layer deep. Let’s take a closer look at what this really means. Start General, Then Move One Layer Deep “I usually begin with basic sources,” explains Chris, a straight-A student from Dartmouth. “If I’m doing a paper on the Kurds in Turkey, for example, I get a recently published general history on this topic.” Similarly, if your topic is Faulkner’s early writing, you might find one or two Faulkner biographies and then focus only on the chapters dealing with his early years. If you have a

hard time finding a few general sources for your topic, then ask your professor—he'll have plenty of titles to recommend. In addition, keep in mind that most courses set up a reserve shelf at the campus library. This shelf contains books that were selected by the professor because of their relevance to the course. Typically, you can check out reserve books for only a couple of hours at a time, so they should always be available to the students who need them. This is a great place to find general sources. So that's step one (the "start general" part of the strategy). The reason we need a second step is because you shouldn't expect to find your thesis idea in a general source. Of course, you might get lucky and find an interesting thesis during this first step. In general, however, overview sources will be much too broad to reveal a targeted and interesting argument that hasn't already been written about extensively. The main reason you found these general sources is to get at their bibliographies. As Chris goes on to explain: "I read any chapters from my general sources that look useful for my paper. I then look up the sources used in that chapter." In other words, the second step of your thesis-hunting expedition is to examine the list of books and articles cited in the relevant sections of your general sources. From this list, choose the cited works that look the most promising, and then go find them in the library. These sources will be more focused—perhaps journal articles or books addressing only a small number of specific arguments. You are most likely to come across an interesting and appropriately targeted thesis idea using these more focused sources. Let's apply this approach to our Faulkner example from before. Perhaps one of our general sources cites a journal article on the influence of a specific European modernist writer on Faulkner. You find this journal article, and while reviewing it you notice that it mentions, in passing, a list of other modernist writers who might have had a similar influence. Aha! Now this could be an interesting thesis. You might choose one of these modernists from the list and then look for historical evidence of their connection to the primary writer. Perhaps, instead, one of the general sources talks about a period of Faulkner's life that he spent in Europe. Maybe it also mentions that our only records of this travel are letters written by the young author himself, and then it provides a citation to a collection of these letters. You then locate these letters, begin to read through them, and notice that he mentions a particular bar in London several times. This too might be a source of a fascinating thesis. You could investigate the intellectual climate of London nightspots of the time and posit their potential influence on Faulkner's work. From there, perhaps the core of your paper could be to present a piece of writing from right before the trip, and another from right after, and then argue which stylistic changes may have been influenced by his foray into the intellectual intensity of the London literary milieu. The key is to keep in mind that even very small observations can

lead to large, interesting discussions. How do you know your thesis idea is good enough to support an insightful paper? “A great thesis typically has at least these four qualities,” explains Christine, a straight-A student from Harvard. “It’s provocative, nuanced, direct, and inclusive.” She goes on to warn: “A thesis should, at the same time, also show a grasp of the complexities of a subject—‘in this poem, X symbolizes Y because Z’ is a weak type of thesis structure, far too reductive and simplistic—don’t be afraid to leave room for ambiguity and unresolved issues.” Wendy, a straight-A student from Amherst, puts it simply: “The most important part of your paper is the thesis. Once you have a solid thesis, the rest just falls into place.” Here’s the tricky part: Your thesis will change and evolve as you continue the paper-writing process. This is inevitable, because you haven’t done your exhaustive research yet. At this early stage, your thesis more likely explains the type of connection or answer you hope to find, rather than the final connections and answers themselves. To revisit our Faulkner example, your early research may indicate that the social milieu of a certain London nightspot influenced a young Faulkner, but you might not yet know all the ways this influence was manifest. More research is required, and that’s okay. You should embrace this evolution of your ideas as the process continues. For now, it’s sufficient that your fledgling thesis looks like it’s on the path toward fulfilling the properties mentioned above. In other words, before continuing, make sure that your preliminary research strongly indicates that something similar to your thesis idea will be supported by the more detailed investigations to follow. Be honest with yourself: If you made up your thesis simply because it sounded cool, but have no real reason to believe it to be true, then you’re courting a paper-writing disaster. If, on the other hand, several pieces of early evidence point to the types of interesting connections described by your thesis, then you’re on the right track.

Step 3 Seek a Second Opinion

At this point you should have an interesting topic and a targeted thesis. You're well on your way toward a standout paper, but don't get too far ahead of yourself. It's time to take a step back. More than a few students have dived deep into the paper-writing process, supported by what they thought was a compelling thesis, only to find out many pages later that their premise was not as strong as it initially seemed. Perhaps they fail to find enough evidence to support the argument. Perhaps they stumble across another source that has already made the exact same point. Or, as is often the case, perhaps they find their thesis to be too broad to be succinctly argued within the scope of a paper assignment. The thesis-hunting tips of the last step help eliminate this possibility, but they're not enough by themselves. Once you think you have a good thesis, a final step remains before diving fully into the research and writing process. As Rielle, a straight-A student from Brown, explains: "I often talk to a professor to clarify my ideas before I begin writing." This is great advice. For every research paper and significant critical analysis essay (i.e., assignments more than just a few pages long), you should make a habit of discussing your targeted thesis idea with your professor. Go to office hours, or make an appointment, explain your topic and thesis, then ask the following questions:

- 1. Is my idea appropriate for the assignment?*
- 2. Does it cover too much?*
- 3. Is it too simple?*

For a critical analysis essay, if the professor deems your thesis appropriate, this is a good sign that you are not going to get stuck. You can now move ahead with confidence. For a research paper, if the professor deems your thesis appropriate, take advantage of this time to explain some of the sources you plan to examine. The professor will likely have some additional sources to suggest. Write these down. This just saved you some suggest. Write these down. This just saved you some serious research time! For both types of papers, if the professor isn't enthusiastic about your thesis idea, then he or she will likely help you adjust it into something that is reasonable. When you leave this meeting, which should require only ten to twenty minutes, you will have confidence in the foundation of your paper. You can now move full speed into the research stage without fear of reaching a devastating dead end later on in the process. It's amazing how many students ignore this incredible resource. One simple meeting can make the difference between a standout work and an incoherent dud. Remember, this step is not intended as a shortcut. If

you skipped the previous step and show up at office hours without a targeted idea, the professor is not going to give you one for free. However, as Christine from Harvard explains: “They’ll rarely refuse to listen if they see you’ve thought things out in advance.”

Step 4 Research like a Machine

Not surprisingly, research is the domain of the research paper. For a critical analysis essay, your sources are already specified, and there are probably only one or two of them. Therefore, when working on an essay, you can skip this step and move on to Step #5 (Craft a Powerful Story), which describes how to organize your argument. For research papers, however, the following advice is crucial. Why? Because how you research can make or break your paper-writing efforts. If your strategy is haphazard—as is the case with most students—then two immediate problems will arise. First, the writing process will become frustrating and tedious, since you will be forced to continually stop and seek out new sources to extend your argument. Second, and more important, the resulting paper will be weak. A good argument requires a solid grasp of all relevant information. You want all the necessary facts and ideas to be at your fingertips, easily manipulated, sourced, and shuffled, as you build your case. If your sources are incomplete and disorganized, then your paper will be, too. On the other hand, you can also run the risk of spending too much time on research. Many eager students have succumbed to the horrors of research recursion syndrome—an unhealthy need to go find “just one more source,” often leading to hours and hours of wasted time, dorm rooms overwhelmed with teetering stacks of books, and one seriously sleep-deprived student. This is grind territory, and you should avoid it at all costs. So while at first glance it may seem easier than choosing a thesis or writing the paper itself, in fact the research step of paper writing is easy to get wrong. Fortunately, straight-A students have figured out a way to walk the research tightrope—getting the information they need without becoming lost amid the endless available sources. Their strategy can be summarized by a simple phrase: Research like a machine. They follow a system—a mechanical process, the same for every paper—that produces consistent high-quality results. Feed them a thesis, watch their wheels turn, and then out pops a set of photocopied, organized, and annotated notes. Their system ensures that the quality of their research is sufficient to fuel a standout paper and at the same time requires the minimum amount of time to achieve this goal. Sounds pretty cool, right? But how does it work? Their system is based on these four steps:

1. *Find sources.*
2. *Make personal copies of all sources.*
3. *Annotate the material.*
4. *Decide if you're done. (If the answer is “no,” then loop back to #1.)*

That's it. The devil, of course, is in the details. So let's take a closer look at what each of the steps entails.

1. Find Sources

There are two types of sources: general and specific. As described in Step #2, the former include overviews of your topic (i.e., biography or textbook), whereas the latter focus on specific arguments (i.e., a journal article or book about a specific event or idea). For a college-level paper, most of your best information is going to come from specific sources. The hard part, of course, is finding them.

Step #2: Start with general sources and then look in their bibliographies for more targeted resources.

As David, a straight-A student from Dartmouth, says: "Once you have two or three materials that you like, it's all about the bibliographies...find out where the author found the fuel for his arguments and go check those out." In Step #2, I suggested that you ask your professor or browse the course reserve shelf to find some of these general sources. Another place to look is your library's online card catalog. This sounds obvious, but using an online catalog correctly is not a trivial task. Just typing in keywords might not turn up every book that deals with your topic of interest. You need some more advanced tricks. One such trick is to take advantage of the Library of Congress (LOC) topic classifications. What are these? The Library of Congress tries to classify all books into one large hierarchy of topics. For example, Heinrich Harrer's fascinating book *The White Spider* (an account of the first team to ascend the infamous North Face of the Eiger Mountain) is described by the following two classifications:

1. Mountaineering—Switzerland—Eiger—History

2. Eiger (Switzerland)—Description and travel

When you find a book in an online card catalog, its corresponding LOC topic classifications should be listed. The cool part is that these topics should also be hyperlinked. That is, if you found an entry for *The White Spider*, you could click on Mountaineering—Switzerland—Eiger—History to return a list of every book in the library under this classification. Therefore, if you find one general source on a topic, then you can easily find many others. And once you have found general sources, you can turn to their bibliographies to find something more specific.

The second strategy for finding specific sources is to search for them directly. This approach is important. Not every specific source relevant to your thesis can be found in the bibliography of a general source. This is particularly true for more recent scholarship. Books take a long time to write; if a paper was published only within the last few years, it is

probably too soon to find a general tome that cites it. The problem here is that specific sources can be difficult to find. For example, continuing with the Eiger topic introduced above, let's say your thesis within this topic is: "The many failed attempts to ascend the North Face of the Eiger played an important role in the development of Swiss cultural identity during the first half of the twentieth century." Finding a general source about the Eiger, such as *The White Spider*, is easy enough. But finding a targeted source on the impact of the Eiger on Swiss cultural identity will be significantly more complicated. Simply typing "the impact of the Eiger on Swiss cultural identity" into the library card catalog probably won't turn up many hits. So how do you locate these elusive specific sources? There are four main search tactics.

Search Tactic #1: Break Up Your

Query into General Chunks If you can reduce your specific query to a group of related, yet succinct, general searches, you will have a much better chance of finding a relevant source. Following the Eiger example, you might try:

- Alpine hiking Switzerland culture
- Switzerland cultural identity
- Alpine hiking
- Mountaineering Switzerland

Any one of these more general queries could turn up a source that either directly references your thesis or makes a point that supports your thesis. With practice, you will get better at constructing these general probes aimed at illuminating a specific idea.

Search Tactic #2: Use Journal Databases

As mentioned, specific sources are more likely to be scholarly articles than books. Your library card catalog does not index articles. Therefore, as Chris from Dartmouth recommends, you should consider "article database searches (like JSTOR) on the specific topic." How do you find these databases? Your library Web site should contain a list of available electronic resources. At some point during your freshman year, you will probably be given an orientation on this topic. (Even if you sleep through it, as most of us do, it shouldn't be that hard to figure out.) This list of resources is usually broken up by academic concentration (i.e., Political Science, Anthropology, and so forth). Go to the concentration relevant to your paper, and you should see a list of searchable archives. Many of these resources will be databases of scholarly articles, so search these focused

databases using the general search term chunks described in the preceding tactic and see what pops up. If your topic is interdisciplinary, meaning that it draws from multiple academic concentrations, follow Chris's advice and try a big database like JSTOR (<http://www.jstor.org>), which contains scholarly articles on a large variety of academic topics.

Search Tactic #3: When in Doubt, Google

"Google is your friend, first and foremost," says David from Dartmouth. This is good advice—as Google is a great tool—but it should be used with some caution. A good rule of thumb is: Don't cite Web sites. Academics don't trust them. Journal articles go through extensive peer-reviewing before they are published, and academic books are written by experts and rigorously edited. On Web sites, however, anything goes. Therefore, they're worthless in terms of supporting an argument. Referencing Web sites is something you do in high school. If you do this in college, be prepared to experience the wrath of your professor. This being said, Google is still immensely useful. Not for finding Web sites to cite, but for finding Web sites that reference books and articles relevant to your thesis. For example, a search for "Eiger and Swiss Cultural Identity" might actually turn up some Web sites dealing with, or related to, this obscure issue. The Google search algorithm is a lot smarter than the one used by card catalogs, so even very complicated queries can turn up surprisingly accurate results. If you're lucky, some of these Web sites will mention specific sources—a book name or article title. Now you can look up these in your card catalog, and then treat them like any other formal source.

Search Tactic #4: Ask a Librarian

Most college libraries are staffed with reference librarians who want nothing more than to help you find the information that you seek. It's what they're paid to do, and they're great at it. Too many students, however, ignore this wonderful resource. Here you have experts who can save you hours of struggle by conducting advanced searches on your behalf; yet most students never think to take advantage of the opportunity. Making a visit to the reference desk should be one of your first steps when researching a challenging assignment. Simply explain your topic and thesis to the librarian, and he or she will walk you through several searches. Not only will this identify some specific sources that you may have otherwise missed, but it will also expose you to new library resources and databases that you can now use for future projects. The more time you spend with reference librarians, the better you will become at finding solid material on your own.

2. Make Personal Copies of All Sources

How you handle the sources makes a big difference in the overall efficiency of the paper-writing process. Though there are many ways to deal with the book chapters and articles relevant to your research efforts, many of the straight-A students interviewed for this book favored the following strategy: Make a photocopy or printout of all relevant material. If you find a book that has two chapters related to your topic, photocopy those two chapters. If you find an important journal article, photocopy the entire article. If you find an article online, or a relevant Web site, print it out. The goal is to create your own personal hard copy of all sources. The advantages of this approach are numerous. First, these hard copies are portable. It's easier to carry around a stack of photocopies than a stack of books and journals, so you can take your research with you to your secret study spots or office hours. Second, the information is more accessible. No flipping through big tomes or searching your computer hard drive; all the relevant information is stored in one condensed stack. You can now physically organize your sources, for example, by putting them into piles by author, clustering relevant arguments together with paper clips, or dividing them into folders labeled by subject. As Sean, a straight-A student from Yale, explains: "It's often easier to grasp something when you have a hard copy in front of you." Third, you can mark them up with impunity. "Printouts and Xeroxes of source info are often superior to books or digital copies," explains Christine from Harvard, "since you can annotate them to death." Feel free to underline things, highlight, draw arrows, cross out sections, or put big stars next to important points. In general, this approach maximizes the control you have over your information, ensuring that your sources work for you. However, there are a couple of important caveats to remember. First, make sure you label each photocopy with all of the information needed to later construct a formal citation. For example, if you photocopy a book chapter, jot down on the first page the name of the book, the author(s), the publisher and its location, and the copyright date. Or, if you prefer, follow Christine's advice and simply "make a photocopy of the title and copyright info" as found in the front of the book, so you can use it later while constructing the works cited for your paper and ensure that you don't find yourself "running back to the library at the last moment for citation info." Second, photocopy each source's bibliography. This way, if you come across an interesting reference in one of your photocopies, you will have easy access to the full citation attached to the reference. For articles, the bibliography is almost always listed immediately following the article. For books using the endnote format, you might have to flip to the back to find the bibliography for a specific chapter.

3. Annotate the Material

Finding a source, of course, is just the first step. A stack of photocopied pages is worthless if you don't know what information it contains and how it might be useful to your paper. You need to review the sources and annotate them with a concise description of the important information, if any, that they contain. Be careful how you proceed here. Your first instinct might be to follow the advice described in Part Two about how to take notes on your reading assignments. Don't do this—it's overkill. For now, you should be content to follow the advice of David from Dartmouth, who recommends **that you “skim, skim, skim.”**

Use The Following:

A. Skimming:

I. Step 14-Intelligently Skimming Through The Book. Pages 46-50.

B. Entertainment

I. Method 1-Speed Reading. Pages 58-63.

C. Methods for Basic Knowledge For Deep Work or Bible Study.

I. Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 65-66.

II. Method 2-Use 80/20 Principle For Reading. Pages 67.

III. Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 68.

IV. Method 4-Flip Through Pages and Analyse. Page 69.

V. Method 5-Devotional Bible Study by Using Devotional Books. Pages 70-71.

VI. Method 6-Devotional Bible Read. Pages 72-73

Specifically, read through the source quickly. Every time you pass by an important definition, idea, or opinion that seems relevant to your thesis, jot down (on your computer or by hand) the page number and a quick description. For example, if the author argues a particular point of interest, write only what this point is— there is no need to also copy down the evidence he uses to support it as you would for notes on a reading assignment. If the source is a book, then, as Anna from Dartmouth explains: “Pick out only the chapters that relate to the specific aspect of the topic that you are interested in...it is not necessary to read the entire book!” When you're finished, staple your annotations to your personal

copy of the corresponding source. In general, proper source annotations should act as concise pointers, containing just enough information to show you where the relevant arguments are hiding. In the next step, where you organize all of your gathered information into a coherent structure, these simple annotations turn out to be exactly what you need to quickly assess the importance of each source. Therefore, you will end up needing to carefully read only the passages that help your paper. You should not think of this step as adding work. As you will soon discover, these concise annotations are actually going to save you a significant amount of time.

4. Decide If You're Done

There is no simple answer to this question. While it would be nice to offer a perfect formula for how much research is enough, it is impossible—there are just too many variations to contend with. Some short papers might require dozens of sources, while some long tracts may focus entirely on a handful of original documents. What follows is a rough procedure that should aid your decision about whether or not you have gathered enough research. Remember, this is just an approximation. Always keep in mind the context of your specific assignment. However, this approach should help reduce the guesswork involved in completing this step.

The Research Termination Determination Procedure:

1. List the topics (specific questions, facts, or accounts from your research) that are crucial to support your thesis.
2. List the topics that might help you support your thesis.
3. If you have at least two good sources for each of the topics from #1, and have at least one good source for a majority of the topics from #2, then you're done. Otherwise, you need to keep researching.

The reason these criteria are just an approximation is because at this early stage you probably don't know exactly how your thesis argument will proceed, so you don't know exactly what information you need. This procedure simply helps you estimate as best you can. By separating out the crucial from the potentially helpful, you are less likely to get stuck hunting down an obscure piece of information that you could do without. This approach is advised by David from Dartmouth, who describes the following similar procedure for sorting his research sources: "I make three piles of my sources: very useful,

potentially useful, and not useful.” To draw from our previous example, if your thesis deals with the Eiger and Swiss cultural identity, you might construct your list of “crucial” and “might help” topics as follows:

1. Topics that are crucial to support the thesis:

- Basic historical information concerning the Eiger (when it was discovered, when it was first climbed, and so forth)
- Arguments concerning Swiss cultural identity at the turn of the century

2. Topics that might be helpful in supporting the thesis:

- Memoirs of people who were involved in the first ascents of the mountain
- Press accounts from the time (both Swiss and non-Swiss)
- General discussions of the role of sports and national pride

If you have a hard time tracking down one of the topics from the second list, you would still be okay. If, on the other hand, you have a hard time tracking down either of the topics from the first list, then you need to keep looking. In the next step, where you actually begin to outline your paper, it's expected that you might need to return briefly to the research phase and find additional sources to fill in any holes. If you follow the procedure above, however, you will minimize the amount of secondary research that you are forced to conduct—thus saving yourself from more hours in the library.

Step 5 Craft a Powerful Story

This step is where the magic happens. It's the fun part of paper writing—the moment of intellectual eureka. You have already defined (and verified) a compelling thesis, and you have at your disposal a collection of well organized and annotated research material. Now it's time to stretch your mental muscles and pull these pieces together into a powerful story. As Anna from Dartmouth says: "In order to write a great paper, you really need to make connections that other people haven't made, and the only way to do that is to think." This is the step where such thinking occurs.

Formulate Your Argument

"You must have a vision of what the overall structure of your paper will be," explains Frank, a straight-A student from Brown. "Organization of thought can make a decently researched essay into a fine piece of academic work." Formulating a solid argument, however, cannot be reduced to a system; it is a mental exercise that requires critical thinking and creativity. At the college level, there is no set structure that allows you to fill in the blanks and automatically produce a smart paper. As mentioned in the opening to Part Three, the intro, body and conclusion nonsense introduced in high school won't do you any good here. It's too simplistic, and your professors will be expecting more. In general, a good college-level argument should accomplish the following:

- 1. Draw from previous work on the same topic to define the context for the discussion.**
- 2. Introduce a thesis and carefully spell out how it relates to existing work on similar issues.**
- 3. Support the thesis with careful reasoning and references to existing arguments, evidence, and primary sources.**
- 4. Introduce some final prognostications about extending the argument and its potential impact on the field as a whole.**

There is, however, no set order or format for presenting these general points. One paper might start by defining the context and then move on to the thesis. Another paper might start with the thesis, argue it, and then introduce the broader context at the end. Many papers might interweave all four points. There is no right answer here. And the hard truth is that the only way to get better at organizing and presenting your thoughts is through practice. So write a lot and read good arguments a lot. This is the best recipe for

developing your skills for this step. That being said, there are some general pointers about how to go about formulating your argument. These aren't rules for what to say; rather, they are tips for how to get your brain fired up and your creative juices flowing.

Tip #1: When it comes time to craft the storyline of your paper, put yourself in the right mind-set. Grab a copy of Atlantic Monthly, The New Yorker, Harper's, or any other publication that features well crafted discussions. Peruse some articles, and then go for a walk along a quiet path. Alternatively, as David from Dartmouth recommends: "Talk to friends —if they are good friends they will allow you to bounce ideas off of them and talk through your work." You can also cloister yourself in a dusty, wooden-shelved, overstuffed-armchair-filled corner of the library, or argue with your professor during office hours. Reread related articles and chapters from your course syllabus. Watch a PBS documentary. Do whatever it takes to get the reasoning portions of your mind inspired and curious.

Tip #2: At this point, grab your source material from the previous step. If your assignment is a critical analysis essay, this will consist of only a couple of books and your reading notes. If it's a research paper, you might have a large stack of photocopied chapters and articles. In either case, dive into this information, and start letting the relevant facts and arguments settle into your mind. This is where your annotations will point you toward what's interesting, and help you avoid the irrelevant.

Tip #3: Take a break. Do something else. Let the pieces float around in the background noise of your mind. "The first thing I do when I have a paper to write is take a nap," explains Laura, a straight-A student from Dartmouth. "I crawl into bed and just think...as long as I'm thinking about the subject when I fall asleep, I will dream about the material and usually come up with some sort of interesting idea." Similarly, start looking for any opportunity to do a little thinking about your argument. "I think about my paper when I go around completing my daily chores, when I walk to class or when I wait on line in the dining hall," explains Anna from Dartmouth. Use this downtime to slide the pieces of your argument around in your head and play with the structure a bit. Keep returning to your research material as needed to find more details and to increase your understanding. You need to

expose yourself to the source material again and again to fully internalize it. Only then can you really pull together the best possible argument.

Constructing an Outline

You need an outline to capture the argument you just spent so much time devising. Keep in mind, however, that all outlines are not created equal. In fact, there are two major outline-related mistakes made by students.

First: under-outlining. If your outline lacks enough detail, it's not going to serve its purpose as a structure to guide your writing, and you will end up writing from scratch. You want to avoid this at all costs; it leads to argumentative dead ends and weak structure overall. "In high school, I wrote all my papers in one go, starting with the intro, constructing and polishing each sentence in order," explains Christine from Harvard. "In college I've become a huge fan of outline-based writing, which has made my essays much more tightly argued and given them better, clearer trajectories...since I can now shuffle topics around until they flow with some natural order and logic— rather than straining rhetorically to bridge from one idea to another."

The second mistake: over-outlining. Some students construct beautifully intricate outlines, replete with three or four levels of information, roman numerals, digits, letters, and tabs flying everywhere—the type of outline they taught you to make for your fifth-grade research project. Don't do this either. It constrains you. As Doris from Harvard explains: "One pitfall to avoid is getting stuck in the outline stage—I've seen students who spend far too much time embellishing their outlines when they should really have begun writing the paper itself long ago." When it comes time to write, you will be hampered if you constructed an outline that practically spells out what each sentence of each paragraph should say. These sorts of low-level decisions should be made when you write, not before. It's not until you're actually putting words on paper that you will understand the best way to make each small piece of your argument flow. Don't let an outline make these decisions for you. The happy medium between these two extremes is to construct a topic-level outline. Before we can cover the specifics of this process, I must first define what I mean by "topic." Here, I use the term to describe any self contained point that you might discuss in your paper. Typically, this is something more general than a piece of evidence but also more specific than a multipart argument. For example, here are some sample topics for our hypothetical paper about the Eiger:

- Our thesis about the Eiger and Swiss cultural identity
- Early written accounts of the Eiger

- The first ascent of the Eiger
- Contemporary press accounts of Eiger summit attempts
- Mentions of the Eiger in early-twentieth-century popular culture
- Mentions of the Eiger in early-twentieth-century Swiss tourist brochures
- MacMillan's thesis about the Alps and European identity
- The relationship between our thesis and MacMillan's argument
- Concluding thoughts about our thesis—implications and future work and future work

We start the outlining process by constructing a topic skeleton. This is a list of all the topics you will discuss in your paper, presented in the order that you plan to include them. Type this list directly into your computer because you will later need the ability to insert text in between items. Your topic skeleton succinctly describes the structure of your argument. For example, we might take the previously mentioned topics and order them as follows to form a topic skeleton for our hypothetical Eiger paper:

1. Mentions of the Eiger in early-twentieth-century Swiss tourist brochures
 2. MacMillan's thesis about the Alps and European identity
 3. Our thesis about the Eiger and Swiss cultural identity
 4. Early written accounts of the Eiger
 5. The first ascent of the Eiger
 6. Contemporary press accounts of Eiger summit attempts
 7. Mentions of the Eiger in early-twentieth-century popular culture
 8. The relationship between our thesis and MacMillan's argument
 9. Concluding thoughts about our thesis—implications and future work
- At this point, no specific pieces of evidence are described by our outline, but it does capture how the paper will flow. In a perfect world, you would have at least one or two good sources to support each topic.

However, it will often occur that as you formulate your topic skeleton, you come across a topic that you really need to include but for which you don't yet have any sources. That's okay. We mentioned at the end of the last step that once you start formulating your argument, you might come across some holes that need to be filled. This is exactly where these holes will become noticeable. Once you have completed your topic skeleton, you need to return to the previous step and find sources to support any of the currently unsupported topics. If you followed the research termination determination procedure from before, there shouldn't be too many of these holes.

Filling in the Details of Your Topic Outline

Once you finish your topic skeleton, and find sources for all of the unsupported topics, it's time to fill in the supporting details. This next step is crucial. As Christine from Harvard explains: "Below each bold header [in my topic skeleton], I compile in regular typeface the evidence pertaining to that header." You should actually type quotes from your research material right into the word processor document containing the outline, and label each quote with the source and page that it came from. For example, under the "first ascent of the Eiger" topic from above, you might insert quotes from a few different books on the mountain as well as excerpts from several contemporary articles. Some of these latter excerpts may also be included under the "contemporary press accounts of Eiger summit attempts" topic. It's okay to share information between topics at this point, since you will sort out which quote to use where once the writing process begins. This is not a time for caution—if it seems relevant, stick it in.

At first, this step may sound excessive. By the time you finish, your outline will be large and filled with quotes, perhaps even longer than the projected length of your completed paper. Fortunately, this process is greatly simplified by the format of your gathered research materials. Because you made a personal copy of and annotated every source, finding the appropriate pieces of evidence to include in your outline will be much easier than if you had to page through each book and article from scratch. Furthermore, the benefits of this outline far outweigh the annoyance of constructing it. As Robert, a straight-A student from Brown, explains; "I find that using this process helps me avoid digging through a pile of books and articles for each piece of information I need as I need it during writing." Remember, the goal of the straight-A approach is to separate the different components of paper construction. When it comes time to write, you don't want to be flipping through your sources, hunting down the right support. This drains your energy, increases your pain, takes time, and reduces the quality of your writing. This is why it is crucial that you extract the information from your sources in advance. Later, the writing process will be reduced to the much simpler task of simply building a framework around this already identified and organized information structure.

Step 6 Consult Your Expert Panel

"I discuss ideas with friends," says Suzanne, a straight-A student from Brown, "and am therefore usually pretty confident with my argument by the time I sit down to write." Suzanne reinforces a key observation: The more input you receive, the better your paper will turn out. And because soliciting advice is easy, you might as well get your outline reviewed by a group of people you trust. In the straight-A lexicon, this strategy is called "consulting your expert panel." The technique is popular because it requires little effort on your part, but the impact on your paper quality is significant. This is the final push that transforms your thinking from interesting into compelling and your paper from competent into a standout.

Choosing Your Expert Panel

The size of your expert panel should be directly proportional to the importance of the assignment. If it's a one-page essay worth 5 percent of your grade, then your expert panel should consist of only yourself. If it's a medium-size critical analysis essay, you might aim for two opinions. If it's a major term paper worth a significant portion of your grade, then you may want to solicit feedback from as many as half-a-dozen well-chosen people. Who should sit on your panel? Your number one pick should be your professor. Unless he specifically states that he won't discuss drafts in progress (which professors sometimes do to avoid an overload of conferencing in a large class), definitely plan to bring your outline to office hours. Lay out the general shape of your argument, and the types of sources you are drawing from and where. More often than not, the professor will have some targeted advice on how to better present your points. He might suggest a new order or an added topic that should be addressed. As David from Dartmouth notes, this meeting also "will help you to create a rapport with the prof, and give you an idea of what he or she is looking for." Yes, you've already talked with your professor in Step #3 (Seek a Second Opinion). Don't worry. There is nothing wrong with talking to a professor on two separate occasions for one paper. The first conference was quick and dealt with making sure you were starting off in the right direction. This second conference is more detailed, making sure that you managed to stay on course. Keep in mind that some students talk to their professors many times during the paper-writing process, perhaps once or twice a week. This is overkill and shouldn't be necessary if you've followed the efficient strategy laid out in this book. But rest assured that two visits are hardly monopolizing your professor's time. In addition to your professor, as David also suggests, "if you have smart friends, get their help too."

Friends from the same class are your best bet, since they will already understand the constraints of the assignment. If you aren't close with any classmates, then tap a friend with a compatible academic background. For example, if your paper is for a history class, it makes more sense to talk to a liberal arts major than an engineering major. The former will be more familiar with this style of paper. Pick a half-hour period to sit down with each friend you chose. Explain your thesis and then run through your outline, touching on your main supporting arguments. Your friends will help you identify pieces of your structure that are unclear or unnecessary. As Jason, a straight-A student from the University of Pennsylvania, explains: "If you can explain why your argument works in a rational, step-by-step manner, and you have an arsenal of sources to cite to support the argument, then you're ready to go." One final warning: Before discussing with a classmate, make sure that collaboration of this sort is allowed. It should be no problem for research papers, but for focused critical analysis essays the professor may specifically forbid that you discuss your response with other people from the class.

Step 7 Write Without the Agony

If you've followed the Straight-A strategy so far, writing should be the most straightforward part of constructing a standout paper. This step is not mysterious. At this point, you know what to say and in what order, so all you have to do is clearly communicate your already well developed argument. "Once I have the outline, my brain relaxes," explains Jeremy, a straight-A student from Dartmouth. "I don't need to think anymore about structuring the paper, but rather just think about how to best articulate my thoughts." Note, however, that this book is not about the mechanics of writing. This is a skill that you will need to develop on your own. In general, the more you write outside of class, the better; so, to improve your skills, try to write as much as you can. Also, don't be afraid to plunk a Chicago Manual of Style above your desk or flip through well-known style guides like William Zinsser's *On Writing Well*. These can help you focus and polish your writing, and professors appreciate clear exposition. This being said, there is not much left to cover. You know what you have to do: Put words on paper. It's not easy, but, if you followed the previous steps, it won't be nearly as agonizing as most students make it. I leave you with only three succinct pieces of logistical advice to help guide you through the process of combining your writing skills with your straight-A preparation to produce the best possible paper:

Separate Your Writing from the Steps That Come Before and After

As Greta, a straight-A student from Dartmouth, explains, when it comes to the writing process she "would map out a schedule, for example, write two pages a day for five days, and then edit one day." Ryan, another Dartmouth student, admits that he "usually gave about two days for the actual writing, but the research part of the paper usually happened a few weeks before." Both of these students' habits are instructed by a simple rule:

Separate your research from your writing and your writing from your editing.

Of course, this is not always practical for a small critical analysis essay, but it's crucial for a more substantial research paper. A fresh mind produces better results. It's hard to write well when you've spent an exhausting morning researching in the library. It's equally as hard to edit carefully when you have already spent hours that day writing the words you are about to review. "Having time away from the paper," explains Jeremy from Dartmouth, "allows you to come at it with better concentration."

Write in Quiet Isolation

Writing requires substantial concentration. If you work in an area with a lot of ambient noise, you will become distracted and your efficiency will decrease dramatically. Therefore, if you have a laptop, retreat to a distant, silent corner of a faraway building to work on your writing. “I am most productive,” explains Suzanne from Brown, “in a place where I have total silence and no external stimulation—for example, the library stacks.” As I emphasized in Part One of this book, avoid, if possible, study lounges, crowded areas of the library, and public computer labs. These places are noisy, and, as Rielle from Brown warns: “You’re always running into people and getting snagged by fascinating conversations.” If you don’t have a laptop, then work at the computer in your room at times when your roommates are in class or at meetings. If necessary, arrange in advance to kick them out for a few hours so you can work in peace. In addition, you should schedule your writing to correspond to your energetic high points during the day. For me, this meant working right after breakfast with my first cup of coffee. For others, this might be the early evening, right before dinner, or the afternoon after a post-lunch workout. The key is to recognize that writing is perhaps the most demanding (in terms of focus required) intellectual activity you will do while a college student. More so than reading, solving problem sets, or studying, writing demands all the energy and focus that you can manage.

Follow Your Outline and Move Slowly

Chris from Dartmouth offers simple advice for tackling the writing process: “I use the outline I’ve created as a guide and just sort of build from that, taking it one paragraph at a time.” Follow this example. Use your outline to direct your writing, setting up and expounding on each of the topics in a clear, cogent way, and copying and pasting quotes directly into your paper wherever needed. Keep your attention focused on the topic at hand. Your mind is free from concerns of structure and sources at this point, so you can concentrate on articulating specific points clearly and strongly. Always make sure your current point reads clearly before moving on to the next. Some students have success by writing their first draft quickly and sloppily, and then returning to clean it up in many successive editing rounds. In your case, however, because you’re working from a detailed topic outline, it will end up being quicker to write carefully the first time. Moving fast tends to produce time-consuming dead ends later on, and ultimately necessitates major rewrites. And, believe it or not, that’s all you need to know. So stop fearing writing! If you follow this system, this step, though still challenging, won’t take an excessive amount of time. Leave

the all-nighters to the average students, get your first draft done quickly and effectively, and then go have some fun.

Step 8 Fix, Don't Fixate

Editing your paper is important, and this shouldn't come as a surprise. If you hand in pages containing spelling and grammatical mistakes, the professor will be more than disappointed—she's likely to lower your grade as a result. Even if your argument is brilliant, it's really hard to get past those simple errors. This last step of the paperwriting process aims to free your work of these imperfections. At the same time, however, you don't want to overedit. Many students fixate on these fixes, and end up devoting hours to reviewing draft after draft. This act of academic self-flagellation is especially prevalent when working on big research papers. After all the work you dedicate to crafting a masterpiece of an argument, you begin to fear letting your baby out into the world. It's sort of like suffering from a nerdy version of Stockholm Syndrome— and it's a drag. “You can edit a paper forever and still not be satisfied,” explains Frank from Brown. “So it's important to know when to just print the damn thing out and send it off to its fate.” The goal here is to devise a simple system, something you can follow for every paper to help you root out the embarrassing typos and confusing constructions but also to prevent you from becoming a grammar psycho. Drawing from the advice given in my straight-A interviews, I present in this step a system that meets these criteria. It involves three simple passes through your draft. No more and no less. For those of you who are used to endless editing runs, the idea that three passes is enough might sound suspiciously quick. Or, if you're the kind of person whose idea of proofreading is hitting the spell-check button, multiple runs might seem hopelessly time consuming. But rest assured, the system is efficient and it gets the job done. As we will soon discuss, the key is the specific kind of attention given to each pass. Here is how it works:

The Argument Adjustment Pass

Your first pass through your work should be conducted on your computer. Read carefully, and focus on the on your computer. Read carefully, and focus on the presentation of your arguments—don't worry about small grammatical mistakes for the moment. Take in the paper one paragraph at a time. If a section is awkwardly stated, clarify the sentences. If it makes a point you already explained earlier, ruthlessly cut it out. If the argument is lacking detail, add in more sentences as necessary to fully explain your point. If a transition is lacking between topics or paragraphs, add one. Also be on the lookout for any major structural issues. Sometimes you don't realize until you finish an entire draft that your topic outline wasn't optimal. Don't be afraid to shift around major chunks of text. This is your

chance to make serious edits to the structure of your paper, so take this seriously. Do this editing at a time when you are rested and unhurried by upcoming appointments. For a large paper, spread this pass out over several days if possible. When you're done, your paper may still contain small mistakes. That's okay. You'll fix those next. The goal here is to tweak the argument until you're satisfied that it makes every point that you want to make in the order that you want to make them. Once you're done with this pass, these big picture details are locked in.

The Out Loud Pass

The Argument Adjustment pass is important, but not sufficient by itself. As Robert from Brown explains: "My papers always read differently on the page than on the screen." And as Melanie, a straight-A Dartmouth student, adds: "having a hard copy to read and mark up was absolutely necessary." Accordingly, for this next pass, you should first print out a copy of your paper, and then take it where you can have some privacy. With a pencil in hand, and this is the important part, begin to read your paper out loud. Don't cheat. Use a strong voice and articulate each word as if you're delivering a speech. For a long paper, it may take a long time to read the entire thing, so be prepared to split this into several sessions. You might also want water or hot tea on hand to prevent you from losing your voice. Whatever you do, however, don't avoid actually articulating every word. Whereas the last pass focused on your arguments, the goal of this pass is to root out small mistakes that might otherwise distract a reader from your engaging thesis. While reading, whenever you come across a grammatical mistake or an awkward construction, mark it clearly on the printout. Then go back up to the beginning of the preceding paragraph and start reading again. After you have marked up the entire document, go back to your computer and enter the changes you noted on your printout. A word of warning—this process always takes longer than expected, so leave yourself plenty of time. The rationale behind this approach is simple. As Ryan from Dartmouth explains: "Reading it out loud helps you catch typos or strange wording better than reading it in your head." No matter how many times you review a draft, if you're scanning silently, there are certain awkward phrases you might skip over every time—our subconscious minds have a habit of patching over these mistakes when reading our own writing. When you say the words out loud, on the other hand, your ear will catch even minor problems and draw your attention to them. "Something that looks fine on paper will jump out as strange or poorly worded when you hear it," explains Jeremy from Dartmouth. Therefore, by reading the paper out loud, you

will catch most mistakes in your paper in just one pass—requiring much less time than the multiple silent reviews necessary to achieve similar results.

The Sanity Pass

Because the previous passes were so careful, you're almost done, and you've only read through your work twice so far! Just to be sure that something embarrassing didn't slip through, it's a good idea to make a final, quick pass through a printed copy of your paper before handing it in. You don't have to do this pass out loud, and feel free to move through it quickly. But definitely use a printed copy, rather than reading on your computer screen, since a hard copy has a better chance of revealing a typo. If possible, separate this pass from the previous two. In fact, it's fine to do this the morning of the deadline. At this point, there should be no major mistakes lurking in your document. The goal here is twofold.

First, as mentioned, this last pass catches stray mistakes.

"I tried to always reread my papers before handing them in," explains James, a straight-A student from Dartmouth. "I try to smooth out any last kinks in the flow during that final editing."

Second, and perhaps more important, it also provides closure on your paper.

Because your work is so polished by this point, this final read-through should essentially go smoothly. As a result, you will develop a better feel for the flow and enjoy the experience of watching your argument unfold. This should help put your mind at ease. After all your work, think of this last pass as your reward. A final review before the paper leaves your hands, probably never to be read by you again. That's why we call it a sanity pass. Once you hand in your paper, you can now confidently tell yourself: "Unless I'm going insane here, I'm pretty sure that I just handed in a damn good piece of writing!"

Part Three Cheat Sheet

Step #1. Target a Titillating Topic

- Start looking for an interesting topic early.

Step #2. Conduct a Thesis-Hunting Expedition

- Start with general sources and then follow references to find the more targeted sources where good thesis ideas often hide.

Step #3. Seek a Second Opinion

- A thesis is not a thesis until a professor has approved it.

Step #4. Research like a Machine

- Find sources.
- Make personal copies of all sources.
- Annotate the material.
- Decide if you're done. (If the answer is "no," loop back to #1.)

Step #5. Craft a Powerful Story

- There is no shortcut to developing a well-balanced and easy-to-follow argument.
- Dedicate a good deal of thought over time to getting it right.
- Describe your argument in a topic-level outline.
- Type supporting quotes from sources directly into your outline.

Step #6. Consult Your Expert Panel

- Before starting to write, get some opinions on the organization of your argument and your support from classmates and friends who are familiar with the general area of study.
- The more important the paper, the more people who should review it.

Step #7. Write Without the Agony

- Follow your outline and articulate your points clearly.
- Write no more than three to five pages per weekday and five to eight pages per weekend day.

Step #8. Fix, Don't Fixate

- Solid editing requires only three careful passes:
 - The Argument Adjustment Pass: Read the paper carefully on your computer to make sure your argument is clear, fix obvious errors, and rewrite where the flow needs improvement.
 - The Out Loud Pass: Carefully read out loud a printed copy of your paper, marking any awkward passages or unclear explanations.
 - The Sanity Pass: A final pass over a printed version of the paper to check the overall flow and to root out any remaining errors.

Part 29: Parenting.

Step 195-What Should I Do As Parent

1. Train My Children on:

- Deep Work.
- UltraLearning.
- Classical Education.
- Christian Doctrine.
- Apologetics: why and what we believe.
- Philosophy.
- Logic, Arguments, EvidenceThinking.
- Reading.
- Talking, Communication.
- Always Raise Question. Never Let Anybody to Tells you cannot raise question and just Believe.
- Worldview and Science and Art.
- Understanding About The World.
- Language.
- Stoicism.
- History.
- How Propaganda Works.
- Reality of The World.
- Situational Awareness and Aware of Surroundings, Self Defence
- Not To be naive.
- Tactics
- Sport.

2. If the child asks why the moon is round. The Usual Adult answer is to discourage the child, what shape did you expect the moon to be? Instead of saying that, say to the child that this is interesting question, let's try to find out answer or maybe nobody knows the answer, and when you grow up you will be able to discover the answer, it would be very healthy for human species, if there were less discouragement and more scientists.
3. If the Kids wants a leverage to negotiate with me with anything they want. The Currency is Pages you read per day. It does not matter, if we are on vacation, it is Saturday or Sunday, the kids are always required to Read 20 Pages, every day.

That Starts at the age of Six. When the child turns six in the family, everyday reads 20 pages

- 4. Children are our first responsibility to teach them those things that They would not loose, when they go to School or University.**
- 5. I am as father need to provide leadership to my child at home.**
- 6. As Family Needs to involve in discipleship ministry.**
- 7. Introduce Alexandra and Adelina to Good Literature:**
 - Have A Deep Literature Hour with Both of them**
- 8. When Reading with Alexandra and Adelina, ask Question:**
 - What, who, when, where, why, How**
 - What does the text Says?**
 - What does the author mean based on text?**
 - Lets try to find what does the author mean by writing this**
 - Use Rules of Reading.**
- 9. Spend Time with Each Child One on one. One of the best Conversation are on one on one.**
- 10. Balance between competition and teamwork. Let the Kids have competition, but also let them learn to work as team.**
- 11. Teach Children to Debate with each other**
- 12. Teach The Children Independence.**
- 13. User Very rarely the Card *I Said So***
- 14. Choose The Right Movies with Lesson Behind.**
- 15. Create A Currency For Your Kids In The House. What is valuable for them to get in return from you, for what they want. The chores are what they supposed to do it. You do not get currency on Chores. The currency is like they need to read a book, exercise. Ask how many pages they finished, they answer is 20, perfect 20 points. If you want to watch TV you need to get 200 points, this means read 200 pages.**
- 16. Never compare Kids with other Kids. Compare the way they behave Yesterday and Today.**
- 17. Ask Your Kids for Their Opinion**
- 18. Discipline:**
 - Read 20 Pages a day every day and Discuss..**
 - Watch Documentaries and Discuss.**
 - If you want to have phone, you have to get straight A and B.**

- **Let the children play iPad, only Saturday and Sundays, but if the child misbehave then no Ipad, No Phone**

Step 196-You Have Required To Do The Work

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.
5. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.
6. Do not read the newest books, but the great books of western world, stoic and classics, as these books stood the test of time.
7. Do Not Have the Opinion and do not make any judgement about Anything, I see and hear, If I did not work Hard to have an opinion. I need to Read, Analyse, Research the topic from every angle, so that I can have an opinion or Make Judgement on the topic.

8. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

9. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

10. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

11. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

12. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

- C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.
- D. Always allow the opponent allow to lay out his argument without interruption.
- E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.
- F. Be Honest.
- G. Be Open Minded.
- H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.
- I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.
- J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 197-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

Part 30: Sales.

Step 198-Books On Sales

1. **Listen, Follow And Apply Rules of Reading Part 1 to 22, before looking into Sales.**
2. **Listen, Follow and Apply the following Books.**
 - A. Socratic Selling.
 - B. 13 Things Mentally Strong People Don't Do.
 - C. The 80/20 Principle By Richard Koch.
 - D. Eat That Frog By Brian Tracy.
 - E. How To Speak How To Listen by Mortimer Adler.
 - F. How To Sell When Nobody's Buying by Dave Lakhani.
 - G. How To Sell Yourself by Arch Lustberg,
 - H. How to Talk TO Anyone.
 - I. 80/20 Sales and Marketing by Perry Marshall.
 - J. Pareto's 80/20 Rule for Corporate Accountant.
 - K. The Ultimate Sales Machine By Chet Holmes.
 - L. Seven Habits of Highly Effective People.
 - M. 80/20 Investor,
 - N. The 80/20 Principle
 - O. Challenger Sale
 - P. SaLES bIBLE
 - Q. Art of Closing Sale
 - R. PSYCHOLOGY OF SALES
 - S. uNLIMITED sales Success.
3. Take 4 subjects: a. Sales, b. Negotiations c. Human Nature d. Money. Take a list from Amazon with 4stars and above and read every books on those topics. For 2 years obsess over doing that and you will go farther in the market place. Market reward the people who outworks and improve.

Step 199-You Have Required To Do The Work

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.
5. Be informed citizen is read more classical books and history. This unfolds how the real world works and where it is going. If You read Classical Books, then you can well predict what would happen next in the future based on the events happening.
6. Do not read the newest books, but the great books of western world, stoic and classics, as these books stood the test of time.
7. Do Not Have the Opinion and do not make any judgement about Anything, I see and hear, If I did not work Hard to have an opinion. I need to Read, Analyse, Research the topic from every angle, so that I can have an opinion or Make Judgement on the topic.

8. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

9. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

10. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

11. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

12. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.

D. Always allow the opponent allow to lay out his argument without interruption.

E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.

F. Be Honest.

G. Be Open Minded.

H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.

I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.

J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 200-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

Step 201-Use Thinking, Logic, Mental Tools, Thinking Tools.

1. **Go to the Rules of Reading Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study**
2. Listen, Follow and Apply **Thinking, Logic and Mental Model PART 7**
Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study
 1. **Step 57- Slow Down. Pages 1061-1063.**
 2. **Step 58- NOT MULTITASK. Pages 1064.**
 3. **Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
 4. **Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
 5. **Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
 6. **Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
 7. **Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
 8. **Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
 9. **Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
 10. **Step 66-Journaling. Pages 1299.**
 11. **Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
 12. **Step 68-Journaling. Pages 1306.**
 13. **Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

Part 31: Situational Awareness.

Step 202 - Books On Situational Awareness

1. **Listen, Follow And Apply Rules of Reading Part 1 to 22, before looking into Situational Awareness.**
2. **Listen, Follow and Apply the following Books.**
 - A. Hindsight 23 situational awareness.
 - B. 80/20 Principle.
 - C. Eat that frog.
 - D. How to speak how to listen.
 - E. Situational awareness Matters.
 - F. Advanced situational awareness.
 - G. Situational awareness.
 - H. **The ultimate situational survival guide _ self-reliance strategies for a dangerous world**

Step 203-You Have Required To Do The Work

1. When Give Opinion on Anything, Do Not Be so Angry and Mean to Others.
2. People Need To Stop Doing By Coming Unprepared To Give Opinion On Any Subject, Without Having Good Idea Of The Literature, and Arguments Written on Topic and Theme Available To Them. The people coming unprepared and not doing any Hard Work To Have an Opinion On The Subject or Topic. When People Coming Overconfidence, which could be resulting in Lack of Preparation, Which Could Lead That Your Position can be Destroyed with Ease. They simply won't do the work required. It's easy to come home, sit on the couch, watch TV, and zone out until bedtime rolls around. But that's not going to help you get smarter.
 - A. People Who Do Not Put The Required Work: The first thing they always do is tell you what they think. When someone has an opinion about everything, they want to share it with you. They often tout stats and research as if they had an imaginary checklist of facts they need to be able to rattle off to establish themselves as an expert in a field they actually know very little about. Because they have an opinion on everything, they are quick to judge others – for their lack of opinions, for their lack of knowledge, for their lack of outrage, and the list goes on.
 - B. People who have opinions about everything barf so much noise that it's hard to find the signal. Your brain has to work overtime to figure out if they did the work to come up with their opinions themselves or if they're simply regurgitating some oped in a newspaper. Over time, opinionated people also end up in their own prisons and they try to take you with them.
 - C. The problem comes from how we see the world. Our opinions are often rooted in how we think the world should work, according to our morals, values, and principles. If we see the world through the lens of our opinions, much of what happens will not agree with us. This is feedback, and how we respond to this feedback is key.

3. How to Get Smarter Read. A lot. Warren Buffett says, "I just sit in my office and read all day." What does that mean? He estimates that he spends 80% of his working day reading and thinking. When asked how to get smarter, Buffett once held up stacks of paper and said, "Read 500 pages like this every week. That's how knowledge builds up, like compound interest." All of us can build our knowledge, but most of us won't put in the effort. "Go to bed smarter than when you woke up."
4. How Long Does it Take To Prepare:
 - A. Depend on the topic and opponent, and how much he's written.
 - B. If the opponent nothing published, then there was very little preparation to be made because I simply didn't know what to expect.
 - C. On the other hand, if the opponent has published lots of written work and have some videos. Read and what his written and videos and prepare the summaries articles, videos, and have sense where he is coming from. This can take Weeks or Months.

5. Before Preparation. The difference between the people who do the work and the people who just reel off memorized opinions is huge. When you do the work, you can answer the next question. You know when to follow the rules and when they'll get you in trouble. When I did my postgraduate I was surrounded by people who could answer the test questions. They got good grades — actually, they got *great* grades but an odd thing happened after school: a lot of those people couldn't apply their knowledge to problems they hadn't seen before. They were chauffeurs — they knew the memorized answer. They couldn't answer the next question. We're all chauffeurs in some aspects of our lives. This is why understanding your circle of competence is so critical to living a rational life.

I. Circle of Competence:

A. **Circle Of Competence**-Understanding my Circle of Competence helps to avoid problems, identify opportunities for improvement and learn from Others. Circle of Competence is simple: Each of us, through experience or study, has built up useful knowledge on certain areas of the world. Some areas are understood by most of us, while some areas require a lot more specialty to evaluate. For example, most of us have a basic understanding of the economics of a restaurant: You rent or buy space, spend money to outfit the place and then hire employees to seat, serve, cook, and clean. (And, if you don't want to do it yourself, manage.) From there, it's a matter of generating enough traffic and setting the appropriate prices to generate a profit on the food and drinks you serve—after all of your operating expenses have been paid. Though the cuisine, atmosphere, and price points will vary by restaurant, they all have to follow the same economic formula. That basic knowledge, along with some understanding of accounting and a little bit of study, would enable one to evaluate and invest in any number of restaurants and restaurant chains, public or private. It's not all that complicated. Far more important is to honestly define what we do know and stick to those areas. Our circle of competence can be widened, but only slowly and over time. Mistakes are most often made when straying from this discipline. Where should we devote our limited time in life, to achieve the most success? So, the simple takeaway here is clear. If you want to improve your odds of success in life and business, then define the perimeter of your circle of competence, and operate inside. Over time, work to expand that circle

but never fool yourself about where it stands today, and never be afraid to say “I don’t know.”

II. Two Type of Knowledge: The Max Planck and Chauffeur Test

A. The Two Types of Knowledge: The Max Planck and Chauffeur Test: How to distinguish between the two types of knowledge: real knowledge and pretend knowledge.

- The first type of knowledge is real. It can’t be bought. It can’t be copied. If you want real knowledge you need to earn it. One is Planck knowledge, the people who really know. They’ve paid the dues, they have the aptitude. You are going to have the problem in your life of getting the responsibility into the people with the Planck knowledge and away from the people with the chauffeur knowledge. Real knowledge comes when people do the work. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- The second type of knowledge is copied. On the surface you know the answer but you lack the understanding to show your work. Then we’ve got chauffeur knowledge. They’ve learned the talk. They may have a big head of hair, they may have fine temper in the voice, they’ll make a hell of an impression. But in the end, all they have is chauffeur knowledge. I think I’ve just described practically every politician in the United States. We have the people who don’t do the work — they pretend. While they’ve learned to put on a good show, they lack understanding. They can’t answer questions that don’t rely on memorization. They can’t explain things without using jargon or vague terms. They have no idea how things interact. They can’t predict the consequences. The problem is that it’s difficult to separate the two. This is the Batesian Mimicry problem. One way to tease out the difference between Planck and chauffeur knowledge is to ask them why.
- How To Distinguish Real Knowledge and Fake Knowledge. With journalists, it is more difficult. Some have acquired true knowledge.

Often they are veteran reporters who have specialized for years in a clearly defined area. They make a serious effort to understand the complexity of a subject and to communicate it. They tend to write long articles that highlight a variety of cases and exceptions. The majority of journalists, however, fall into the category of chauffeur. They conjure up articles off the tops of their heads or, rather, from Google searches. Their texts are one-sided, short, and— often as compensation for their patchy knowledge. The same superficiality is present in business. The larger a company, the more the CEO is expected to possess “star quality.” Dedication, solemnity, and reliability are undervalued, at least at the top. Too often shareholders and business journalists seem to believe that showmanship will deliver better results, which is obviously not the case. One way to guard against this is to understand your circle of competence. Dobelli concludes with some advice worth taking to heart. Be on the lookout for chauffeur knowledge. Do not confuse the company spokesperson, the ringmaster, the newscaster, the schmoozer, the verbiage vendor, or the cliché generator with those who possess true knowledge. How do you recognize the difference? There is a clear indicator: True experts recognize the limits of what they know and what they do not know. If they find themselves outside their circle of competence, they keep quiet or simply say, “I don’t know.” This they utter unapologetically, even with a certain pride. From chauffeurs, we hear every line except this.

III. Batesian Mimicry Problem. Batesian Mimicry: Why Copycats Are Successful.

Mimic and the Real Thing:

- A. "There's two kinds of snakes you come across. There's the Texas Coral Snake, and the Mexican Milk Snake, and they both look exactly alike. The Texas Coral Snake is dangerous, it's venomous, it can kill you in a minute. The Mexican Milk Snake can't do anything to you; it's an impostor." How is it that these two look alike? It's due to a phenomenon called Batesian Mimicry.
- B. In the 1850s, the naturalist Henry Walter Bates found a certain set of butterflies who were clearly *not* of the same species but whose wings looked almost the same to the naked eye. After thinking it over, Bates eventually figured out what was going on: While the butterflies which were toxic to potential predators (the "models") were able to operate freely and relatively unmolested, there had also developed a "mimic" population of butterflies which wasn't toxic at all, yet still went untouched! In fact, biologists eventually figured out that the more toxic and dangerous the "model" was and the more frequently they appeared in the local population, the easier it was for its "mimics" to get by! Predators simply wouldn't take the risk of mixing up the two. If there aren't as many "models" around or they aren't that dangerous, the mimics have a harder time.
- C. This is a wonderful model, and in the practical world we live in, a similar phenomenon abounds: Copycats or "pretenders to the throne" are often very effective, very convincing "mimics" of the true champions. They dress the part, they talk the talk, and they know what buttons to push. But in the end, they are merely chauffeurs. We see a very Batesian effect at work: The more impressive the "model," the more effective its mimics can be in convincing people they too are impressive, and in all the same ways. But for every Warren Buffett (just one by our count), there has been many "future" Warren Buffett's. For every Steve Jobs, there have been many "next" Steve Jobs'. In fact, sometimes even just *appearances* can be quite convincing: now-disgraced Theranos founder Elizabeth Holmes was very fond of wearing a very Steve Jobsian black turtleneck outfit. Because they can be very convincing, we must be wise enough to watch out for Batesian mimicry

— even in ourselves. This brings up an interesting, at times paradoxical, question: Who can best tell the difference between a Coral Snake and its Mimics? The Coral Snake itself. The real thing knows a fake. It's worth taking the time to work on learning all the big ideas you can find, not just the ones you want to learn. In that search, you'll find a host of big winners you didn't even know existed.

6. Preparation:

- A. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it?
 - I. I have to do the reading.
 - II. I have to talk to competent people and understand their arguments.
 - III. Never try to be biased toward any of the side, but question both side of the argument.
 - IV. Do not support any side, until all the facts are put out there, clear and obvious.
 - V. Once known all the facts then analyse both sides of the argument like William Lane Craig.
 - VI. I have to think about the key variables and how they interact over time.
 - VII. I have to listen and chase down arguments that run counter to your views.
 - VIII. I have to think about how you might be fooling yourself.
 - IX. I have to see the issue from multiple perspectives.
 - X. I have to think.
 - XI. I need to become your most intelligent critic and have the intellectual honesty to kill some of your best-loved ideas.
 - XII. Be honest with yourself and open minded. ANALYSE both side of the argument logically and see which is true logically. Means has the clear terms, premises are true, and conclusion follows from premises.
 - XIII. Never say your opinion about anything that requires the analysis of the arguments and facts. Work very bery hard to have an opinion about anything.
 - XIV. Listen very carefully other side and use ancient method *state the opposition argument in my own words and ask him/her if the argument I

stated in my own words represents correctly their argument and if I UNDERSTOOD Correctly their arguments.

XV. Never use cheap shots to win argument, like logical fallacies.

XVI. Debate and discussion is not about just win at any cost, but let other person to think about your arguments and engage with them. Second reason never use in discussion cheap shots toward other person, but be civil. Third reason is win the debate and discussion. Fourth is find the truth.

B. For Affirmative and Negative Case:

- I. Read, analyse, Research, Syntopicon and Investigate Published Work.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments
- II. Read Opponents Books, Articles, Newspapers, Blogs. Reading Published work. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of opponent Arguments.
- III. Watch Video. Watching Videos of the opponent. What objections he would raise against the topic and prepare the responses for each of these points.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- IV. Listen The recording that the opposition made, in which he addresses these issues.
 - Listen, Use And Apply Rules of Reading Methods Every Steps.
 - Use Grammar in Rules of Reading.
 - Use Logic In Rules of Reading.
 - Investigate Line of logic of My own Arguments.
- V. Talk with People who are students in his class, who can tell me, privately, insights into his thinking and character.
- VI. If that sounds like a lot of work, just say, “I don’t have an opinion on that; why don’t you tell me how you got to have such a firm one? It sounds like I could learn something.”
- VII. Another way to get smarter, outside of reading, is to surround yourself with people who are not afraid to challenge your ideas. “Develop into a lifelong self-learner through voracious reading; cultivate curiosity and strive to become a little wiser every day.”

7. Compound Knowledge- Are The Resources I will Choose Concentrating On the Expiring Information or Compound Knowledge?

- I. Are on the Resources providing expiring information?
 - A. Will you care about what you're reading in a month? In a year? In five years?
 - B. Are you focused enough on the same thing to build cumulative knowledge or are you too spread out?
 - C. What do you spend time on that's likely to change in the next few years? What's not likely to change?
 - D. What would need to happen for you to stop outsourcing organisation of information to the computer?
- II. Signs of The Information in the resources are expiring
 - A. First, it's marketed to you.
 - B. Second, lacking details and nuance, it's easily digestible. This is why it's commonly telling you what happened, not why it happened or under what conditions it might happen again
 - C. Third, it won't be relevant in a month or a year. Expiring information is one reason I stopped reading most news. It's a false map.
- III. While most of us focus on consuming information that we won't care about next month, let alone next year, focus on knowledge and companies that change very, very slowly or not at all. And because the information he was learning changed slowly he could compound his knowledge over time.
- IV. Doing his own thinking and vacuums up the details. When we don't think for ourselves it's easy to put the blame on someone else, to "pass the buck" so to speak.
- V. When we consume information that doesn't expire or expires slowly; is very detailed; and we spend time thinking about it not passing the buck, we can match patterns. This is how you learn to see what other people are missing. The longer you do this, the more advantage you get.
- VI. Just like the rest of us, Buffett's dependent on information and knowledge to make great decisions. Unlike most of us, he has a great memory—perhaps because he's not trying to outsource his memory or thinking to others.
- VII. A lot of what the snowball is about the concept of learning, and creating, and the advantage of having the information and knowing it. When I came here today one

of the things that I was thinking is that what you do is so much at the intersection, because retrieving information is different from having it already in your head.

VIII. What you do is different. You work on manipulating how you use the information.

In fact, Warren Buffett and Charlie Munger have the files in their head. That's why they aren't really out there googling all the time looking for, trying to look stuff up, because they already know it.

IX. I think a lot of the work that you do here is helpful to the ordinary person, but Warren Buffett or Charlie Munger don't need it. At the same time, the lesson that they have, which is that learning yourself, making yourself as smart as you can is extremely valid, and not just relying on a library where you can look something up all the time, because a lot of times when you need to make a decision, and you need 50 pieces of information, you need to know it then.

8. The Art of Anticipation of Objections.

- A. Analyse My Arguments, and Scrutinise The arguments by using Rules of Reading.
- B. Analyse the arguments of the opponent. Scrutinise Their arguments by using Rules of Reading.
- C. Analyse My own arguments. Scrutinise My own arguments, and the potential Loopholes in the argument by Use Rules of Reading.
- D. Use Think, Logic, Strategem, Thinking models.
- E. Write.
- F. Prepare The responses to anticipated objections that, I think the opponent will bring up.
- G. Be intellectually Prepared. This means That I need to know my arguments, so well, that nothing new can surprise me. I would also invest lots of time in knowing and know better opposite side arguments. I would read both side of the arguments, and work Hard on analysing the arguments and evidence of both sides. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey. While we all hold an opinion on almost everything. Have I do the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- H. Doing the work required to hold an opinion means you can argue against yourself better than others can. Only then can you say, "I can hold this view because I can't find anyone else who can argue better against my view." Great thinkers, like Charles Darwin, did the work. And it's one of the biggest reasons he's buried at Westminster Abbey.
- I. Doing the work counteracts our natural desire to seek out only information that confirms what we believe we know. When Darwin encountered opinions or facts that ran contrary to his ideas, he endeavored not only to listen but also not to rest

until he could either argue better than his challengers or understand how the fact fit. Darwin did the work. It's wasn't easy, but that's the point.

- J. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position, This leads to the True Confidence.
- K. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of view, then the world becomes your library to help you to become better at the craft.
- L. I Always need to ask myself: Have I done the work required to have an opinion on any Subject? Never allow myself to have an opinion on anything that I don't know the other side's argument better than they do. The work required to have an opinion is very hard part, have I avoid it? If that sounds like a lot of work, just say, "I don't have an opinion on that; why don't you tell me how you got to have such a firm one? It sounds like I could learn something."
- M. I might need to Suspend my judgement and tell them that I do not have an opinion on this specific Topic.
- N. Never Under Prepare, but Vastly Over Prepare for the Opponent and their arguments and responses
- O. Spend years in preparation, take debate class at the college or university. You need to participate in debates. You need to have mock debates, where someone play role of your opponent, and then you respond to them. You need to do reading and learn how to flow the debates. How to construct affirmative case and negative case. You need to take time to prepare and have enormous preparation.
- P. Memorize the arguments for my case

9. When Dialogue, Discussion, Debate Takes A Place.

A. As Affirmative Speaker, you need to present Prima Facie Case for proposition that is under debate. Prima Facie Case will be one that will establish the truth of proposition you are defending. If I am defending proposition that God Exist, I will want to give 3-5 arguments leading to that Conclusion, that God Exists, and then I will lay those out with great clarity in my opening speech, and say this is the groundwork for the debate. I am not interested in talking about other issues for example if Christianity bad for society Then, I come back to those in every speech over and over again. The goal is to make opponent argue on your grounds. You do not go over to his grounds, and let your audience forget, your affirmative case, rather you reorganise opponent speech, so that you answer his objections in so far as they reply to your arguments, so you may answer them in a very different order than he gave them, because you will be seeing for example: now what answer or response did he have to the cosmological argument, I see two basic responses and then you deal with them.

- Make Briefs, where I have suitable objection, and then have two or three responses to those objections.
- Use The Brief During Exchange with the Opponent. File these Briefs into Folders, and spread These Manila Folders out in front of me on Desk, When I am interacting with the Opponent. Once the opponent Rises his point I just pull These briefs from these folders and never have to think on my feet because I am completely prepared. Key is never have to think on the feet to be so well prepared, that I would have my responses ready for anything he brings up.
- Quote Peer Review Scientific Articles on the topic in support the conclusions.

B. Take Notes While the Opposition is speaking:

- How To Take Notes- Flow Chart. By Taking Notes, I am sure that I am responding to my opponent's arguments and everything he brings up.

- I. Make 11-12 Columns on the Pad. Prepare the left column in advance of the communication, debate. The Left Column needs to be filled in, if you starting first. If not, then leave left column as blank.
- II. First Left Hand Column Are My Arguments.
- III. Second Left Hand Column are Opposition Arguments and Responses to My arguments.
- IV. Third Left Column are My Responses to the Opponent responses.
- V. Fourth Left Hand Column are My Rebuttal.
- VI. Fifth Left Hand Column are Opponent Rebuttal.
- VII. Sixth Left Hand Column are my Responses to the Opponent rebuttal.
- VIII. Seventh Left Hand Column is the Final My Rebuttal.
- IX. Eight Left Hand Column is The opponent Rebuttal.
- X. Ninth Left Hand Column is my closing statements.
- XI. Tenth Left Hand Column is the opponent closing statements.
- XII. Eleventh Left Hand Column is the Cross Examination.
 - My Answer.
 - Opponent Answer.
 - My response to the response of the opponent.

- C. Always Remind the audience what are your three to five arguments and what are the responses of the opponent, if any to your arguments.
- D. Always allow the opponent allow to lay out his argument without interruption.
- E. Take the opponent arguments and put in my own words and correctly represent their argument carefully without misrepresentation.
- F. Be Honest.
- G. Be Open Minded.
- H. Always from Your side be honest and rigorous exchange of arguments and counter Arguments from which me and opponent would benefit.
- I. One of good technique is whenever you can quote an opponent against himself, this is powerful device. Have the manuscript, point to the footnote, cite the book, and the quotation and have the page number.
- J. Never Take Cheap Shots at the Opponent.

- K. Encourage not just trust someone say so, but demand published peer reviewed articles in support of the positions that one take
- L. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.

Step 204-Letting The World Do The Work For You

1. Listen and Apply book
 - I. This Explains Everything_ Deep, Beautiful, and Elegant Theories of How the World Works
2. **The world never tells you that you're wrong; it only gives you outcomes.**
3. **Don't force. Don't resist. Have a beginner's mind. Let the world teach you.**
4. **Reality will do a lot of the work for us if we simply align with it. Most of the time we're simply adding friction because we want the world to work in the way we think it should.**
5. **If you don't see the world the way it is, you'll think it works in a way that it doesn't and make terrible mistakes. The key to getting what you want out of life is to identify how the world works and align yourself accordingly. This is hard because we think the world should work the way we see it. The word "should" is important. Because we think the world should work in a way that it doesn't, our approach is suboptimal. What the pupil must learn, if he learns anything at all, is that the world will do most of the work for you, provided you cooperate with it by identifying how it really works and aligning with those realities. If we do not let the world teach us, it teaches us a lesson. Joseph Tussman**
6. When an outcome is not what you want it to be, things get tough. You can ignore the result and continue to think that you're right. This protects your ego. It also carries the risk of your continuing to believe something that isn't true. Alternatively, you can calibrate your believability on the subject at hand by lowering the odds that you're right. For example, maybe you gave yourself an 85 out of 100 for the ability to hold a firm opinion on this subject, and now you lower your score to 75. If the world continues to provide undesirable outcomes, eventually you get the hint and change your beliefs. Finally, you can give up your opinions and just respond to the world as it is. This option is the hardest.
7. You do not create the way the world works, you can only align yourself with it. It takes a lot of work to align ourselves with reality. When we don't get the outcome we're seeking, the last place we look is inside ourselves. Instead, we blame others or

circumstances. If you want to align yourself with reality, you have to work at it and care about it. There are two keys to aligning yourself with how the world really works: accepting feedback and stopping bargaining.

- I. We let people, not results, guide our behavior. The world tries to tell us when we don't see it the way it is. The problem is we don't listen to the world. Instead, we let others tell us what's right and wrong, what works, and what doesn't. Common actions get common results. Most of our actions come from others. We want what they want. Even worse, we employ the same actions to get it. This isn't always wrong. If you're just starting, the quickest path to average is to copy. If you want better results than average, you're going to have to iterate. Doing something different means we might look like a fool, and we do not want to look like a fool. Iterating means trying something new, it means you might fail. Show me a person who's afraid to look bad, and I'll show you a person you can beat every time. If we do what everyone else is doing, we're going to get the same results that everyone else is getting. Different results demand different actions. If you can't really fail, you can't really succeed. Let results, not popularity, determine your actions. If you're doing something that doesn't get you the results you want, try something new. If you're doing something that seems to work, keep doing it. Consistently repeat successful actions.
- II. Bargaining with the world doesn't work. A lot of otherwise smart people know what they're doing isn't getting the results they want, but because they think the world *should* work in a way that it doesn't, they keep repeating them hoping for different results. If you are this person, see it for what it is, and change your actions. The feedback from the world is often painful. Often, it is this very pain that causes us to no longer delude ourselves with how the world should work and accept how it does work. If you can learn to accept the world for how it is, before suffering, you'll go faster and further. Outcome over ego. If you think you know how the world works but you're doing something that gets suboptimal results because it *should* work a different way, you don't really know how the world works. Rational people take feedback from the world. If you want to know how someone sees the world, look at their actions. In the end, it's all your fault. You are accountable for your outcomes. When you take responsibility for your outcomes, you naturally accept feedback from reality. When you get feedback from reality, you adjust your behavior.

- III. As Per Kobe Bryant statement: Trivial things should not be taken your attention. The attentions should be focused on things that is very important. Anything outside of the most important things in life, you should not have time for. You Should love the challenge in life, and always be curious, if you can be at the top , as these greats in that area. Always focus on one thing and not multiple things, this gives an edge and advantage over other people, who focusing on multiple things in life. The World Becomes a library to you, to be better at your craft.: Everything you see whether TV show I saw, Books, Journals, I read, whether discussion, debate I listen, people I talk to. Everything was done to try to learn to become better at the craft your focusing. When you have this point of you, then the world becomes your library to help you to become better at the craft.
- IV. Have the best work ethic on daily basis. This is everyday process, and try to figure it out, the strengths and weaknesses of my position and opposing person position.
- V. Always look at the reality of the situation, and do not let the emotion cloud the situation and the execution. Always be in the present and the moment.
- VI. If you understand the world as it really is, not as you'd wish it to be, you will begin to make better decisions almost immediately. Once you start making better decisions the results compound. Better initial decisions free up your time, reduce your stress, allowing you to spend more time with your family and leave your competition in the dust.
- VII. How can we best understand the world as it is? Acquiring knowledge can be a very daunting task. If you think of the mind as a toolbox, we're only as good as the tools at our disposal. A carpenter doesn't show up to work with an empty toolbox. Not only do they want as many tools in their toolbox as possible, but they want to know how to use them. Having more tools and the knowledge of how to use them means they can tackle more problems. Try as we might, we cannot build a house with only a hammer. If you're a knowledge worker, you're a carpenter. But your tools aren't bought at a store and they don't come in a red box that you carry around. Mental tools are the big ideas from multiple disciplines, and we store them in our mind. And if we have a lot of tools and the knowledge required to wield them properly, we can start to synthesize how the world works and make better decisions when confronted with problems.
- VIII. This is how we understand and deal with reality. The tools you put into your toolbox are Mental Models. Mental models are a framework for understanding

how the world really works. They help you grasp new ideas quickly, identify patterns before anyone else and shift your perspective with ease. Mental Models allow us to make better decisions, scramble out of bad situations, and think critically. If you want to understand reality you must look at a problem in multiple dimensions — how could it be otherwise? Getting to this level of understanding requires having a lot of tools and knowing how to use them. You knew there was a hitch right? We need to change our fast-food diet of information consumption and adopt the healthier diet of knowledge that changes slowly over time. While changing diets isn't easy, it can be incredibly rewarding: more time, less stress, and being better at your job. The costs, however, are short term pain for long-term gain. You must change how you think.

- IX. 2nd Order Thinking. One example of a model we can immediately conceptualize and use to improve our ability to make better decisions is something we can borrow from ecology called second-order thinking. The simple way to conceptualize this is to ask yourself "If I do X, what will happen *after* that?". I sum this up using the ecologist Garrett Hardin's simple question: "And then what?" A lot of people forget about higher order effects — second and third-order effects or higher. I've been in a lot of meetings where decisions are made and very few people think to the second level, let alone the third. Rather, what typically happens is called first conclusion bias. The brain shuts down and stops thinking at the first idea that comes to mind that seems to address the problem as you understand it. We don't often realize that our first thoughts are usually not even our own thoughts. They usually belong to someone else. We understand the sound-byte but we haven't done the hard work of real thinking. After we reach the first conclusion, our minds often shut down. We don't seek evidence that would contradict our conclusion. We don't ask ourselves what the likely result of this solution would be — we don't ask ourselves "And then what?" We don't ask what other solutions might be even *more* optimal. For example, consider a hypothetical organization that decides to change their incentive systems. They come up with a costly new system that requires substantial changes to the current system. Only they don't consider (or even understand) the problems that the *new* system is likely to create. It's possible they've created more problems than they've solved — only now there are *different* problems they must put their head down to solve. Optically, they "reorganize their incentive programs," but practically, they've simply expended energy to stay in place. Another, perhaps more complicated,

example is when a salesman comes into a company and offers you a software program he claims will lower your operating costs and increase your profits. He's got all these beautiful charts on how much more competitive you'll be and how it will improve everything. This is exactly what you need because your compensation is based on increasing profits. You're sold. Then second-order thinking kicks in and you dare to ask how much of those cost savings are going to go to you and how much will eventually end up benefits enjoyed by customers? To a large extent, that depends on the business you're in. However, you can be damn sure the salesman is now knocking on your competitor's door and telling them you just bought their product and if they want to remain competitive they better purchase it too. Eventually, you all have the new software and no one is truly better off. Thus, in the manner of a crowd of people standing on their tip-toes at a parade, all competitors spend the money but none of them win: The salesman wins and the customer wins. We know, thanks to people like Garrett Hardin, Howard Marks, Charlie Munger, Peter Kaufman, and disciplines like ecology, that there are second and third-order effects. This is how the world really works. It just isn't always a comfortable reality. Understanding how the world works isn't easy and it shouldn't be. It's hard work. If it were easy, everyone would do it. And it's not for everyone. Sometimes, if your goal is to maximize utility, you should focus on getting very, very good in a narrow area and becoming an expert, accepting that you will make many mistakes outside of that domain. But for most, it's extremely helpful to understand the forces at play outside of their narrow area of expertise. Because when you think about it, how could reality be anything other than a synthesis of multiple factors? How could it possibly be otherwise?

- X. When our mental models line up with reality, they help us avoid problems. However, they also cause problems when they don't line up with reality as we think something that isn't true.
- XI. We must be open to other perspectives if we truly want to understand the results of our actions. Despite feeling that we've got all the information, if we're on the ship, the fish in the ocean has more he can share. The second flaw is ego. Many of us tend to have too much invested in our opinions of ourselves to see the world's feedback—the feedback we need to update our beliefs about reality. This creates a profound ignorance that keeps us banging our head against the wall over and over again. Our inability to learn from the world because of our ego happens for many reasons, but two are worth mentioning here. First, we're so

afraid about what others will say about us that we fail to put our ideas out there and subject them to criticism. This way we can always be right. Second, if we do put our ideas out there and they are criticized, our ego steps in to protect us. We become invested in defending instead of upgrading our ideas. The third flaw is distance. The further we are from the results of our decisions, the easier it is to keep our current views rather than update them. When you put your hand on a hot stove, you quickly learn the natural consequence. You pay the price for your mistakes. Since you are a pain avoiding creature, you update your view. Before you touch another stove, you check to see if it's hot. But you don't just learn a micro lesson that applies in one situation. Instead, you draw a general abstraction, one that tells you to check before touching anything that could potentially be hot. Organizations over a certain size often remove us from the direct consequences of our decisions. When we make decisions that other people carry out, we are one or more levels removed and may not immediately be able to update our understanding.

Step 205-Use Thinking, Logic, Mental Tools, Thinking Tools.

1. **Go to the Rules of Reading Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study**
2. Listen, Follow and Apply **Thinking, Logic and Mental Model PART 7 Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study**
 1. **Step 57- Slow Down. Pages 1061-1063.**
 2. **Step 58- NOT MULTITASK. Pages 1064.**
 3. **Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
 4. **Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
 5. **Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
 6. **Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
 7. **Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
 8. **Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
 9. **Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
 10. **Step 66-Journaling. Pages 1299.**
 11. **Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
 12. **Step 68-Journaling. Pages 1306.**
 13. **Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

*Part 32: Pareto Principle, Vital
Few and Trivial Many or 80/20
Principle*

Step 206-80/20 Principle

80/20 Principle or Pareto Principle

General Information About 80/20 Principle

1. Books On The 80/20 Principle:

- I. Eat That Frog.
- II. The 80 20 principle.
- III. 80/20 sales and marketing.
- IV. Pareto's 80 20 Rule for Corporate Accountants.
- V. The 80_20 investor _ investing in an uncertain and complex world -- how to simplify investing with a single principle.

2. DEFINITION OF THE 80/20 PRINCIPLE: The 80/20 Principle states that there is an inbuilt imbalance between causes and results, inputs and outputs, and effort and reward. Typically, causes, inputs, or effort divide into two categories:

- I. The majority, that have little impact. This means 80% inputs will result in 20% outputs
- II. A small minority, that have a major, dominant. This means 20% inputs will result in 80% output.
- III. 80 percent of outputs result from 20 percent of inputs; that 80 percent of consequences flow from 20 percent of causes; or that 80 percent of results come from 20 percent of effort.
- IV. Once you Find Out, what is 20% input that gives 80 of Output. Then You need to Put 100% effort into those 20% inputs, to achieve the best results.

3. The 80/20 Principle asserts that when two sets of data, relating to causes and results, can be examined and analysed, the most likely result is that there will be a pattern of imbalance. The imbalance may be 65/35, 70/30, 75/25, 80/20, 85/15, 90/10, 95/5, or 99.9/0.1, or any set of numbers in between. However, the two numbers in the comparison don't have to add up to 100. Example: Two

economists have just made a study of the revenues and lifespans of 300 movies released over an 18-month period. They found that four movies—just 1.3 percent of the total—earned 80 percent of box office revenues; the other 296 movies or 98.7 percent earned only 20 percent of the gross. So movies, which are a good example of unrestricted markets at work, produce virtually an 80/1 rule, a very clear demonstration of the principle of imbalance.

4. The 80/20 Principle can and should be used by every intelligent person in their every area of daily life, by every organisation, and by every social grouping and form of society. It can help individuals and groups achieve much more, with much less effort.
5. Understanding the 80/20 Principle gives you great insight into what is really happening in the world around you.
6. 80/20 Analysis.
 - I. Traditionally, the 80/20 Principle has required 80/20 Analysis, a quantitative method to establish the precise relationship between causes/input/effort and results/outputs/rewards. This method uses the possible existence of the 80/20 relationship as a hypothesis and then gathers the facts so that the true relationship is revealed. This is an empirical procedure which may lead to any result ranging from 50/50 to 99.9/0.1. If the result does demonstrate a marked imbalance between inputs and outputs (say a 65/35 relationship or an even more unbalanced one), then normally action is taken as a results.
 - Precise
 - Quantitative
 - Requires Investigation
 - Provides Facts
 - Highly Valuable.
 - II. 80/20 Analysis examines the relationship between two sets of comparable data. One set of data is always a universe of people or objects, usually a large number of 100 or more, that can be turned into a percentage. The other set of data relates to some interesting characteristic of the people or

objects that can be measured and also turned into a percentage. For example, we might decide to look at a group of 100 friends, all of whom are at least occasional beer drinkers, and compare how much beer they drank last week.

- III. What makes 80/20 Analysis unique is that the measurement ranks the second set of data in descending order of importance and makes comparisons between percentages in the two sets of data. In our example, then, we will ask all our 100 friends how many glasses of beer they drank last week and array the answers in a table in descending order. Shows the top 20 and bottom 20 from the table. 80/20 Analysis can compare percentages from the two sets of data (the friends and the amount of beer drunk). In this case, we can say that 70 percent of the beer was drunk by just 20 percent of the friends. This would therefore give us a 70/20 relationship. Introduces an 80/20 frequency distribution chart (or 80/20 chart for short) to summarise the data visually.
- IV. Like any simple and effective tool, 80/20 Analysis can also be misunderstood, misapplied, and, instead of being the means to an unusual insight, serve as the justification for conventional thuggery. 80/20 Analysis, applied inappropriately and in a linear way, can also lead the innocent astray—you need constantly to be vigilant against false logic.
- V. Let me illustrate this with an example from my own new profession, the book trade. It is easy to demonstrate that, in most times and places, about 20 percent of book titles comprise about 80 percent of books sold. For those who are steeped in the 80/20 Principle, this is not surprising. It might seem a short hop to the conclusion that bookshops should cut the range of books they stock or, indeed, that they should concentrate largely or exclusively on “bestsellers.” Yet what is interesting is that in most cases, instead of sending profits up, restricting range has sent profits down. This does not invalidate the 80/20 Principle, for two reasons. The key consideration is not the distribution of books sold, but what customers want. If customers go to the trouble of visiting a bookstore, they want to find a reasonable range of books (as opposed to a kiosk or supermarket, where they don’t expect range). Bookstores should concentrate on the 20

percent of customers who account for 80 percent of their profits and find out what those 20 percent of customers want.

VI. The other reason is that what matters even when considering books (as opposed to customers) is not the distribution of sales—the 20 percent of books that represent 80 percent of sales—but the distribution of profits—the 20 percent of titles that generate 80 percent of profits. Very often, these are not the so-called bestsellers, books written by well-known authors. In fact, a study in the United States revealed that “best sellers represent about 5% of total sales.”⁵ The true bestsellers are often those books that never make it into the charts but sell a reliable quantity year in and year out, often at high margins. As the same U.S. research comments, “Core inventory represents those books that sell season-in and season-out. They are the ‘80’ in the 80/20 rule, often accounting for the lion’s share of sales in a particular subject.”

7. 80/20 Thinking.

I. A new and complementary way to use the 80/20 Principle is what I call 80/20 Thinking. This requires deep thought about any issue that is important to you and asks you to make a judgment on whether the 80/20 Principle is working in that area. You can then act on the insight. 80/20 Thinking does not require you to collect data or actually test the hypothesis. Consequently, 80/20 Thinking may on occasion mislead you—it is dangerous to assume, for example, that you already know what the 20 percent is if you identify a relationship—but I will argue that 80/20 Thinking is much less likely to mislead you than is conventional thinking. 80/20 Thinking is much more accessible and faster than 80/20 Analysis, although the latter may be preferred when the issue is extremely important and you find it difficult to be confident about an estimate.

- Fuzzy
- Qualitative
- Requires Deep Thought
- Provides Insight

- **Highly Valuable**

- II. **80/20 Analysis is extremely useful. But most people are not natural analysts, and even analysts cannot stop to investigate the data every time they have to make a decision—it would bring life to a shuddering halt. Most important decisions have never been made by analysis and never will be, however clever our computers become. Therefore, if we want the 80/20 Principle to be a guide in our daily lives, we need something less analytical and more instantly available than 80/20 Analysis. We need 80/20 Thinking.**
- III. **80/20 Thinking is my phrase for the application of the 80/20 Principle to daily life, for nonquantitative applications of the principle. As with 80/20 Analysis, we start with a hypothesis about a possible imbalance between inputs and outputs, but, instead of collecting data and analyzing them, we estimate them. 80/20 Thinking requires, and with practice enables, us to spot the few really important things that are happening and ignore the mass of unimportant things. It teaches us to see the wood for the trees.**
- IV. **80/20 Thinking is too valuable to be confined to causes where data and analysis are perfect. For every ounce of insight generated quantitatively, there must be many pounds of insight arrived at intuitively and impressionistically. This is why 80/20 Thinking, although helped by data, must not be constrained by it**
- V. **To engage in 80/20 Thinking, we must constantly ask ourselves: Vital Few :what is the 20 percent that is leading to 80 percent? Ask Trivial Many : What is 80 percent that leads to 20 percent. We must never assume that we automatically know what the answer is but take some time to think creatively about it. What are the vital few inputs or causes, as opposed to the trivial many? Where is the haunting melody being drowned out by the background noise?**
 - **Once you Find Out, what is 20% input that gives 80 of Output. Then You need to Put 100% effort into those 20% inputs, to achieve the best results. Additionally Remove Trivial Many.**

8. Application of the 80/20 Principle implies that we should do the following:

- I. Celebrate exceptional productivity, rather than raise average efforts**
- II. Look for the short cut, rather than run the full course**
- III. Exercise control over our lives with the least possible effort**
- IV. Be selective, not exhaustive**
- V. Strive for excellence in few things, rather than good performance in many**
- VI. Delegate or outsource as much as possible in our daily lives and be encouraged rather than penalized by tax systems to do this (use gardeners, car mechanics, decorators, and other specialists to the maximum, instead of doing the work ourselves).**
- VII. Choose our careers and employers with extraordinary care, and if possible employ others rather than being employed ourselves**
- VIII. Only do the thing we are best at doing and enjoy most**
- IX. Look beneath the normal texture of life to uncover ironies and oddities**
- X. In every important sphere, work out where 20 percent of effort can lead to 80 percent of returns**
- XI. Calm down, work less and target a limited number of very valuable goals where the 80/20 Principle will work for us, rather than pursuing every available opportunity.**
- XII. Make the most of those few “lucky streaks” in our life where we are at our creative peak and the stars line up to guarantee success.**

9. Low Value use of Time.

- I. 1 Things other people want you to do**
- II. 2 Things that have always been done this way**
- III. 3 Things you're not unusually good at doing**
- IV. 4 Things you don't enjoy doing**
- V. 5 Things that are always interrupted**
- VI. 6 Things few other people are interested in**
- VII. 7 Things that have already taken twice as long as you originally expected.**
- VIII. 8 Things where your collaborators are unreliable or low quality**
- IX. 9 Things that have a predictable cycle**

10. High Value use of Time

- I. 1 Things that advance your overall purpose in life
- II. 2 Things you have always wanted to do
- III. 3 Things already in the 20/80 relationship of time to results
- IV. 4 Innovative ways of doing things that promise to slash the time required and/or multiply the quality of results
- V. 5 Things other people tell you can't be done
- VI. 6 Things other people have done successfully in a different arena
- VII. 7 Things that use your own creativity
- VIII. 8 Things that you can get other people to do for you with relatively little effort on your part
- IX. 9 Anything with high-quality collaborators who have already transcended the 80/20 rule of time, who use time eccentrically and effectively
- X. 10 Things for which it is now or never

11. When thinking about any potential use of time, ask two questions:

- I. Is it unconventional?
- II. Does it promise to multiply effectiveness?

Apply 80/20 Principle In Business

- 1. Large Project- Sales 35,000, Profit 16,000 euro and return on sales is 45%.**
- 2. Small Project Sales 135,000, Profit 12,825 euro, and return on sales is 9.5%.**
- 3. Total: Sales 170,000, profit 28,825 euro and return on sales is 17%.**
- 4. These figures exhibit a 56/21 rule: large projects constitute only 21 percent (35,000/170,000) of turnover but give 56 percent of profits (16,000/28,825).**
- 5. These figures tell us that 26 percent of the business (old clients) made up 84 percent of the profits: an 84/26 rule. The message here was to strive above all to keep and expand long-serving clients, who were the least price sensitive and who could be served most cheaply. New clients who do not turn into long-serving clients were recognised as being loss makers, leading to a much more selective approach to pitching for business: pitches were only made where it was believed the company concerned would turn into a long-term client.**
 - I. Old Clients: Sales 43,500, Profit 24,055 and Return on Sales 55.3%**
 - II. Intermediate Clients Sales 101,000, profit 12,726, return on sales 12.6%**
 - III. New Clients: sales 25,500, profit -7,956, and return on sales 31.2%**
 - IV. Total: Sales 170,000, profit 28,825 and Return on sales 17%**

*Part 33: Classical Books, Liberal
Art and Great Books of Western
World*

Step 207 - Great Books of Western World

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 - [*To the Lighthouse*](#)
- [Franz Kafka](#)
 - [*The Metamorphosis*](#)
- [D. H. Lawrence](#)
 - [*The Prussian Officer*](#)
- [T. S. Eliot](#)
 - [*The Waste Land*](#)
- [Eugene O'Neill](#)
 - [*Mourning Becomes Electra*](#)
- [F. Scott Fitzgerald](#)
 - [*The Great Gatsby*](#)
- [William Faulkner](#)
 - [*A Rose for Emily*](#)
- [Bertolt Brecht](#)
 - [*Mother Courage and Her Children*](#)
- [Ernest Hemingway](#)
 - [*The Short Happy Life of Francis Macomber*](#)
- [George Orwell](#)
 - [*Animal Farm*](#)
- [Samuel Beckett](#)
 - [*Waiting for Godot*](#)

Step 208 - Classical Books

Classic Biographies:

Read the personal biographies and autobiographies of the most influential thinkers and inventors in history.

1. [Autobiography of a Yogi](#) (Paramahansa Yogananda)
2. [The World As I See It](#) (Albert Einstein)
3. [My Inventions: The Autobiography Of Nikola Tesla](#) (Nikola Tesla)
4. [The Autobiography of Charles Darwin](#) (Charles Darwin)
6. [The Autobiography of Benjamin Franklin](#) (Benjamin Franklin)
7. [Autobiography: Truth and Fiction Relating to My Life](#) (Johann Wolfgang von Goethe)
8. [The Seven Pillars of Wisdom](#) (T.E. Lawrence)
9. [The Everyday Life of Abraham Lincoln](#) (Francis F. Browne)
10. [Theodore Roosevelt: An Autobiography](#) (Theodore Roosevelt)
11. [The Autobiography of Malcolm X](#) (As Told To Alex Haley)
12. [Mark Twain: A Biography](#) (Albert Bigelow Paine)
13. [The Autobiography of Andrew Carnegie](#) (Andrew Carnegie)
14. [The Story of My Life](#) (Helen Keller)

Philosophy:

Deepen your knowledge of philosophy with the classics of Western Philosophy.

1. [The Republic](#) (Plato)
2. [Thus Spake Zarathustra](#) (Friedrich Nietzsche)
3. [Beyond Good and Evil](#) (Friedrich Nietzsche)
4. [The Critique of Pure Reason](#) (Immanuel Kant)
5. [The Problems of Philosophy](#) (Bertrand Russell)
6. [History of Western Philosophy](#) (Bertrand Russell)
7. [A Pluralistic Universe](#) (William James)
8. [The Nicomachean Ethics](#) (Aristotle)
9. [Meditations](#) (Marcus Aurelius)
10. [A Treatise of Human Nature](#) (David Hume)
11. [Mere Christianity](#) (C.S. Lewis)
12. [The Wisdom of Life](#) (Arthur Schopenhauer)
13. [Utopia](#) (Thomas More)
14. [Island](#) (Aldous Huxley)

Politics:

Influential political treatises that ignited modern political debates that still rage.

1. [The Wealth of Nations](#) (Adam Smith)
2. [The Age of Reason](#) (Thomas Paine)
3. [Common Sense](#) (Thomas Paine)
4. [The Prince](#) (Niccolò Machiavelli)
5. [Second Treatise of Government](#) (John Locke)
6. [The Communist Manifesto](#) (Friedrich Engels and Karl Marx)
7. [On Liberty](#) (John Stuart Mill)
8. [Proposed Roads to Freedom](#) (Bertrand Russell)
9. [Anarchism and Other Essays](#) (Emma Goldman)
10. [Democracy in America](#) (Alexis de Tocqueville)
11. [Brave New World](#) (Aldous Huxley)
12. [1984](#) (George Orwell)

Education:

Thought-provoking books on the nature of education and how to deepen your understanding of life.

1. [Education and the Significance of Life](#) (Jiddhu Krishnamurti)
2. [Dr. Montessori's Own Handbook](#) (Maria Montessori)
3. [The Montessori Method](#) (Maria Montessori)
4. [Democracy and Education](#) (John Dewey)
5. [Deschooling Society](#) (Ivan Illich)
6. [Weapons of Mass Instruction](#) (John Taylor Gatto)

Psychology:

Explore the inner workings of the human mind through the lens of modern psychology.

1. [Dream Psychology](#) (Sigmund Freud)
2. [The Psychology of Revolution](#) (Gustav Le Bon)
3. [Your Mind and How to Use It: A Manual of Practical Psychology](#) (Walter Atkinson)
4. [The Mass Psychology of Fascism](#) (Wilhelm Reich)
5. [Dreams](#) (Henry Bergson)
6. [As a Man Thinketh](#) (James Allen)
7. [The Varieties of Religious Experience: A Study in Human Nature](#) (William James)

Science:

1. [The Mathematical Principles of Natural Philosophy](#) (Sir Isaac Newton)
2. [On the Origin of Species](#) (Charles Darwin)
3. [Physics](#) (Aristotle)
4. [The Pioneers of Science](#) (Sir Oliver Lodge)
5. [Relativity: The Special & the General Theory](#) (Albert Einstein)
6. [The Journals of Lewis and Clark](#) (William Clark and Meriwether Lewis)

Western Religion:

The three Abrahamic religions and their different cultural translations of God, scripture and truth.

1. [The Torah](#)
2. [The Bible](#)
3. [The Koran](#)

Eastern Religion:

The Eastern religious traditions and their radically different ideas of liberation and the nature of being.

1. [The Yoga Sutras of Patanjali](#)
2. [The Rig Veda](#)
3. [The Upanishads](#)
4. [The Mahabharata](#)
5. [The Ramayan](#)
6. [The Bhagavad Gita](#)
7. [The Kama Sutra of Vatsyayana](#)
8. [The Dhammapada: The Sayings of The Buddha](#)
9. [The Tao Te Ching](#)

English/Scottish/Irish/Welsh Classics:

Literary classics from the nations that comprise the United Kingdom.

1. [The Life and Adventures of Robinson Crusoe](#) (Daniel Defoe)
2. [The Adventures of Sherlock Holmes](#) (Arthur Conan Doyle)
3. [The Lost World](#) (Arthur Conan Doyle)
4. [Ulysses](#) (James Joyce)
5. [A Portrait of the Artist as a Young Man](#) (James Joyce)
6. [Finnegan's Wake](#) (James Joyce)
7. [Treasure Island](#) (Robert Louis Stevenson)
8. [A Tale of Two Cities](#) (Charles Dickens)
9. [Great Expectations](#) (Charles Dickens)
10. [Pride and Prejudice](#) (Jane Austen)
11. [The Picture of Dorian Gray](#) (Oscar Wilde)
12. [The Importance of Being Earnest](#) (Oscar Wilde)
13. [Gulliver's Travels](#) (Jonathan Swift)
14. [A Modest Proposal](#) (Jonathan Swift)
15. [The Jungle Book](#) (Rudyard Kipling)
16. [Dracula](#) (Bram Stoker)
17. [The Time Machine](#) (H. G. Wells)
18. [The Complete Works](#) (William Shakespeare)
19. [Paradise Lost](#) (John Milton)

20. [The Canterbury Tales](#) (Geoffrey Chaucer)
21. [Heart of Darkness](#) (Joseph Conrad)
22. [The Lord Of The Rings](#) (J. R. R. Tolkien)
23. [Alice's Adventures in Wonderland](#) (Lewis Carroll)
24. [Through the Looking-Glass](#) (Lewis Carroll)
25. [The Pilgrim's Progress](#) (John Bunyan)
26. [The Chronicles of Narnia](#) (C.S. Lewis)

Western European Classics:

Literary classics from the Western European nations of Germany, France, Spain, and Italy.

1. [Siddhartha](#) (Hermann Hesse)
2. [The Count of Monte Cristo](#) (Alexandre Dumas)
3. [Grimms' Fairy Tales](#) (Jacob Grimm and Wilhelm Grimm)
4. [Les Misérables](#) (Victor Hugo)
5. [The Divine Comedy](#) (Dante)
6. [Candide](#) (Voltaire)
7. [Don Quixote](#) (Miguel de Cervantes Saavedra)
8. [Around the World in Eighty Days](#) (Jules Verne)
9. [Faust](#) (Johann Wolfgang von Goethe)
10. [The Notebooks of Leonardo Da Vinci](#) (Leonardo da Vinci)
11. [Madame Bovary](#) (Gustave Flaubert)

12. [The Stranger](#) (Albert Camus)

American Classics:

American literature classics that have shaped uniquely American ideals of freedom and liberty.

1. [Walden, and On The Duty Of Civil Disobedience](#) (Henry David Thoreau)
2. [Moby Dick](#) (Herman Melville)
3. [Adventures of Huckleberry Finn](#) (Mark Twain)
4. [Leaves of Grass](#) (Walt Whitman)
5. [The Wonderful Wizard of Oz](#) (L. Frank Baum)
6. [The Call of the Wild](#) (Jack London)
7. [Twelve Years a Slave](#) (Solomon Northup)
8. [This Side of Paradise](#) (F. Scott Fitzgerald)
9. [Poems](#) (T. S. Eliot)
10. [Essays](#) (Ralph Waldo Emerson)
11. [On The Road](#) (Jack Kerouac)

Russian Classics:

Renowned Russian literary classics.

1. [War and Peace](#) (Leo Tolstoy)
2. [Anna Karenina](#) (Leo Tolstoy)
3. [The Gulag Archipelago](#) (Aleksandr Solzhenitsyn)
4. [The Brothers Karamazov](#) (Fyodor Dostoyevsky)
5. [Notes from the Underground](#) (Fyodor Dostoyevsky)

Ancient Greek and Roman Literature:

Classic epics from ancient Greece and Rome.

1. [The Iliad](#) (Homer)
2. [The Odyssey](#) (Homer)
3. [Aesop's Fables](#) (Aesop)
4. [Myths and Legends of Ancient Greece and Rome](#) (E. M. Berens)
5. [The History Of The Decline And Fall Of The Roman Empire](#) (Edward Gibbon)

Indian Classics:

Some of the classic books of India.

1. [Sadhana: The Realisation of Life](#) (Rabindranath Tagore)
2. [Gitanjali](#) (Rabindranath Tagore)

Chinese Classics:

Some of the classic books of China.

1. [The Analects](#) (Confucius)
2. [The Sayings of Confucius](#) (Confucius)
3. [Chuang Tzu: Mystic, Moralist, and Social Reformer](#) (Zhuangzi)
4. [The Art of War](#) (Sun Tzu)

Step 209-How To Get Liberal Arts Education without Degree.

While the Classical Liberal Arts typically fall at the bottom of the education hierarchy today, I think it's one of the most valuable education curriculums you can follow to prepare yourself for an uncertain future.

Why? Because nobody can predict which technical or job skills will stay in-demand in a future that will be dominated by robots and artificial intelligence. But studying emerging trends, we do know that we will need to train the uniquely human qualities that can't be replicated by machines.

These uniquely human qualities are what make us effective leaders and good communicators: creativity, empathy, social intelligence, curiosity, storytelling and adaptability.

The Liberal Arts has a bad reputation because it has the lowest barriers to entry of University degrees and it often attracts students that can't get into the more competitive disciplines in Science, Technology, Engineering and Mathematics (STEM). In these technical disciplines, you will fall behind very quickly if you don't diligently focus for long periods of time and complete the daily work assignments.

However, if you really dedicate yourself to studying the Classical Liberal Arts it can be one of the most challenging and helpful University degrees. There are few forms of higher education more effective at building individuals with strong character who are well-rounded and flexible in the face of disruptive change.

And now thanks to the Internet, you don't necessary have to go up to a 100K in debt to get a Liberal Arts education. For a fraction of the cost of a University degree, you create your own own Liberal Arts education while traveling the world and directly experiencing the fascinating cultures, history and museums across the cultural mosaic of human civilization.

What Is The Meaning of Liberalism?

A Classical Liberal Arts education studying the Trivium and Quadrivium while reading the classical and modern work of literature and philosophy that form the generally agreed upon Liberal Arts canon in Western education.

Another important component is regularly debating the most important issues of our day and the human condition with other intelligent and informed people who can challenge you to see your own [cognitive biases](#) and [reality tunnels](#).

While the classical meaning of liberalism is often bastardized by pundits in the media, a liberal is a someone who works to freed himself or herself from the bigotry, authoritarian attitudes and established dogmas.

Liberalism often gets a bad name because of the elitism attached to attaining a Liberal Arts education at a prestigious University. Many highly educated people perpetuate this elitism through their often thinly-veiled contempt for people of lower educational attainment and lesser financial means.

This is misguided. **A real liberal is someone who seeks the freedom and equality of all people** — everywhere in the world — and does not allow him or herself to be caged by any institutional, ideological or class biases.

The 4-Year Liberal Arts Reading List

This 4-Year Liberal Arts reading list is a guide to many of history's most important books at least from a Western perspective (please feel free to share a similar canon from other cultures that has been translated into English in the comments).

If you read the books on this 4-year Liberal Arts reading list you can learn directly from the thinking patterns of history's greatest thinkers and I can guarantee it will transform your world and make you a better person.

This reading list has been reviewed yearly since 1937 by the Liberal Arts faculty at St. John's College to create a generally agreed upon Liberal Arts curriculum that anyone can study in their own time.

The first two years span over 2,000 years of intellectual history and the last two years are from the last 300 years that have seen the development of the ideas that underpin the science and freedom we enjoy in the modern world.

The Liberal Arts reading list is organized in chronological order but you don't necessary need to read these books in any particular order.

If you're really determined, you can complete the entire Liberal Arts canon in about 4 years by reading a book every 1-2 weeks (some larger books will take longer to read though)

However, for most people this education may stretch on for decades as you read the books on the list that most interest you (and I've also created a [21st Century Reading List](#) of other books I recommend reading as well).

1st Year: Greek Civilization and the Classical Liberal Arts

The foundation of Western Civilization was laid by the Greeks. Pythagorus, Socrates, Plato and Aristotle created a liberal renaissance in the ancient European world.

The [Socratic Method](#) and [The Trivium](#) still form of the foundation of one the best systems ever created for critical thinking and rational debate.

1. HOMER: *Iliad, Odyssey*
2. AESCHYLUS: *Agamemnon, Libation Bearers, Eumenides, Prometheus Bound*
3. SOPHOCLES: *Oedipus Rex, Oedipus at Colonus, Antigone, Philoctetes, Ajax*
4. THUCYDIDES: *Peloponnesian War*
5. EURIPIDES: *Hippolytus, Bacchae*
6. HERODOTUS: *Histories*
7. ARISTOPHANES: *Clouds*
8. PLATO (SOCRATES): *Meno, Gorgias, Republic, Apology, Crito, Phaedo, Symposium, Parmenides, Theaetetus, Sophist, Timaeus, Phaedrus*
9. ARISTOTLE: *Poetics, Physics, Metaphysics, Nicomachean Ethics, On Generation and Corruption, Politics, Parts of Animals, Generation of Animals*
10. EUCLID: *Elements*
11. LUCRETIUS: *On the Nature of Things*
12. PLUTARCH: *Lycurgus, Solon*
13. NICOMACHUS: *Arithmetic*
14. LAVOISIER: *Elements of Chemistry*
15. HARVEY: *Motion of the Heart and Blood*
16. Essays by: Archimedes, Fahrenheit, Avogadro, Dalton, Cannizzaro, Virchow, Mariotte, Driesch, Gay-Lussac, Spemann, Stears, J.J. Thompson, Mendeleyev, Berthollet, J.L. Proust.

2nd Year: Roman, Medieval and Renaissance Periods

The Roman Empire lasted nearly 700 years before collapsing under the weight of its immorality and greed.

The period known as the Dark Ages followed, which was characterized by illiteracy and the authoritarian rule of the Catholic Church until the Italian Renaissance and birth of modern world.

1. THE HEBREW BIBLE
2. THE BIBLE: New Testament
3. ARISTOTLE: *De Anima, On Interpretation, Prior Analytics, Categories*
4. APOLLONIUS: *Conics*
5. VIRGIL: *Aeneid*
6. PLUTARCH: "Caesar," "Cato the Younger," "Antony," "Brutus"
7. EPICTETUS: *Discourses, Manual*
8. TACITUS: *Annals*
9. PTOLEMY: *Almagest*
10. PLOTINUS: *The Enneads*
11. AUGUSTINE: *Confessions*
12. MAIMONIDES: *Guide for the Perplexed*
13. ST. ANSELM: *Proslogium*
14. AQUINAS: *Summa Theologica*
15. DANTE: *Divine Comedy*
16. CHAUCER: *Canterbury Tales*
17. MACHIAVELLI: *The Prince, Discourses*
18. KEPLER: *Epitome IV*
19. RABELAIS: *Gargantua and Pantagruel*
20. PALESTRINA: *Missa Papae Marcelli*
21. MONTAIGNE: *Essays*
22. VIETE: *Introduction to the Analytical Art*
23. BACON: *Novum Organum*
24. SHAKESPEARE: *Richard II, Henry IV, The Tempest, As You Like It, Hamlet, Othello, Macbeth, King Lear, and Sonnets*
25. POEMS BY: Marvell, Donne, and other 16th- and 17th-century poets
26. DESCARTES: *Geometry, Discourse on Method*
27. PASCAL: *Generation of Conic Sections*
28. BACH: *St. Matthew Passion, Inventions*
29. HAYDN: *Quartets*
30. MOZART: *Operas*
31. BEETHOVEN: *Third Symphony*
32. SCHUBERT: *Songs*
33. MONTEVERDI: *L'Orfeo*
34. STRAVINSKY: *Symphony of Psalms.*

3rd Year: The Enlightenment in the 17th and 18th Centuries

The separation of the church and state led to the Enlightenment and a new golden age of scholarship and innovation for the modern nations who freed themselves from religious theocracy.

It also led to the despiritualization of the Universe and the dehumanization of people who resisted the evangelical zeal of Western science and religion.

1. CERVANTES: *Don Quixote*
2. GALILEO: *Two New Sciences*
3. HOBBS: *Leviathan*
4. DESCARTES: *Meditations, Rules for the Direction of the Mind*
5. MILTON: *Paradise Lost*
6. LA ROCHEFOUCAULD: *Maximes*
7. LA FONTAINE: *Fables*
8. PASCAL: *Pensees*
9. HUYGENS: *Treatise on Light, On the Movement of Bodies by Impact*
10. ELIOT: *Middlemarch*
11. SPINOZA: *Theological-Political Treatise*
12. LOCKE: *Second Treatise of Government*
13. RACINE: *Phaedre*
14. NEWTON: *Principia Mathematica*
15. KEPLER: *Epitome IV*
16. LEIBNIZ: *Monadology, Discourse on Metaphysics, Essay On Dynamics, Philosophical Essays, Principles of Nature and Grace*
17. SWIFT: *Gulliver's Travels*
18. HUME: *Treatise of Human Nature*
19. ROUSSEAU: *Social Contract, The Origin of Inequality*
20. MOLIÈRE: *Le Misanthrope*
21. ADAM SMITH: *Wealth of Nations*
22. KANT: *Critique of Pure Reason, Foundations of the Metaphysics of Morals*
23. MOZART: *Don Giovanni*
24. JANE AUSTEN: *Pride and Prejudice*
25. DEDEKIND: "Essay on the Theory of Numbers"
26. "Articles of Confederation," "Declaration of Independence," "Constitution of the United States of America"
27. HAMILTON, JAY AND MADISON: *The Federalist*
28. TWAIN: *The Adventures of Huckleberry Finn*
29. WORDSWORTH: *The Two Part Prelude of 1799*
30. Essays by: Young, Taylor, Euler, D. Bernoulli, Orsted, Ampere, Faraday, Maxwell.

4th Year: The Modern World In The 19th and 20th Centuries

The liberal ideals, laws and sciences provided the foundation for the modern world and many of the ideas and philosophies today come from much deeper roots.

These books can help you develop a better understanding the freedoms and flaws of the modern world.

1. Supreme Court opinions
2. GOETHE: *Faust*
3. DARWIN: *Origin of Species*
4. HEGEL: *Phenomenology of Mind*, "Logic" (from the Encyclopedia)
5. LOBACHEVSKY: *Theory of Parallels*
6. TOCQUEVILLE: *Democracy in America*
7. LINCOLN: Selected Speeches
8. FREDERICK DOUGLASS: Selected Speeches
9. KIERKEGAARD: *Philosophical Fragments, Fear and Trembling*
10. WAGNER: *Tristan and Isolde*
11. MARX: *Capital, Political and Economic Manuscripts of 1844, The German Ideology*
12. DOSTOEVSKI: *Brothers Karamazov*
13. TOLSTOY: *War and Peace*
14. MELVILLE: *Benito Cereno*
15. O'CONNOR: Selected Stories
16. WILLIAM JAMES; *Psychology, Briefer Course*
17. NIETZSCHE: *Beyond Good and Evil*
18. FREUD: Introductory Lectures on Psychoanalysis
19. BOOKER T. WASHINGTON: Selected Writings
20. DUBOIS: *The Souls of Black Folk*
21. HUSSERL: *Crisis of the European Sciences*
22. HEIDEGGER: *Basic Writings*
23. EINSTEIN: Selected papers
24. CONRAD: *Heart of Darkness*
25. FAULKNER: *Go Down Moses*
26. FLAUBERT: *Un Coeur Simple*
27. WOOLF: *Mrs. Dalloway*
28. Poems by: Yeats, T.S. Eliot, Wallace Stevens, Valery, Rimbaud
29. Essays by: Faraday, J.J. Thomson, Millikan, Minkowski, Rutherford, Davisson, Schrodinger, Bohr, Maxwell, de Broglie, Heisenberg, Mendel, Boveri, Sutton, Morgan, Beadle & Tatum, Sussman, Watson & Crick, Jacob & Monod, Hardy

Part 34: Motivation Quotes

Step 220-Motivation Quotes

Hard Work

- "I have nothing in common with lazy people who blame others for their lack of success. Great things come from hard work and perseverance. No excuses." Kobe Bryant
- "Do. The Work. Every day, you have to do something you don't want to do. Every day. Challenge yourself to be uncomfortable, push past the apathy and laziness and fear." Tim Grover
- "There are no shortcuts. I don't want to hear about workouts you can do in five minutes a day, or twenty minutes a week; that's total bullshit."
- "I love the guys who want results so much they'll fight me to do more than they're supposed to."
- You keep pushing yourself harder when everyone else has had enough."
- "You get into the Zone, you shut out everything else, and control the uncontrollable."
- "You don't compete with anyone, you find your opponent's weakness and you attack."
- Hard work is everyday process trying to figure out strengths and weaknesses. Then study more to see the places to improve. by Kobe Bryant

Improvement

- *If You Keep Out improving the guys Consistently, eventually, then none of the guys can compete with you* *Patrick Bet Davis.
- “You have power over your mind – not outside events. Realise this, and you will find strength.” Marcus Aurelius
- “If it is not right do not do it; if it is not true do not say it.” Marcus Aurelius
- Everything You do try to learn , how to become better in the craft. When, you have this point of view, then literally the world becomes your library to help you to become better at your craft. Because you know what you want, the world giving you exactly the information you needed. Kobe Bryant
- You have to look at the reality of situation. You need to get over yourself, it is not about you. Like Ok, you feel embarrassed, you are not that important, you worry how people may perceive you and like you are walking around and it's embarrassing because you failed something in front of the crowd. Get over yourself. After that, the. You need ask questions, why did I failed in those situation, got an answer and work on those things hard.
- "The most important conversations you'll ever have are the ones you'll have with yourself."
- The ticket to victory often comes down to bringing your very best when you feel your worst."
- Are you an experienced scuba diver? Great, shed your gear, take a deep breath and become a one-hundred-foot free diver. Are you a badass triathlete? Cool, learn how to rock climb. Are you enjoying a wildly successful career? Wonderful, learn a new language or skill. Get a second degree. Always be willing to embrace ignorance and become the dumb fuck in the classroom again, because that is the only way to expand your body of knowledge and body of work. It's the only way to expand your mind."
- Always be ready to adjust, recalibrate, and stay after it to become better, somehow."

- If you want to master the mind and remove your governor, you'll have to become addicted to hard work. Because passion and obsession, even talent, are only useful tools if you have the work ethic to back them up."
- Most of us sweep our failures and evil secrets under the rug, but when we run into problems, that rug gets lifted up, and our darkness re-emerges, floods our soul, and influences the decisions which determine our character."
- "A lot of us surround ourselves with people who speak to our desire for comfort. People who would rather treat the pain of our wounds and prevent further injury than help us callous over them and try again. We need to surround ourselves with people who will tell us what we need to hear, not what we want to hear, but at the same time not make us feel we're up against the impossible."
- "In every failure there is something to be gained, even if it's only practice for the next test you'll have to take. Because that next test is coming. That's a guarantee."
- There is no more time to waste. Hours and days evaporate like creeks in the desert. That's why it's okay to be cruel to yourself as long as you realize you're doing it to become better."
- Motivation is Crap. Motivation Come and Goes. People right Now maybe listening to this shit, they get motivated go run if its cold somewhere where they are at, a lot of the people shut that door go back inside, that's motivation. It comes and goes as how you feel if you and your wife are good, if you and your kids are good, if you are good at work. I like people whose life is imploded Ain't got shit in life and says, still get after today man. And that's what it's about so that's when you move from motivated to driven to obsessed. And I want people realise that once you get to this portion over here. The driven obsessed part, you are unstoppable. This has to be something that's comes from deep down inside.
- Goggins' approach to motivation is to be aggressively bad-ass towards yourself. Find the things you hate and force yourself to do them again and again until you are numb to the suffering. And then do more. Always do more than the next guy.
- "I never felt that I was good enough, strong enough, smart enough. He let me know that there was always room for improvement. A lot of sons would have been crippled by his demands, but instead the discipline rubbed off on me. I turned it into drive." – Arnold Schwarzenegger

Failure and Success

- *I've missed more than 9,000 shots in my career. I've lost almost 300 games. Twenty-six times I've been trusted to take the game-winning shot and missed. I've failed over and over and over again in my life. And that is why I succeed.* By Michael Jordan.
- I can Accept Failure, everyone fails at something. But I cannot Accept not trying.
By Michael Jordan
- "Just like in bodybuilding, failure is also a necessary experience for growth in our own lives, for if we're never tested to our limits, how will we know how strong we really are? How will we ever grow?" – Arnold Schwarzenegger
- "The last three or four reps is what makes the muscle grow. This area of pain divides the champion from someone else who is not a champion. That's what most people lack, having the guts to go on and just say they'll go through the pain no matter what happens." – Arnold Schwarzenegger
- "Failure is not an option. Everyone has to succeed." – Arnold Schwarzenegger
- "Life's six rules for success. 1. Trust yourself. 2. Break some rules. 3. Don't be afraid to fail. 4. Ignore the naysayers. 5. Work like hell. 6. Give something back." – Arnold Schwarzenegger
- One of the most fascinating lessons I've absorbed about life is that the struggle is good.

Relentless

- "It's a lot more than mind over matter. It takes relentless self-discipline to schedule suffering into your day, every day."

Hardship and Obstacles

- "Obstacles don't have to stop you. If you run into a wall, don't turn around and give up. Figure out how to climb it, go through it, or work around it." By Michael Jordan
- "Don't stop when you're tired. Stop when you're done." "Everyone fails sometimes and life isn't supposed to be fair, much less bend to your every whim." "You must recognize what you are about to do, highlight what you do not like about it, and spend time visualizing each and every obstacle you can. By David Goggins

Weakness and Strengths

- My attitude is that if you push me towards something that you think is a weakness, then I will turn that perceived weakness into a strength." By Michael Jordan
- "Whenever you are about to find fault with someone, ask yourself the following question: What fault of mine most nearly resembles the one I am about to criticize?" Marcus Aurelius.
- "Strength does not come from winning. Your struggles develop your strengths. When you go through hardships and decide not to surrender, that is strength." – Arnold Schwarzenegger
- "If you don't find the time, if you don't do the work, you don't get the results." – Arnold Schwarzenegger
- "Denial is the ultimate comfort zone." ~ David Goggins
- "Life is one big tug of war between mediocrity and trying to find your best self." ~ David Goggins
- "The path to success will leave you callused, bruised, and very tired. It will also leave you empowered." ~ David Goggins
- "Everybody comes to a point in their life when they want to quit. But it's what you do at that moment that determines who you are." ~ David Goggins
- "We don't rise to the level of our expectations, we fall to the level of our training." ~ David Goggins
- "Before you start a goal – let's take care of our insecurities because they are going to surface when you put yourself in the crucible and you're suffering." ~ David Goggins

- “It’s a lot more than mind over matter. It takes relentless self discipline to schedule suffering into your day, every day.” ~ David Goggins
- Analyze your schedule, kill your empty habits, burn out the bullshit, and see what’s left.” ~ David Goggins
- “In every failure a lot of good things will have happened, and we must acknowledge them.” ~ David Goggins
- “A warrior is not a person that carries a gun. The biggest war you ever go through is right between your own ears. It’s in your mind. We’re all going through a war in our mind, and we have to callus our mind to fight that war and to win that war.” ~ David Goggins
- “Refused to compromise who I was to conform to their unwritten rules.” ~ David Goggins
- “Your entitled mind is dead weight. Cut it loose. Don’t focus on what you think you deserve. Take aim on what you are willing to earn!” ~ David Goggins
- “Tell yourself the truth! That you’ve wasted enough time, and that you have other dreams that will take courage to realize...” ~ David Goggins
- “Pain unlocks a secret doorway in the mind, one that leads to both peak performance, and beautiful silence.” ~ David Goggins
- “Suffering is the true test of life.” ~ David Goggins
- “When you’re in hell, you forget how great you really are because you’re suffering and you forget the great things you’ve done.” ~ David Goggins
- “If you want to get better, do the things that no-one else wants to do. Do the things that no-one is even thinking about doing.” ~ David Goggins
- “There is no more time to waste. Hours and days evaporate like creeks in the desert. That’s why it’s okay to be cruel to yourself as long as you realize you’re doing it to become better.” ~ David Goggins
- “Everyone fails sometimes and life isn’t supposed to be fair, much less bend to your every whim.” ~ David Goggins
- “You must recognize what you are about to do, highlight what you do not like about it, and spend time visualizing each and every obstacle you can.” ~ David Goggins
- Everybody wants a quick fix. You may get results, but they won’t be permanent. The permanent results come from you having to suffer.” ~ David Goggins

Gratitude

- “When you arise in the morning think of what a privilege it is to be alive, to think, to enjoy, to love...” Marcus Aurelius

Part 35: Mental Toughness

Step 211-All of David Goggins' Mental Shifts to Reach Full Potential

1. Book By David Goggins

I. Cant Hurt Me_ Master Your Mind and Defy the Odds By David Goggins.

2. Accountability Mirror

The Accountability Mirror is a mirror on which you write what your current situation is, how to get out of it, and what your goals are.

The beauty of the AM is that it doesn't lie.

It shows you *exactly* who you are, stripping the truth from every embellishing story you tell yourself.

David used the AM at the very beginning to assess his situation and plan his next step.

3. Taking Souls

Taking souls is a practice aimed at silencing whoever is doubting you.

The idea behind it is simple: when your "bully" thinks you are about to give up, double down and show them you're much tougher than they think you are!

David found out about this trick when he was training to become a SEAL.

No matter how much his supervisor was trying to break him, it seemed it only made him tougher.

When his leaders understood they wouldn't manage to weaken David, they left him be.

4. The Calloused Mind

The calloused mind is a practice that helps you double down when the temptation to quit is the strongest.

Instead of thinking about how much you want to stop, remember every painful moment in your life, every humiliation, every time you've suffered, and realize that these weren't punishments to bring you down, but obstacles to fortify your mind and body!

Switch the way you look at your past. Don't look at it as a tragedy. Look at it as a training ground!

Every obstacle made you strong and prepared you for this very moment. It prepared you to endure the pain and go further than you ever have, to push your limits!

When you think about these things, something will happen in your brain. You will tap into your sympathetic nervous system, the pain will decrease and you will gain motivation.

Always be optimistic. A negative outlook will not trigger the calloused mind.

5. On Accepting Yourself

The majority of people lead mediocre lives due to psychological issues they have not resolved. Their trauma is preventing them from being their best selves.

The only way to solve a trauma is to revisit it, write it down, accept what happened, let go, and move on.

When you go back to your past and identify all of the moments when you were weak, you free yourself from them and accept what happened.

Accepting and making peace with your past helps you accept yourself in the present.

6. The Cookie Jar

The cookie jar is intimately linked to the calloused mind.

The cookie jar is a mental pool containing every happy moment and every unhappy moment of your life.

It helps you answer the question “why am I doing this” when you are in the midst of a difficult challenge.

It helps you understand that on one hand, the painful moments made you who you are so you can ultimately triumph; on the other hand, the cookie jar is a promise for many more happy moments like the ones you’ve already had.

It’s the ultimate justification for the pain you’re enduring.

7. No Shortcut

Mastery does not tolerate shortcuts.

Shortcuts exist to get better results with the same amount of pain/effort.

It can neither scale nor work in the long term.

The only way to go beyond your limitations is to do more, and better.

8. The Governor

The governor is an imaginary psychological limitation that prevents us from exploiting 100% of our capacity.

It’s the reason why we don’t achieve more.

The governor is that little voice in our head that tells us we suck and that we won’t make it.

You need to do two things to take off your governor and access your full potential:

- I. Don’t listen to your voice.**
- II. When you feel like you cannot keep moving anymore, push just 5%-10% more. Doing so, you will unlock more potential.**

9. The 40% Rule

Goggins believes that most people live up to 40% of their potential.

The remaining 60% is locked due to the governor. People never push above their capacities because they're weak.

The reason why they're weak is that they live in an environment that is too comfortable.

It makes them lazy. It makes them hate pain. And it prevents them from pushing further.

If you want to go over your 40%, you need to:

- I. Stretch your pain tolerance
- II. Let go of your identity
- III. Let go of your self-limiting beliefs

10. What If?

What if is Goggins' last trick.

To everyone that ever doubted you — including yourself — the most powerful thing to answer is *what if*.

What if it was possible? What if they were wrong? What if you were right?

What if opens the door of possibility. It gets you to try and see what happens.

It keeps you moving forward.

It prevents you from quitting.

Step 212 - Kobe Bryant On Mental Toughness and Work Ethic

1. Books Kobe Bryant Toughness and Work Ethic

- I. Relentless_ From Good to Great to Unstoppable By Tim Grover.**
- II. Winning_ The Unforgiving Race to Greatness By Tim Grover**

2. Kobe Bryant ON Valuetainment and his Toughness

- I. Be Extremely Curious, trivial things should not pull my attention. It had the things that I have a purpose I am interesting in, and anything outside the line, you should not have a time for.**
- II. Have focus on one thing , and do not be multitasking or distracting yourself with trivial things.**
- III. Every thing you see, like tv shows, reading books, people I talk to. Everything I will learn to Master My craft, when you have this point of view, you literary the world becomes your library to help you to become a master of your craft. Because you know what you looking for the world gives the exact information you need to prepare for mastering the craft.**
- IV. Never hang out with people just to hang out.**
- V. Get over yourself, it is not about you, and you feel embarrassed, it not that important. Then you need to ask yourself why this mistake happened. Look at this with rationale and alter anything needed to not make the same mistake.**
- VI. Kobe Making Decision: A. Does the person understand the business. B is the business that you can help in some form of shape. C what is the barrier of entrance to the business. D Entrepreneur itself, if he obsessed, do the company have a culture that you believe is sustainable, are these leaders that you believe in. E do they have a culture of obsessiveness.**
- VII. If you tired, then suck it up and go further and no complain and no excuses. You need to lead by example. If there is an obstacle, then you need to show to kids that this will be overcome. Parents needs to lead by example, not just talking, but show them.**

- VIII. When you do Deep work, Study and as employee working, switch the mind to something else, switch the mode to something else. Maximus from Gladiator, picking up the dirt, smelling the dirt, it is go time. This is mental switch. Put Yourself in the cage and focus on the task. Once you finish, you become different person. While you in the cage, do not let distraction take away focus from you.
- IX. Pain Tolerance is one of the biggest factors of someone who can handle pressure. The whole idea pressure is pain. The Pain Can be a lot of other things like embarrassment, real pain. This is one of the way is to measure someone toughness.
- X. Preparation: tough people also prepares for the pain that is going to come. Preparation is a measure of toughness.
- XI. Toughness is also practice the endurance of the pain. Practice, Practice, Practice.
- XII. Do not advertise your pain to the world to know your pain. Man are tough are not looking for attention.
- XIII. Life is a constant Test on Daily, Weekly, monthly, Yearly Basis. When you been tested, this measures your toughness.
- XIV. Soft Person does not have backbone, and when they are cornered, pushed and shoved they quit. Soft claims their values, but when the tough times comes, compromise their values. Ask Myself How Do I react when the tough times comes.
- XV. Tough people do not over react to the problem and issues.

3. Kobe Bryant 10 Rules of insane work Ethic:

- I. Be Driven:** be driven and always try your best in any situation. If you tired, then suck it up and go further. And no complain and no excuses.
- II. Work Helps You grow:** Outwork everybody else on the team, or in Gym.
- III. Outwork Everyone:** Try to prove that I was better then anybody else in the craft. Wake Up Early and Go To Bed Early. Get the competitive advantage by Waking up early and do the work.
- IV. Love What You Do**
- V. Make One Move at A Time:** You have to put one foot in front of the other. Focus on the day task. You have to have a plan in place, how you going to improve for each day to get better and stick it to the plan and trust the plan, that this brings to the end result.
- VI. Have A schedule**

4. Kobe Bryant 10 rules of success:

- I. Make Sacrifices:** We are all can be Masters of our craft, but you have to be willing to make Sacrifices, that comes along to make that decision.
- II. One move at a time:** you can draw lessons from different things, as the world become your library. You could see the vision of the end result, you need to make one step at the time
- III. Trust your skills:** You have to be fearless to take the shots, because if you miss the shot, then you have to deal with criticism. Trust your skills, trust the work you put in.
- IV. Use your scars as weapon:** use the things in life, use those moments as weapons
- V. Focus on each day:** You have to put one foot in front of the other. Focus on the day task. You have to have a plan in place, how you going to improve for each day to get better and stick it to the plan and trust the plan, that this brings to the end result.
- VI. Do not be afraid of confrontation:** do not be afraid of confrontation to get us, where we need to go. If you are leader, you not just singing Kumbaya, but held others accountable, even having that moment being uncomfortable.
- VII. Be competitive when it's hard:** It takes true competitive person to get up when you down and continually compete.

VIII. Just keep going:

IX. Thrive on being outsider

X. Compete with yourself: Have competitive drive to be better everyday. Put hard work on daily basis. Work on your craft day in and day out on the craft when no one is watching.

XI. We don't quit. We don't cower. We don't run. We endure and conquer

Step 213- Michael Jordan Toughness

1. Books Michael Jordan Toughness and Work Ethic
 - I. Relentless_ From Good to Great to Unstoppable By Tim Grover.
 - II. Winning_ The Unforgiving Race to Greatness By Tim Grover.
2. Good Competitor evaluates his opponent, understanding for what he really is. Never give the competitor confidence, try take all the time. Mentally I need to trick myself to find the motivation. I need to look inside myself try to find the challenges, I need to look who I am competing against.
3. Practice if you are playing in the game, so when the moment comes in the game, its not new to me. That's the reason why you practice, thats the effort, so when you get to that moment, you do not have to think, instinctively things happen.
4. Jordan's 10 rules of success:
 - I. Keep Working Hard: Everyday be the first person there, before the son, Jordan would be there and the last person leave every night. Work to get better every single day on the craft.
 - II. Ignite the fire: Awaken a person inside of me to excel to be one of the best or be best/
 - III. Be different: want to excel in my craft and isolate in my craft from everybody else, that I am more than just a few dimensional.
 - IV. Fail your way to success: Jordan missed more than 9000 shots in his career, lost almost 300 games. 26 times he been trusted to take the winning shot and missed. He failed over and over in his life. That is why he succeed/
 - V. Have high expectation: see always where to improve in the craft.
 - VI. Be positive
 - VII. Be who you were born to be.
 - VIII. Have vision: mentally have a vision, to finish that we have to obtain. This will test your will to succeed
 - IX. Stop making excuses
 - X. Practice: Practice if you are playing in the game, so when the moment comes in the game, its not new to me. That's the reason why you practice, thats the effort, so when you get to that moment, you do not have to think, instinctively things happen.

Step 214-Tim Grover and Work Ethic

1. **Books By Tim Grover Toughness and Work Ethic**
 - I. **Relentless_ From Good to Great to Unstoppable By Tim Grover.**
 - II. **Winning_ The Unforgiving Race to Greatness By Tim Grover.**
2. **Different between coolers, closers and cleaners**
 - I. **Coolers, Closers, and Cleaners: Good, Great and Unstoppable.** For his own thinking, Grover devised a three-tiered system that can be applied to any group of individuals: your friends, your family, your co-workers, your team, etc. As Grover says: “Everyone has a different definition of personal success: some people allow life’s circumstances to decide what they want and say “good enough” when they get it, and then there are a select few who can’t even define success because they keep raising the bar on what that means. Coolers, Closers, and Cleaners.” He finds that most people are Coolers, a small percentage are Closers and perhaps there may be a Cleaner in the group. But once you meet the Cleaner you will never forget him/her. Seeing as how the rest of this post will be focused on the relentless 13, which are the traits of cleaners, we will only discuss coolers and closers here and save cleaners for later. Grover describes...
 - II. **COOLERS** as: “A Cooler is careful; he waits to be told what to do, watches to see what everyone else is doing, and then follows the leader. He’s a mediator, not a decision-maker; he’s not taking sides unless he’s forced to. He can handle a certain amount of pressure when things are going well, but when things get too intense, he kicks the problem over to someone else. He can make a huge play, but he’s not ultimately responsible for the outcome. He’s the setup guy, keeping things cool until the Closer or Cleaner can take over.”
 - III. **CLOSERS** as: “A Closer can handle a lot of pressure; he’ll get the job done if you put him in the right situation and tell him exactly what you need him to do. He’ll study all sorts of scenarios so he can anticipate what might happen, but he’s uncomfortable when faced with something unexpected. He seeks attention and credit, and he’s very aware of what everyone else is doing and what others think of him. He loves the rewards and perks associated with his fame and would choose financial security over winning

or success.” The main difference between the three is that the Cleaner never needs a kick in the ass while everyone else does and we will see why that is in the next section regarding the relentless 13, or the 13 traits of a cleaner.

- IV. The Relentless 13 Grover explains that every Cleaner he has ever known has some combination of the traits below. Not every Cleaner has every trait all the time, but every Cleaner has experienced at least some of them at some point. He admits that some may intrigue you and some may repel you, but each of the relentless 13 will contribute to your ability for being relentless. By the way, he labels each #1 as none is more important than another. In case you are wondering why he calls them “Cleaners”, it’s because rather than blaming others when something goes wrong, they take responsibility, clean up the mess, and move on. While Grover dedicates a full chapter to each of the relentless 13, I will simply touch on an important idea that I took away from each. And if you want to delve deeper, which I recommend, you can check out the entire book. The relentless 13, when you’re a cleaner...

3. Tim Grover 13 rules of Relentless (cleaner):

- I. You keep pushing yourself harder when everyone else has had enough. Grover touches on the exact point we made in a recent post in that to experience success it is critical to **be comfortable being uncomfortable**. In other words, cleaners do stuff every day they don't want to do, pushing past apathy, fear, and laziness.
- II. You get into the Zone, you shut out everything else, and control the uncontrollable. Grover explains cleaners with respect to the Zone as follows: "But once a cleaner steps into the Zone, he's detached from everything on the outside. Whatever else is going on—personal, business, anything—it can't affect him until he's ready to return. That, by definition, is the Zone. No fear, no intrusion. Total concentration. You're not thinking, because thinking turns your thoughts on to everything, and the Zone is about the opposite, turning your thoughts off to everything except the task at hand. Thinking takes you away; the Zone keeps you where you need to be."
- III. You know exactly who you are. This one is about instinct and taking action. Cleaners are so ready and so prepared that they take what they have learned, and their thought moves straight to their gut, instinct takes over and they put it into action.
- IV. You have a dark side that refuses to be taught to be good. Grover believes all cleaners have a dark side somewhere deep within them. He describes it as "Deep inside you, there's an undeniable force driving your actions, the part of you that refuses to be ordinary, the piece that stays raw and untamed. Not just killer instinct." He believes that cleaners embrace their dark side by being able to drop all their inhibitions and allow themselves to do whatever it is they need to do, the way they want to do it – instinctively and without fear.
- V. You're not intimidated by pressure, you thrive on it. He believes being called "clutch" is an insult and that there is no such thing as having a "clutch" gene. The reason being is that being called "clutch" means you only step up at the last minute while being a cleaner means you are always stepping up. You are always keeping the pressure cranked up, but it is internal pressure as a cleaner is always hardest on themselves.

- VI. When everyone is hitting the “In Case of Emergency” button, they’re all looking for you. Cleaners always know they will be ok no matter what happens they are confident that they can handle anything. If things don’t work out, they recognize what isn’t working and are flexible enough to adjust, adapt and move on.
- VII. You don’t compete with anyone, you find your opponent’s weakness and you attack. I like how Grover contrasts cleaners with coolers and closers when he says: “A Cooler wonders what’s going to happen. A Closer watches things happen. A Cleaner makes things happen.”
- VIII. You make decisions, not suggestions; you know the answer while everyone else is still asking questions. Cleaners make a plan that reflects their goals and interests and then they execute. As he says: *“Figure out what you do, then do it. And do it better than anyone else.”*
- IX. You don’t have to love the work, but you’re addicted to the results. Being a cleaner involves a lot of hard work and part of it is understanding what you need to sacrifice to do that work. You need to be able to keep your eye on the mission and control whatever is trying to pull you away from it. Cleaners are not distracted by instant gratification as they are focused on the long-term payoff.
- X. You’d rather be feared than liked. Cleaners are very upfront and straight-shooters and will tell you what they think whether you like it or not. I love how he says: “Fear and respect: let them know you were there by your actions, not your words or emotions. You don’t have to be loud to be the focus of attention.”
- XI. You trust very few people, and those you trust better never let you down. Cleaners are surrounded by those who want them to be successful and who understand what it takes to be successful. Those who aren’t following their dreams themselves likely won’t support you in your pursuit of yours and they will tell you the same negative stuff they tell themselves.
- XII. You don’t recognize failure you know there’s more than one way to get what you want. Cleaners are always trying to improve. They don’t believe in failure because they never believe anything is over. If something doesn’t go as planned, they learn from it, change direction and try a different way.
- XIII. You don’t celebrate your achievement because you always want more. A Cleaner believes they have zero limitations and are always demanding more

of themselves than anyone else possibly can. This means that they are always thinking of how they can do more and get better. As Grover says: *“The drive to close the gap between near-perfect and perfect is the difference between great and unstoppable.”*

4. Winning by Tim Grover

- I. Whether you're an athlete with championship dreams, an entrepreneur building a business, a CEO managing an empire, a salesperson closing a deal, or simply a competitor determined to stand in the winner's circle, *Winning* offers thirteen crucial principles for achieving unbeatable performance. This book reveals the truth about the obstacles and challenges that stand between you and your goals: Winning never lies. Winning knows your secrets. Winning wages war in the battlefield of your mind. Winning wants all of you. And more. If you're addicted to the taste of success and crave more, then you're ready for *Winning's* results-driven performance strategy. And if you're already winning and want to learn how to execute at a level that will establish you as one of the greatest—so you can own not just *this* moment, but the next, and the next—this book will show you the path.
- II. Kobe Bryant. Everything Kobe did was about winning. Winning is everywhere. Every moment. You have the opportunity to win. Grover describes winning as brutal, never ending and relentless. Any book with a title like “10 easy steps to winning” is a fraud. There is nothing easy or simple or predictable about winning. The book doesn't tell you what to do. You know what to do. *Winning* paints a picture of exactly what winning is, and the kind of attitude you will have to adopt if you want to win again and again and again. Winners, or “cleaners”, never stop chasing greatness. There is always more.
- III. THE LANGUAGE OF WINNING. Winning doesn't bullshit. Grover isn't about “motivation”. Anyone who really wants to win drives themselves. It is a given. Anyone who needs a book or a speech to give them temporary motivation is missing the point. The book isn't here to tell you that “You got this!” or “everyone's a winner!”. The book is about showing you the brutal, unforgiving, uncertain path that anyone who really wants to win must walk down. The unbearable loneliness, exhaustion and fear. There is nothing normal or typical about the lifestyle of a real winner. Normal people don't stand out. Normal people go where everyone else has gone. Winning is in everyone, but for most people, it will never be shown because of all of the fear and worry and doubt. The way you talk about winning will show you where you are at with regard to actually winning. “Look at these definitions

of winning again. Uncivilised. Hard. Nasty. Unpolished. Dirty. Rough. Unforgiving. Unapologetic. Uninhibited. Everything. If that describes your journey, and how you attack your goals, we are speaking the same language.”

5. 13 Definition of Winning

- I. Winning makes you different, and different scares people. Grover talks about the importance of knowing how to think for yourself, as opposed to being told what to do and accepting the norm. Every great development in humanity came as a result of someone thinking for themselves and not just accepting the world as they were given it. “Winning requires you to learn, and then question what you learn, and then learn more. You have to be willing to challenge what you’ve been taught” Grover also talks about the concept of non-negotiables, and how they can hold you back in your journey if you are not careful. For him, the only non-negotiable is performance. Everything else is there to be looked at and scrutinised. Nothing is off-limits for people who really want to win.
- II. Winning wages war on the battlefield in your mind. “I don’t have a better way to say this. Winning Fucks with your mind. It just does” The writer talks about the non-stop mental warfare that takes place in the mind of every winner. You are exhausted and impatient and on the edge all the time, even when you rest. The message of this chapter reminds me of a quote I came across once: “Hustlers don’t sleep. They nap” Your brain is like a minefield that is yours to dominate. You must be aware of your own insecurities, distractions and weaknesses if you are going to stay in control. “If you decide something is going to be a problem, then it’s going to be a problem” This is a chapter about the mindset of a winner, but not in that positive rah rah self help sense. It is a real, honest look at the lengths we have to go to if we are to stay on the winning path. Grover also talks of how winners control absolutely everything that they can, with the expectation that there will be plenty of unexpected challenges that they will have to overcome in the moment.
- III. Winning is the ultimate gamble on yourself. This chapter is really about confidence. The chapter details the similarities and differences between Kobe Bryant and Michael Jordan. Grover knew these players personally probably better than anyone in basketball, and his insight is pretty cool. He talks of how for all of their differences, both Kobe and Michael shared unshakeable confidence in themselves and their ability to get the job done when the time came. They never buckled. Their ability to bounce back from a loss. Their ability to ignore the negativity of the media. Their ability not to

be overpowered by more physical players. They always knew that they could come out on top. It defined their greatness. This belief went way beyond basketball. Michael became the first player to become the majority owner of a team after he retired. He started numerous business ventures. He competed on the golf course. Kobe learned 5 languages. "Everything he did was about his massive belief in himself" Grover talks of how truly confident people cannot be broken. They have been beaten down and broken over and over by life and their goals, and they have ploughed through every obstacle that life has thrown at them. People like that truly back themselves when the pressure is on.

- IV. Winning isn't heartless, but you will use your heart less. "Winning has a price, and that price is that your mind must be stronger than your feelings" People talk about how brutal Michael Jordan was in training with his teammates. To the untrained eye, you might be forgiven for thinking that he was a bit of a c*nt. But think about it. He won 6 rings. He is etched in basketball history, and he bought his whole team with him. We all know about Scottie Pippen, and Steve Kerr, and Dennis Rodman, because of the rings that they won under the leadership of Michael Jordan. That kind of greatness doesn't have the time to worry about your feelings and emotions. Your mind knows exactly what to do. Your weakness often comes from your feelings. You know you need to work out. Your feelings get in the way. You know that you should consistently post. You feel exhausted. Self-control is all about controlling your thoughts, in order to control your emotions, in order to control your actions. Control what you can control. Michael wasn't emotional when he was angry. He was cold and unemotional. He was aggressive, but he was absolutely in control. That is a dangerous combination.
- V. Winning belongs to them, and it's your job to take it. This chapter is all about competition. Have you ever been accused of being overly competitive? Or having a competition problem? Grover wants to challenge you to be OK with that. The greats never stop. There is always another challenge. Why do you think all the great boxers keep fighting until they are a shell of their best selves? It is in them to fight and compete. There is nothing else like it. Competition drives us all. To compete every day is to get the most out of every single day. We are all hard-wired to win. You

cannot teach competitiveness, and you cannot make other people want to win. You may inspire it, but ultimately it is a completely internal and personal fight. You must want to win, with all of your being, for yourself over anyone else.

VI. Winning wants all of you; there is no balance. “Time for everything equals time for nothing” Winning wants all of you. It demands obsession. The whole work-life balance thing doesn’t really mean a lot to people who badly want to win. When you are obsessed with achieving greatness in one area, that usually comes at the expense of most of the things everyone considers normal and healthy. Being the best requires hard sacrifices, and it is never going to be easy. There is no perfect future where you can have greatness in your field, and a great family life, and great holidays, and loads of sleep, and loads of friends. Winning wants all of your time and attention. There is no balance for those who want to win. Stop looking for it, and stop feeling guilty about your lack of it.

VII. Winning is selfish Why is it so wrong to be considered selfish? Self literally defines who you are. To invest in yourself, love yourself, be yourself, all sound like a great thing. To be selfish has such a negative ring to it. But what is the difference really? How is it a bad thing to be concerned with your own results and success? This chapter convinces us of the absolute necessity for someone who wants to win to be selfish. The chapter also makes an important distinction; there is a difference between selfish winners and selfish losers. Selfish losers take from everyone, and everyone else is better off without them. If you are selfish but not concerned with winning, then you are just prioritising your own pleasure and impulses. Selfish winners give to themselves first, so that they can ultimately give to the world. They give themselves the time, space and permission to achieve what they want to achieve because they know that their winning can lift up those around them. In order to be the most charitable person in the world, you first have to put some serious money behind you! You can’t create your own wins without first prioritising your own goals and dreams. Separation is power. Separation is freedom. Winning is an investment. If you want to win, you must be selfish and invest. If you are not willing to invest in yourself, why should anyone else?

VIII. Winning takes you through hell; if you quit, that's where you'll stay. People think of winning as this triumphant celebration that solves everything. According to Grover, that is true only for a moment. But stay in that moment too long, and it will be the last time you ever get to experience it. Winning takes a brutal trip from the bottom. You must toil, and grind, and think, and push relentlessly through mud and sacrifice. If you don't quit, you will win. It will feel incredible for a moment. Do you want to win again? Do you want more? You must go right back to the bottom. You're not a "winner" now. Your next success must be earned, just like your last. It is relentless. Even when you do win, you are still scarred by all that you've had to go through to get there. The personal sacrifice. The lack of friends. The neglected family life. The lack of time off. The one-dimensionality of your existence. The journey to winning is so brutal, that anyone who will manage it time and time again must be nothing short of addicted.

IX. Winning is a test, with no correct answers Everyone experiences fear. It is a fact of life. But fear and doubt are very different. When you feel that fear, do you question your ability to get there in the end? Or do you think about how far you've come, about all the preparation you've put in, and do you stay confident in your ability to ultimately handle whatever's coming your way? This is the difference between doubt and fear. "I have self-doubt. I have insecurity. I have fear of failure. I have nights when I show up at the arena and I'm like my back hurts. My feet hurt. My knees hurt. I don't have it. I just want to chill. We all have self-doubt. You don't deny it, but you also don't capitulate to it. You embrace it." Kobe Bryant Fear is about playing to win. Doubt is about playing to not lose. Fear is pressure. Doubt is panic. Fear says you might win. Doubt says you might lose. Ultimately, winning is a terrifying leap of belief in yourself. According to Grover, there are 4 components that will determine your ability to handle fear. Talent, intelligence, competitiveness, and resilience. He goes into detail about the importance of all 4. Spoiler alert: talent is really common, and resilience is really rare.

X. Winning knows all your secrets One of Grover's most popular ideas from his first book is the idea of the dark side. We all have that side of ourselves that the world doesn't know about. When we are alone at night, there they are. All your mistakes, your fears, the voices in your head, all real and

uninhibited. The writer talks about the genuine power that comes from completely incorporating your dark side and accepting your full self, rather than feeling bad or trying to change everything that isn't completely spot on. "Deep inside you, there's an undeniable force that drives your actions. The piece of you that refuses to be ordinary, the piece that stays raw and untamed. Not just instinct, but killer instinct. The kind you keep in the dark, where you crave things you don't talk about. You don't care about how it comes across to others because you know this is who you are and you wouldn't change if you could. The dark side is your fuel. Your energy. It excites you. Keeps you on the edge. Recharges you. Fills your tank. Its an addiction as powerful as your addiction to success" Kobe's dark side was the black mamba. When he stepped onto the court, he wasn't the Kobe Bryant that had legal issues and family problems. He was a cold-blooded killer that would dominate anyone stupid enough to play against him.

- XI. Winning never lies. Winning knows the truth, and it wants you to admit it. There is nothing subjective about winning. It is a score. An amount of money. A number on a scale. A decision. It doesn't matter how hard you tried, how many people were with you, or how talented you are. Ultimately it is black and white. We love to lie to ourselves: "We deserve more" "The score didn't reflect the game" "Next year is our year" "We're going in the right direction" If these statements aren't rooted in anything measurable or objective, they are usually just excuses for us not doing what it took to actually win. You can put your time into convincing yourself that you are a winner, or you can put your time into being honest with yourself, changing your course, taking the right actions and then actually winning. You cannot do both. This is one of my favourite ideas from this whole book: Stop talking. When you win, you don't need to talk. If you win, that will do the talking for you. If fake it till you make it is your strategy for success, you aren't going to get anywhere. Winning doesn't buy your lies, and most people don't either.
- XII. Winning is not a marathon, it's a sprint with no finish line. Don't manage your time. Manage your focus. Think about the Olympic marathon. These are the worlds best athletes. When they are competing for the gold, do they chill for any 1 of those 26 miles? Is there ever a point where they just take it easy? They are patient, they aren't stupid, but they squeeze every second

that they can out of every mile of the race. Slow down. Take your time. Pace yourself. If your goal is to finish, this language makes sense. If your goal is to win, this language is stupid. "Rome wasn't built in a day. No, it wasn't. It was built every single day, for thousands and thousands of days" Many people are intrigued by the massive success of someone like Kobe Bryant. How was he able to achieve just so much? According to Grover, it was mainly due to his rare ability to focus on whatever it was he wanted, unfalteringly, until the moment he got it. He didn't party. He didn't have hobbies. He trained, and then he recovered, and then he trained, all the way up to the last game of the finals. There was no slowing down. "I never lost a game, I just ran out of time" Michael Jordan Winning doesn't care if you don't have time. Winning expects you to make time. If you've only got so much time to achieve what you want to achieve, all you can do is choose what you focus on. If you want to win that badly, all of your focus should be spent doing what it takes to win.

XIII. Winning is everything "Long term goals are great, but long term isn't promised to anyone. Your skills and energies have an expiration date. If you want something, go get it now." Grover talks in this chapter about the importance of a sense of urgency. He reckons it is ultimately the difference between those that win and those that watch others win. Kobe's impatience was legendary. Zero tolerance. Ultimately, winning is your legacy. It is what you've done. It is the mark you've left on the world. Every day, your time grows shorter. Tim Grover's message is simple: Do everything. Experience everything you want. Go and achieve your goal. Do not settle or slow or pace yourself. Push. Life is a daily campaign against laziness and the urge to quit. We are all human. It would be so easy to just fit into normality. But if you are going to win, you must keep going. Every day, you keep going. The pursuit of winning is what life is about. It is the pursuit that costs everything but gives everything.

6. Books on Mental Toughness.

- I. Develop Mental Toughness to Perform.**
- II. Develop mental toughness.**
- III. Self Discipline mastery.**
- IV. Execute Toughness, the leadership performance.**
- V. Intensional Mindset, developing Killer Instinct.**
- VI. Mindset of Champion.**
- VII. Mamba Forever.**
- VIII. Mental Toughness for Runners.**
- IX. Self Disciplinary.**

7. Books on Work Ethic.

I. Christian Authors.

- **Luther on Vocation.**
- **Teaching Of Luther and Calvin About Ordinary Works Part 1 and 2.**
- **Christian Work Ethic.**
- **A THEOLOGY OF BUSINESS: A REFORMED PERSPECTIVE ON THE BASIS AND APPLICATION OF CHRISTIAN ETHICS IN BUSINESS.**
- **TOWARDS A CHRISTIAN ETHIC OF WORK IN SOUTH AFRICA.**
- **Calling A biblical Perspective of Work.**
- **Every Good Endeavor by Timothy Keller.**
- **Christian AND Work.**
- **5 Commands for Business Ethics.**
- **Calling of Faith and Work.**
- **Treatise of Vocation**
- **Quakers in the Contemporary Workplace.**
- **Religious Tradesman.**

II. Non Christian authors.

- **Revive Work Ethic.**
- **How to Build Strong Work Ethic.**
- **Work Ethic for Development Profesional**

8. Work Ethic:

- I. Be Predictable:** Good Work Ethic is the person who is predictable every day, like you show up at 8 am and leave at 17h and do this every day. Show up every day without disruptions.
- II. Consistency:** You show up every day consistently. You keep show up and keep doing the work.
- III. Preparation:** Do Proper Planning A Month, Week, Few days and night before which helps to prevent poor performance. The most prepared wins.
- IV. Do More:** Stay back and do more work, and put effort to achieve the results I want. If the person makes 100 calls a day, you need to do 200 calls a day. If the person sells 20 products, you sell 40 products. If somebody practices 3 hours, then you do 5 hours. Do A little bit more.
- V. Now Mentality.** Subscribe to the Now Mentality. Means if you want to call tomorrow, then call it now and today.
- VI. Find Running Mates:** Find a person with the same mentality, who pushes you to do better and more.
- VII. Don't fall for Work Smart:** Do not fall for the work smart only concept. You need to work very hard.
- VIII. Cut off Distractions:** Cut distractions, do not involve into office politics, but come to do performance. If there is office politics, then you go perform instead involve into office politics.
- IX. Absolute Focus:** Train your mind to Focus. Use Deep Work by Cal Newport to do the deep work. The absolute focus is when you take away distractions, and start to focus on the task of deep work. Example Reading a book, you need to read as many times as possible to try to understand and Follow and Apply Rules of reading to that reading or task. Train your brain to be focus , because your brain is muscle. Stop Making Excuses that you cannot focus, but practice focusing on daily basis.
- X. Have To Do List:** Good Work Ethic person has a to do list. In my Case Use deep work routine with 80/20 RULES, Eat ThatFrog AND Eisenhower Matrix this is my to do list, as it shows exactly what needs to be done and list of TO DO List*
- XI. Eat Right:** Work Ethic requires energy for you to last long time, stamina, efficiency. Use Keto Diet, Intermittent Fasting and Exercise on Daily basis.

XII.Plug the Leaks: Plug the leaks is the time wasters in my life and my work life.

XIII.Cut the Fat: cut the fat means that the works that do not need to be done or somebody else can do it. Turn off the Facebook and snapchat and social media. Ask myself if the work I have done and effort put, lead to increase in the results?

XIV.Drop Perfection: Do not seek for perfect time, or perfect environment.

XV.Avoid burnout. Have your own Escape.Gift Yourself

9. Tim Grover

- I. Master of your craft and be expert of my craft. Do not try to become experts of everything. Do What You do. Do not Jump from one thing to another. You have to Master whatever you are going to Master. Once you Master one part of the craft, then move to another part of your craft and master that part of the craft.**
- II. Competition never ends. The winning then manifest into something else.**
- III. Do not stay in the middle and get out of the comfort zone.**
- IV. Winning doesn't have any friends, it has allies.**

10. Advanced Through Pain

- I. The pain period exists to allow us the opportunity to show how badly I really want to prove that I want it as badly as I say we do. To Back up our claims that we are who we say we are. The pain period where the all the growth occurs that's true whether we are talking about building big muscles, building big company or building vision. There is no way around the pain and the sacrifice and the work. The only way out is through. But here the motivation part, the only way you can fail is if you quit. That's literally the only way that you can be stopped. As virtually impossible to fail- just don't quit. Don't quit and you cannot fail**

Step 215-Focus and Books On Focus For Deep Work

1. Books on Focus and Concentration For Deep Work.

- I. Atomic Habits By James Clear**
- II. Deep Work, Rules for Focused Success in A distracted World.**
- III. Focus on Hidden Drive of Excellence.**
- IV. 18 minutes find your focus master distraction-and-get-the-right-things-done.**
- V. Focus-use-the-power-of-targeted-thinking-to-get-more-done.**
- VI. Master-of-one-find-and-focus-on-the-work-you-were-created-to-do.**
- VII. The-art-of-being-indispensable-at-work-win-influence-beat-overcommitment-and-get-the-right-thing.**
- VIII. Focus__A_Brief_Guide_on_How_to_Improve_Focus_and_Concentration.**
- IX. Power Of Focus**
- X. Hyperfocua**
- XI. How to Become Straight A student**
- XII. Ultralearning**

*Part 36: Deep Life, Deep Work
and Benjamin Franklin Daily
Routine*

Step 216-Deep Life, Deep Work and Benjamin Franklin Daily Routine.

Documents That Will Stay At Home and Documents That Will Be Brought to Work.

1. Documents Leave At Home.

- A. Identify End Goal.
- B. Quarterly Value Plan.
- C. Quarterly Planning Or Strategic Planning.
- D. Project Tracker.
- E. Task List.
- F. Values Document.
- G. Personal Code of Conduct.
- H. Professional Code of Conduct.
- I. Skills.
- J. Ideas Book.
- K. What Sport Training To Do On Daily Basis.

2. Documents Bring To Work.

- A. Daily Planning.
- B. Work NoteBook.
- C. Work Priorities and To Do List.
- D. Weekly Planning.
- E. Weekly Value Plan.
- F. Calendar. This includes, Professional, Academic and Personal.
- G. Habit Tracker.
- H. Reflect and Review Journal.
- I. Headphone.
- J. Phone.
- K. Documents How to do TimeBlocking.
- L. Deep Life and Deep Work.

M. Timeframe For The Different Tasks.

N. Document On What Sport Training Do I Do On Daily Basis.

Documents That I will Use on Daily and Weekly Basis and Other Times For Reading or Listen.

1. Documents Use On Daily Basis.

- A. Deep Life, Deep Work, Deep Studies AND Benjamin Franklin Routine Document (Schedule DAY).**
- B. TimeFrames For Different Tasks.**
- C. Rules of Reading 1-12. Below are Complimentary Books Used with Rules of Reading.**
 - **Rules of Reading 10a to 10k.**
 - **Logic Books 1-8.**
 - **Grammar Books 1-3.**
 - **Writing Books 1-8.**
- D. Bible Study and Devotional Books 1-7.**
- E. Marriage Books.**
- F. Stoicism.**
- G. Deep Work and Deep Studies.**
- H. Studies And Learning.**
- I. Reflect, Review, Journaling and Visualisation Document.**
- J. Health For Checking food, minerals and vitamins to eat and Drink.**

2. Documents Use On Weekly Basis.

- A. Value , Code Of Conduct and Skills Documents By Which I live.**
- B. Important Books 1-24**
- C. Communication 1-4.**
- D. Reflect, Review, Journaling and Visualisation Document.**

3. Documents Use For Other Time Basis.

- A. Parenting 1-13.**
- B. Habits Books 1-6.**
- C. Church Books.**
- D. Mental Model 1-8.**
- E. Finance. Or Any Other Topics and Books.**

Stage 0:Core Systems

First Things First: Your Personhood Precedes Your Productivity. Good productivity system is a tool to serve the whole person. Your personhood comes first! Your productivity system is there to serve you, not the reverse.

Below are summaries of the **Two** main categories that contain the elements of my core systems: **Core Documents And Core Productivity**.

List Of The Items I need To Have.

Quarterly

- **Identify End Goal.**
- **Ruler.**
- **Quarterly Planning.**
- **Value Document: Values, Code of Conduct and Skills.**
- **Quarterly Value Plan.**
- **Work NoteBook.**
- **Work Priorities and To Do List.**
- **Project Tracker.**
- **Calendar.**
- **Deep Life and Deep Work and Benjamin Franklin Routine.**
- **Task List.**
- **Ideas Book.**
- **TimeFrames For Tasks**

Weekly

- Identify End Goal.
- Ruler.
- Weekly Planner Notebook.
- Habit Tracker.
- Quarterly Planner Notebook.
- Value Document: Values, Code of Conduct and Skills.
- Weekly Value Plan.
- **Work NoteBook.**
- **Work Priorities and To Do List.**
- Project Tracker.
- Calendar.
- What Sport Do I do On Daily Basis.
- **Deep Life and Deep Work and Benjamin Franklin Routine.**
- **Task List.**
- **TimeFrames For Tasks.**

Daily:

- Identify End Goal.
- Ruler.
- Daily Planner NoteBook.
- Deep Work NoteBook.
- Habit Tracker.
- Project Tracker.
- **Work NoteBook.**
- **Work Priorities and To Do List.**
- Calendar.
- Journaling, Review, Reflect Notebook.
- Weekly Value Plan.
- What Sport Do I DO On Daily.
- **Deep Life and Deep Work and Benjamin Franklin Routine.**
- **Task List.**
- **TimeFrames For Tasks.**

Core Documents

1. Discipline-Internally Powered Efficacy (Productiveness).

Rule 1- Check Disciplines Once A Year During My Birthday, and Review How I am Doing and What next Disciplines I need To Do It For Next Year.

Rule 2-Define your non-negotiable: Identify a few daily activities that requires Discipline that are crucial for your well-being and make a commitment to do them every day.

Rule 3-Take few things and think how can I make progress everyday. If it's too hard find something easier.

Rule 4-Set up organizational systems: Choose tools that will help you stay organised, such as a planner, calendar. Consistently use these tools to manage your time and tasks.

Rule 5-Create a routine: Establish a daily routine that incorporates your non-negotiable and gives structure to your day.

Rule 6-Get Metric And track if Done This discipline.Sometimes track the execution of these disciplines with metrics Such as Exercise or How many hours of Deep Word I have done today.. Sometimes I take a break from this tracking.

2. Values- External Powered.

In this Part of the Document I will Write My Roles and the Values by which I try to live each of them on Daily Basis.

Rule 1-Identify and Write Down List Of Roles and The Values You Associate With them and by which I Try To Live on Daily Basis. Take some time to think deeply about what values are most important to you.

Rule 2-Write My Roles and The Values By which I Try To Live Each Of Them On Daily Basis:

- I. Step 1- Identify Specific Actions, Specific Habits or Behaviour, that go with Actually living out your values.**
- II. Step 2- Write First Person Narrative, What or How I want to be or act in that role that narrative implicitly captures my value. This way of Writing Makes The Value Concrete. Example:**
 - A. Roles:** “I want to be the kind of Husband, Parent and friend who ...*A values-based behavior related to the role:* “...who listens when the people I love want to have a conversation with me.”
 - B. Concrete values-based action,** “When people I love want time with me, and I am just fiddling on the computer or my phone, I lock or shut down the tech toys and walk away, so I can be truly present with them.” (If I am working intensely on something, I might ask that we talk a little later.)
 - C. The key is that I’ve expressed my value as an action, a measurable behaviour:** I either turn away from scrolling through my phone and turn toward my family member — I live out that values-based action — or I do not.

III. Step 3-Example of Writing

1. Value:

- A. Example of Writing.**
- B. A Value Based Behaviour To The Role.**
- C. Concrete Value Based Action.**

Rule 3-Create a personal code: Write down your values and create a personal code that you will live by.

I. Step 1- Use the Words “Always” and “Never” to Help You Write Down a Personal Code of Conduct. Example.

A. I don’t commit verbal violence toward anyone, including myself.”

Rule 4-Review The Core Values on Daily, Weekly and Quarterly Basis.

Rule 5-Ask Yourself Am I following The Value Document. Are They Align with My Quarterly, Weekly, Daily Plan?

Rule 6- Add New Values and Personal Conduct in Value Document.

I. Personal Code Of Conduct.

A. Personal Life.

- Behavior.**
- Moral and Ethics.**
- Skills.**

B. Professional Life.

- Behavior.**
- Moral and Ethics.**
- Skills.**

**I Will Read or Listen Like AudioBook On Phone, On Daily Basis
And Apply To Create Daily Planning.
Stage 1-Core Productivity.**

1. Identify End Goals.

Rule 1- Identify End Goals in the Following Areas:

I. Powerful Goodness, Devotional Reading and Bible Study.

II. Family

- **Wife.**
- **Daughters.**
- **Other Family members.**
- **Relatives.**

III. Professional:

- **Career.**
- **Self Employment.**

IV. Sport and Self Defence.

V. Finance.

Rule 2. Map Out For Each Goal Viable Path To Reach it.

Rule 3. Divide The End Goals into Small Manageable Goals and Tasks.

Rule 4- Create and Write Manageable Goals and Tasks Every January for that Year.

Rule 5- Review and Journal Progress of Manageable Goals and Tasks Every Last Friday, Saturday and Sunday of the Month.

2. Create and Update Quarterly Value Plan.

Rule 1- I Need To Create Value Documents On Following Date:

- I. Identify End Goals. Page 11.**
- II. Deep Life, Deep Work and Benjamin Franklin Routine Pages 12-13.**
- III. To Create Quarterly Value Plan, I Need To Review and Analyse Value, Code Of Conduct and Skills Documents The Last Friday, Saturday and Sunday Of Quarter, to Create Next Quarter Value Plan.**
- IV. It Usually Takes Around 90-180 Minutes.**

Rule 2- To Create Quarterly Value Plan, I Will Review and Analyse The Following Documents:

- I. For Values Use Values and Code Of Conduct By Which I live Page 5-24.**
- II. For Behaviour and Moral And ethics in Personal Life use values and code of conduct and Skills By Which I live Page 25-38.**
- III. For Behaviour and Moral And ethics in Professional Life use values and code of conduct and Skills By Which I live Page 39-51.**
- IV. Skills I will Learn For Personal Life and Professional Life. Pages 52-82.**

Rule 3-After Review and Analysis of the Value, Code Of Conduct and Skills Documents, I need to Decide The number of Values, Code of Conduct and Skills I will do For The Quarter:

- I. Between 5-10 Values I want to Practice For Quarter.**
- II. Between 5-10 Personal Code Of Conduct, I would Like to Practice For the Quarter.**
- III. Between 5-10 Professional Code of Conduct, I Would Like to Practice for the Quarter.**

IV. Between 5-10 Skills, I would like to Learn and Practice for Quarter.

Rule 4-Write On the Quarterly Value Plan Notebook, Decided Values, Professional and Personal Code Of Conduct and Skills.

Rule 5- Add, Write and Mark in Calendar, Every Last Friday, Saturday and Sunday of Each Month, That I will Do Review of the Previous Quarterly Value Plan This helps to See If I am on The Track or I need to Do some Changes in My Schedule or Do Something Differently.

Rule 6-Review Every Part of Previous Quarterly Value Plan, If I am on the Track Every Last Friday, Saturday and Sunday of Each Month, By using All Parts of *Journaling and Review of A Month* Pages 2083-2086.

3. Update Career and Personal Strategic Plans (Quarterly Planning) Once Every Semester

Rule 1- I Need To Create Quarterly Planning On the Following Date:

- I. To Create Quarterly Planning, I Need To Review and Analyse Quarterly Value Plan, My Project Tracker and My Calendar, Work Notebook, Work Priorities on The Last Friday, Saturday and Sunday Of Quarter, to Create Next Quarter Planning.
- II. Usually it Takes around 90-180 Minutes To Create Quarterly Planning. I Will Read or Listen Like AudioBook On Phone, Every Friday, Saturday or Sunday To Decide 3 Values I Will Apply To My Life For That Week.

Rule 2- Every Quarter Planning is Created Based On The Following Documents:

- I. Identify End Goals. Page 11.
- II. Deep Life, Deep Work and Benjamin Franklin Routine Pages 11-19.
- III. Quarterly Value Plan Document.
 - Values I want to Practice for the Quarter.
 - Professional Code of Conduct, I would Like to Practice for The Quarter.
 - Personal Code of Conduct, I would Like To Practice for the Quarter.
 - Skills, I would like to Learn and Practice for Quarter.
- IV. My Project Tracker.
- V. Work Notebook.
- VI. Work Priorities Word Document.
- VII. TimeFrame For Tasks.

VIII.My Calendar.

- **Professional Calendar,**
- **Personal Calendar.**
- **Academic Calendar.**

Rule 3- Review and Analyse, Quarterly Value Plan, Project Tracker, Work Notebook, Work Priorities Word Document and Personal and Professional Calendars.

Rule 4-When Planning For Quarter, this planning must have intention.

Rule 5- Once the Review and Analysis of the Documents have been Done. Then Think, Decide and Write What Are The Most Important Goals and Tasks I Will Be Pursuing and Working Toward this Quarter.

Rule 6-Write Quarterly Planning In the Following Format: One Plan with two parts. One Part is for Professional Life and Other Part is Non professional Life.

- I. Step 1- General Principle: Better To Plan Less and Actually Carry Out. Do not Schedule Too Much on Quarterly Basis Have Realistic Schedule. Use Slow Productivity Approach To Setting Up Goals.**

Rule 7-When Lay out The Strategic Plan or Quarterly Planning For Professional Life and Non Professional Life, Have Values Document and Quarterly Value Plan. Then I need to Do The Following:

- I. Ask Yourself, are the Strategic Plan or Quarterly Planning for Professional Life and Non Professional Life Align with My Values in the Value Document And Personal Code of Conduct and Professional Code of Conduct and Skills. In other words I need TO watch my plans for pursuing those parts of my life in the way that it is true and Align to my Values, Professional and Personal Code of Conduct and Skills. If There is an Extended Plan, Below is information, That I need to Follow.**
 - A. Sometimes these will also link to an extended plan when I have a big enough, long enough pursuit that it might need its own space. In other words, if there is particular Big project or initiative that I am working, will describe in its own document and linked to it from professional Strategic Plan.**

Rule 8-Maintenance (How Will I update These Documents).

- I. I review my Quarterly Plan or Strategic Plans (and extended plans) once a week, preferably when doing my weekly plan). I can tweak them at any time, but I try to give them major overhauls roughly once a semester (fall, winter/spring, summer.**
- II. I will Review Values Document and Quarterly Value Plan: My Values, Personal and Professional Code of Conduct, Skills Once A Week, as Reminder of My values, Code of conduct and Skills in My professional and Personal Life. I need to See if I follow my Values and Code of Conduct and Skills that I decided to Pursue for This Quarter.**
- III. I sometimes maintain an idea notebook and/or digital idea storage system keeping thoughts on values and strategic plans. I should review this in detail, at the very least, when I do my strategic plan updates.**

Rule 9-There are Two Ways I will Write the Quarterly Plan. Choose One of the Way I will Do it. Embrace whatever format seems most useful for the particular Quarter you are planning.

Rule 10a: Either Plan My Quarter For Each Month, And What I will Do On that Specific Month Based On Time Available On Time Block On Quarter Planning.

Rule 10b. Or I will Plan My Quarter When, There is No Major Appointments, Meetings or other scheduled obligation that break up my Day, I will Plan based on simple heuristics: like 3 hours of deep work a day and a list of things to schedule each Month into the time that remains.

Rule 11: No Matter what Way Will I plan my week, the most important is Always Decide in Advance What I am Going To Do With My Week. These Decisions Look Different at the different time of the year, but what matters is that when it comes to my schedule, I AM IN Charge.

Example: Quarterly Plan #1

October

After weekly planning do a focused task block to get out ahead of the small things on my lists for October. Be sure in this block to finish <specific 20-minute task that is time sensitive>

Prepare a lecture for <my fall class>

End the work day with a 1 – 2 hour writing block.

Today is a research day: head in the office right away to dig into <research project>.

End day with 1.5 hours in <a favorite secluded spot on campus>, where the first hour is writing and the last thirty minutes is a batched attack on tasks.

November

I have a training seminar to attend in the morning and a meeting with my student in the later afternoon. Between these two events focus on prepping another lecture.

Depending on the length of my afternoon meeting, I may be able fit in a task block before coming home.

December

First thing in the morning do budget and take care of <related annoying financial task>. The goal is to finish before <doctor's appointment near where I live>

After the doctor's appointment find a quiet place to work deeply on <research project>.

End day somewhat early for <yard work project>

Write. Deep work on research until mental burn out. Shutdown for weekend. Finish <yard work project>.

The above weekly plan represents the most common format I use: sketching my goals for QUARTER. Notice, I'm not simply listing things I want to get done each Quarter, but instead, I will Review Calendar, Value Plan and Project Tracker, and then decide what I want to Achieve Each Month. A big part of the Quarterly planning process is working backwards from your calendar to fill in the open time effectively.

Example: Quarterly Plan #2

Research

Carve out three hours of deep work every day for the below research tasks. This is the core of each day's schedule.

This week is do or die for getting to a final result for <a research project with an upcoming deadline.>

During downtime on this project (while waiting for responses from co-authors), see if I can push through <the final details of a different proof I'm working on.>

Dedicate one day's deep work for finishing <a journal paper review>

Georgetown Teaching/Misc

Each day, outside of the deep work hours assigned above, make progress on the below non-deep tasks.

Once my new textbook arrives, I need to decide on my syllabus for <class I'm teaching this fall> and post online.

The following small tasks are time sensitive this week: (1) pick up new parking pass; (2) send back visa letter for <a researcher I know>; (3) respond to <a colleague's> recent questions.

Writing

Use the morning block <[note: I sometimes work for an hour at home in the morning to allow traffic to die down]> and commute to plan and gather the sources I need to start writing next week.

Over weekend, write a blog post where I <reminder of post topic>

This plan adopts a different format. Because this was a summer week with no major appointments, meetings, or other scheduled obligations to break up my days (so rare, yet so wonderful), I could base my schedule around some simple heuristics: three hours a day on deep work for research, and a list of small things to schedule each day into the time that remains.

I would never get away with this approach during the height of the school year, but for a lazy week in July, it worked perfectly.

The bigger message here, however, is that I always decide in advance what I am going to do with my week. These decisions look different at different times of year, but what matters is that when it comes to my schedule, I'm in charge.

Rule 12- Add, Write and Mark in Calendar, Every Last Friday, Saturday and Sunday of Each Month, That I will Do Review of the Quarterly Planning. This helps to See If I am on The Track or I need to Do some Changes in My Schedule or Do Something Differently.

Rule 13-Review Every Part of Quarterly Planning, If I am on the Track Every Last Friday, Saturday and Sunday of Each Month, By using All Parts of *Journaling and Review of A Month* Pages 2083-2086

4. Create and Update Weekly Value Plan.

Rule 1- I Need To Review And Analyse Value Documents On Following Date:

- I. Deep Life, Deep Work and Benjamin Franklin Routine Pages 21-22.**
- II. To Create Weekly Value Plan, I Need To Review and Analyse The Quarterly Value Plan Last Friday, Saturday and Sunday Of Week, To Create Next WEEK, Weekly Value Plan.**
- III. It Usually Takes Around 90-180 Minutes.**

Rule 2- To Create Next Weekly Value Plan, I Will Review and Analyse The Following Document:

- I. Identify End Goals. Page 11.**
- II. Quarterly Value Plan.**
- III. Quarterly Value Plan Note Book.**
- IV. For Values Use Values and Code Of Conduct By Which I live Page 5-24.**
- V. For Behaviour and Moral And ethics in Personal Life use values and code of conduct and Skills By Which I live Page 25-38.**
- VI. For Behaviour and Moral And ethics in Professional Life use values and code of conduct and Skills By Which I live Page 39-51.**
- VII. Skills I will Learn For Personal Life and Professional Life. Pages 52-82.**

Rule 3-After Review and Analysis of the Quarterly Value Plan, Quarterly Value Plan Note Book, Value, Code Of Conduct and Skills Documents, I need to Decide The number of Values, Code of Conduct and Skills For Next Week Weekly Value Plan

- I. Between 1-2 Values I want to Practice For This Week.**
- II. Between 1-2 Personal Code Of Conduct, I would Like to Practice For this Week.**
- III. Between 1-2 Professional Code of Conduct, I Would Like to Practice for this Week**
- IV. Between 1-2 Skills, I would like to learn and practice for This Week.**

Rule 4-Write On the Weekly Value Plan Notebook, Decided Values, Professional and Personal Code Of Conduct And Skills I will Pursue and Work For This Week.

Rule 5- Add, Write and Mark in Calendar, Every Last Friday, Saturday and Sunday of Each Week, That I will Do Review The Previous Week Weekly Value Plan This helps to See If I am on The Track or I need to Do some Changes in My Schedule or Do Something Differently.

Rule 6-Review Every Part of Previous Week Weekly Value Plan, If I am on the Track Every Last Friday, Saturday and Sunday of Each Week, By using All Parts of *Journaling and Review of A Week* Pages 2088-2091.

5. Productivity (Weekly and Daily Planning).

Step 1 Create Weekly Planning.

Rule 1- Create Weekly Planning on Friday Saturday and Sunday Or Weekday Begins, on Monday Morning. I deploy weekly Planning. Be flexible with Your Weekly and Daily Planning. Spend Between 90-120 Minutes, on what is upcoming for next week and decide how to tackle. When Planning For Weekly, this planning must have intention.

Rule 2-Review Values Once A week On Weekends to remind myself What are my values and my life for.

Rule 3-Every Weekly Planning is Based on The Following:.

- I. Identify End Goals. Page 11.
- II. Deep Life, Deep Work and Benjamin Franklin Routine Pages 21-35.
- III. Weekly Value Plan Document.
 - **Values I want to Practice for The Week.**
 - **Professional Code of Conduct, I would Like to Practice for The Week.**
 - **Personal Code of Conduct, I would Like To Practice for the Week.**
 - **Skills I would like to learn and practice for the Week.**
- IV. My Strategic Plans (Quarterly Planning).
- V. My Calendar. This Includes Professional, Academic and Personal.
- VI. My Project Tracker.
- VII. My Task Lists.
- VIII. Work Notebook.**
- IX. Work Priorities Word Document And Time Frames For Task.**

X. Daily Planning.

Rule 4- Take Daily Planning Note Book. These are the following Reason, To take Daily Planning Notebook First, while Creating The Weekly Planning Are:

- A.** Once I Know Common things that I need to do on Constantly on daily Basis Without any changes and draw them on the Daily Planning. This helps me to see Visually, the amount of Time available on daily basis. This helps me to see what Tasks, Goals and Workday Activities I could Prioritize in Planning for the Week and Work On Them.

Rule 5- Take Daily Planning Note Book. Draw TimeBlocking On Daily Planning For Next Week Monday To Sunday. This Should Take Between 60-120 Minutes.

- A.** Step 1 Open 2 page Planner.
- B.** Step 2. Draw Square Shutdown Box At The Top Of the Left Page. System, that helps to mind shift from work mode to non work mode.
- C.** Step 3 On the Left Page Draw The vertical Line in The Middle from the top to 7 Lines Down
- D.** Step 4- Around 7 lines from the top Draw Horizontal Line, And Write the Following:
- I.** On Left Side Of Page Write Tasks.
 - II.** On the Right Side of the Page Write Ideas.
- E.** Step 5. Left Page DRAW Two Horizontal Lines between Line 7-14 and Write Metric Tracker.
- F.** Step 6 -On the Left Page Draw The vertical Line in The Middle from The Line 14 to The Bottom.
- G.** Step 7-Discipline of Execution.
- I.** Draw Eisenhower Matrix with 4 Quadrants.
 - Quadrant 1 Do It Right Now-Task Important And Urgent. **Reactive.**
 - Quadrant 2 Schedule It-Task Important But Not Urgent. **PROACTIVE.**
 - Quadrant 3 Delegate It-Task Not Important But Urgent. **Distraction.**

- **Quadrant 4 Delete It**-Task Not Important And Not Urgent. **Time Waste.**

H. Step 8 On the Top Right Page. Write Date.

I. Step 9 On Right Top Page Of Planner, Write Philosophy I Will USE.

J. Step 10 On Right Page Of Planner, Draw 2 Vertical Line on Left Side and Right Side, Making 3 Columns.

K. Step 11 Use 2 Lines To Represent 1 Hour And Write vertically Hours From 6am to 21pm and Divide The Hours of Workday Into 6 Blocks and Draw A Block That Covers Lines Corresponding to these Hours:

- **Early Morning 5am-8am.**
- **Morning 8am-12pm.**
- **Noon 12pm-14pm.**
- **Afternoon 14pm-18pm.**
- **Evening 18pm-22pm.**
- **Night 22pm-05am.**

Rule 6- Think And Write In The TIMEBLOCKING on Daily Planning For Each Day The Common Things That I need To Do Constantly. These Are the Tasks That Needs to Be Done Usually on Daily Basis. Write and Assign Workday Activities to These Blocks And Draw The Box For That Period in The TimeBlock on Daily Planner. Example Of Those Activities Might Be:

A. Early Morning, Listen Deep Life, Deep Work and Benjamin Franklin Routine For Setting Up The Quarterly Value Plan, Quarterly Planning, Weekly Value Plan, Weekly Planning and Daily Planning. This helps to Set Up Tasks, Goals For The day..

- Quarterly Value Plan. Pages 12-13.**
- Quarterly Planning. Pages 14-20.**
- Weekly Value Plan. Pages 21-22.**
- Weekly Planning. Pages 23-35.**
- Daily Planning. Pages 36-53.**

B. Early Morning, Listen Deep Life, Deep Work and Benjamin Routine For Stages 2-12. Pages 67-88 and Stage 14. Pages 107-109. This Helps Me To Prepare My Mind, and Environment For The day and what do I need to Take From Those Stages In order to have Successful Day.

C. Deep Work and Deep Studies. Listen Deep Life, Deep Work and Benjamin Routine. Deep Work and Deep Studies Stages 13. Pages 90-106, Choose What I Need To Do In this Stage. Then Apply Those Things While Doing Deep Work, Or Deep Studies.

D. Powerful Goodness, Bible Study, Devotion, Prayer and Meditate On The Word. Listen Deep Life, Deep Work and Benjamin Routine For Stage 13. Pages 88-104.

E. Employment or Self Employed.

- I. Listen Deep Life, Deep Work and Benjamin Routine Stages 13. Pages 90-106.**
- II. Deep Work.**
- III. Deep Studies.**

IV. Tasks.

V. Emails and Phone.

VI. Meetings.

F. Travel.

G. Bring Children To.

I. Crèche, School and College.

II. Sport and Training.

III. Hobbies.

IV. Work.

V. Other Things.

H. Collect Children From.

I. Crèche, School and College.

II. Sport and Training.

III. Hobbies.

IV. Work.

V. Other Things.

I. Listen and Practice Reflect, Review and Journaling For Today. Rules of Reading Pages 2088-2091.

J. Listen and Practice Discipline- Do Daily No Matter What. This is on Values and Code of conduct and Skills by which I live Page 3.

K. Do Homework, Read, Learn, Sport With Children.

L. Sport I Do on Daily Basis.

M. Gym Time Twice A Week. (Monday or Wednesday and Friday).

N. Family Time.

O. Academic and Self Taught Studies.

P. Put Things in Place and Household Chores.

Q. Any Other Tasks That needs to be done constantly On Daily Basis.

Rule 7- Based on The Professional, Academic and Personal Calendar. Think and Write in The TIMEBLOCKING on Daily Planning, important Task, Activities and Reminders. Write and Assign Workday Activities To Particular Time And Draw A Box For That Period in the TIMEBLOCKING. Example of THIS.

- A. Meeting. Estimate 1.5 times longer than the original meeting. Example. If the meeting is 60 min originally, then schedule 90 Minutes.**
- B. Appointment. Estimate 1.5 times Longer than The original. Example. If the Appointment is 60 min originally, then schedule 90 Minutes.**
- C. Deadline.**
 - I. Academic.**
 - II. Employment.**
 - III. Any other Deadlines.**
- D. Reminder Of Important Date. Like Birthday, Dates Anniversary, National holidays ETC.**

Rule 8-Organise The Task.

- I. When Do I add A task to My List vs Straight Into My Week Plan?**
- II. If the task or obligation pops up, and you writing down and capturing exactly what I need to do. At the End of the day you need to processing the task that needs to be done. There are two places that the task can go:**
 - A. On the Appropriate Task Board List. This is not time specific task list.**
 - B. Or Calendar. It goes on the calendar if this connected to specific day that task needs to be executed. Calendar is for time specific tasks.**

Rule 9- Review And Analyse How Much Time Is Available Based On TimeBlocking on Daily Planning For Each Day. Remember Better To Plan Less and Actually Carry Out. Do not Schedule Too Much on Weekly Planning Basis. Have Realistic Schedule. Use Slow Productivity Approach To Setting Up Goals.

Rule 10 -After Review and Analysis of The Available Time For Each Day of The Week. I will Start to Prepare For Weekly Planning.

Rule 11- Review and Analyse the Following Documents To Plan FOR Weekly Planning:

I. Weekly Value Plan Document.

- **Values I want to Practice for The Week.**
- **Professional Code of Conduct, I would Like to Practice for The Week.**
- **Personal Code of Conduct, I would Like To Practice for the Week.**
- **Skills I Would like to Learn and Practice For this week.**

II. Identify End Goals. Page 11.

III. My Strategic Plans (Quarterly Planning).

IV. My Calendar. This includes Professional, Academic and Personal.

V. My Project Tracker.

VI. My Task Lists.

VII. Work Notebook.

VIII. Work Priorities Word Document.

IX. Daily Planning.

X. What Sport To Do On Daily Basis.

XI. TimeFrame For Tasks.

Rule 12- Once the Review and Analysis of the Documents have been Done. Then Think, Decide and Write What Are The Most Important Goals and Tasks I Will Be Pursuing and Working For this Week.

- I. Based On The Time Available On Time Blocking On Daily Planning, Plan My Week in the Weekly Planning Notebook. Plan My Weekly Deep Work Timetable. This Include lectures, tutorials, your self-study sessions and group study sessions and Any Other Tasks. Enter in the key assignment and exam dates. Work backward from the due date to allocate time needed.**

Rule 13-USE And Apply 80/20 Principle By Asking: Is this Task in the top 20% of my activities or in the bottom 80%? Identify Most Important Task.

- I. Once Identify Task In the Top 20% input that gives 80% of Output. Then, Put 100% effort into 20% inputs, to achieve best results. Remove Trivial Tasks.**

Rule 14-Write Weekly Planning In the Following Format: One Plan with two parts. One Part is for Professional Life and Other Part is Non professional Life.

- I. Step 1- General Principle: Better To Plan Less and Actually Carry Out. Do not Schedule Too Much on Quarterly Basis Have Realistic Schedule. Use Slow Productivity Approach To Setting Up Goals.**

Rule 15-There are Two Ways I will Write the Weekly Plan. Choose One of the Way I will Do it. Embrace whatever format seems most useful for the particular week you are planning.

Rule 16a: Either Plan My Week For Each Day, And What I will Do On that Specific Day Based On Time Available On Time Block On Daily Planning.

Rule 16b. Or I will Plan My Week When, There is No Major Appointments, Meetings or other scheduled obligation that break up my Day, I will Plan based on simple heuristics: like 3 hours of deep work a day and a list of things to schedule each day into the time that remains.

Rule 17: No Matter what Way Will I plan my week, the most important is Always Decide in Advance What I am Going To Do With My Week. These Decisions Look Different at the different time of the year, but what matters is that when it comes to my schedule, I AM IN Charge.

Example: Weekly Plan #1

Monday

After weekly planning do a focused task block to get out ahead of the small things on my lists for the week. Be sure in this block to finish <specific 20-minute task that is time sensitive>

Prepare a lecture for <my fall class>

End the work day with a 1 – 2 hour writing block.

Tuesday

Today is a research day: head in the office right away to dig into <research project>.

End day with 1.5 hours in <a favorite secluded spot on campus>, where the first hour is writing and the last thirty minutes is a batched attack on tasks.

Wednesday

I have a training seminar to attend in the morning and a meeting with my student in the later afternoon. Between these two events focus on prepping another lecture.

Depending on the length of my afternoon meeting, I may be able fit in a task block before coming home.

Thursday

First thing in the morning do budget and take care of <related annoying financial task>. The goal is to finish before <doctor's appointment near where I live>

After the doctor's appointment find a quiet place to work deeply on <research project>.

End day somewhat early for <yard work project>

Friday

Write. Deep work on research until mental burn out. Shutdown for weekend. Finish <yard work project>

The above weekly plan represents the most common format I use: sketching my goals for each day of the week. Notice, I'm not simply listing things I want to get done each day, but instead, I will Review How much time available on each day From Daily Routine, once inserted all the tasks from calendar and The tasks that I am doing Constantly on daily basis. I am trying to Do is match work to the time that actually available on those days. A big part of the weekly planning process is working backwards from your calendar to fill in the open time effectively. Fortunately, because this plan is for a summer week, I had lots of open time to work with.

Example: Weekly Plan #2

Research

Carve out three hours of deep work every day for the below research tasks. This is the core of each day's schedule.

This week is do or die for getting to a final result for <a research project with an upcoming deadline.>

During downtime on this project (while waiting for responses from co-authors), see if I can push through <the final details of a different proof I'm working on.>

Dedicate one day's deep work for finishing <a journal paper review>

Georgetown Teaching/Misc

Each day, outside of the deep work hours assigned above, make progress on the below non-deep tasks.

Once my new textbook arrives, I need to decide on my syllabus for <class I'm teaching this fall> and post online.

The following small tasks are time sensitive this week: (1) pick up new parking pass; (2) send back visa letter for <a researcher I know>; (3) respond to <a colleague's> recent questions.

Writing

Use the morning block <[note: I sometimes work for an hour at home in the morning to allow traffic to die down]> and commute to plan and gather the sources I need to start writing next week.

Over weekend, write a blog post where I <reminder of post topic>

This plan adopts a different format. Because this was a summer week with no major appointments, meetings, or other scheduled obligations to break up my days (so rare, yet so wonderful), I could base my schedule around some simple heuristics: three hours a day on deep work for research, and a list of small things to schedule each day into the time that remains.

I would never get away with this approach during the height of the school year, but for a lazy week in July, it worked perfectly.

The bigger message here, however, is that I always decide in advance what I am going to do with my week. These decisions look different at different times of year, but what matters is that when it comes to my schedule, I'm in charge.

Rule 18- Add, Write and Mark in Calendar, Every Last Friday, Saturday and Sunday of Each Week, That I will Do Review The Previous Week Weekly Planning This helps to See If I am on The Track or I need to Do some Changes in My Schedule or Do Something Differently.

Rule 19-Review Every Part of Previous Week Weekly Planning, If I am on the Track Every Last Friday, Saturday and Sunday of Each Week, By using All Parts of *Journaling and Review of A Week* Pages 2088-2091

Step 2 Create Daily Planning

Rule 1-Define Deep Work and Shallow Work:

- I. Deep Work is ability to focus without distraction on a cognitively demanding task.** This creates new value, improve skills and Hard to Replicate.
- II. Shallow work: Non-cognitively demanding, logistical-style tasks, often performed while distracted and Not Create New Value or Improve Skill.** It is not Deep Work, but Shallow Work if the work is not Hard, Context Shift and or have Distraction.

Rule 2- Create Daily Plan Either At The Shutdown Previous Day or Evening of Previous Day or In the Morning. Be flexible with Your Daily Planning. Spend Between 90-180 Minutes, on what is upcoming for next Day or Today and decide how to tackle. When Planning For Daily, this planning must have intention.

Rule 3-Review and Analyse the Following Documents To Plan FOR Daily Planning:

- I. Identify End Goals. Page 11.**
- II. Deep Life, Deep Work and Benjamin Franklin Routine Pages 36-67.**
- III. Weekly Value Plan Document.**
 - Values I want to Practice for Today.**
 - Professional Code of Conduct, I would Like to Practice for Today.**
 - Personal Code of Conduct, I would Like To Practice for Today.**
 - Skills I Would like to learn and practice for Today.**
- IV. Weekly Planning.**
- V. Project Tracker.**
- VI. Habit Tracker.**
- VII. My Task List.**

VIII. Work Notebook.

IX. Work Priorities Word Document.

X. TimeFrame For Tasks.

XI. What Sport To Do On Daily Basis.

XII. My Calendar.

- Academic.
- Professional.
- Personal.

XIII. If it's a weekday, build a time block plan. If not, sketch a looser plan.

Rule 4- Once the Review and Analysis of the Documents have been Done. Then Think, Decide and Write What Are The Most Important Goals and Tasks I Will Be Pursuing and Working For TODAY.

Rule 5-USE And Apply 80/20 Principle By Asking: Is this Task in the top 20% of my activities or in the bottom 80%? Identify Most Important Task.

- I. Once Identify Task In the Top 20% input that gives 80% of Output. Then, Put 100% effort into 20% inputs, to achieve best results. Remove Trivial Tasks.**

Rule 6-General Principle: Better To Plan Less and Actually Carry Out. Do not Schedule Too Much on Daily Basis. Have Realistic Schedule. Use Slow Productivity Approach To Setting Up Goals.

Rule 7-Each Drew Eisenhower Matrix Have Different Quadrant For Different Tasks And Activities, These are the following Quadrants, and what Activities and Tasks will be Written in Each Quadrant.:

1. Quadrant 1 Do It Right Now-Task Important And Urgent. Reactive.

- **Shallow Work, Meeting, Solitude, Boredom Appointment, Deadlines, Crises, Emergencies, Emails, Phones, Social Interaction, Auditing Time Spend, Meditation, High Quality Downtime, Ad Hoc Tasks.**

2. Quadrant 2 Schedule It-Task Important But Not Urgent. PROACTIVE.

- **Spend Majority of Time In Quadrant 2.**

- **Personal Life.**

- **Values.**
- **Behavior.**
- **Moral Ethics.**
- **Skills.**

- **Professional Life.**

- **Values.**
- **Behavior.**
- **Moral Ethics.**
- **Tasks.**
- **Goals.**
- **Skills.**

- **Goals.**

- **Tasks.**

- **Deep Work and Deep Studies.**

- **Learning and Studies.**

- **Review, Journaling and Visualisation.**

3. Quadrant 3 Delegate It-Task Not Important But Urgent. Distraction.

- **Task not Important For you, But Urgent for Others. Avoid This Quadrant As Much as Possible.**

4. Quadrant 4 Delete It-Task Not Important And Not Urgent. Time Waste.

Rule 8:Example of How Will I Write in Eisenhower Matrix of Any Quadrant.

I. Example.

- Quadrant 1-Deadline.

i. Part 1 Submit Assignment.

a. Task. Check Eisenhower Matrix, What Steps To Take.

Rule 9- Once the Review and Analysis of the Documents have been Done. Then Think, Decide What Are the Moat Important Goals and Tasks I Will Be Pursuing and Working For TODAY.

Rule 10- I Need to Ask Myself For Each Goal, Task and Workday Activities, the Following Questions:

- I. Ask Myself If I need to Use Rules of Reading For Today. If Yes, Then Write In Eisenhower Matrix, The Page OF Rules of Reading That I will Use. Then Listen, Follow and Apply Rules of Reading To The Task, Goal and Workday Activities.**
- II. Ask Myself If I need to Use Feynman Technique For Today's Deep Work Or Any Other Task. If Yes, Then Write In Eisenhower Matrix, The Page OF Rules of Reading That I will Use. Then Listen, Follow and Apply Feynman Technique To Any Deep Work or Task.**
- III. Ask Myself If I Need To Use Newspaper, Internet, Youtube, WhatsApp and Email For Today. If Yes, then Check If those Reasons are based On Rules Of Reading Pages 18-22.**
- IV. Do I need to Use Computer or Phone Today For Any Task, Goal and Workday Activity?**

Rule 11- Ask Myself If the Tasks, Goals or Workday Activities on the Quadrant 2 are Values, Behaviors, Moral Ethics For Professional or Personal, Learning and Studies, Deep Work or Deep Studies or Review and Reflect Journaling.

I. Determine if A Task Qualifies As Deep Work By Asking Questions. If All the Answer is Yes to Most Questions, then it falls under category of Deep Work:

- **Does this task require focused attention?**
- **Does this task require specialised training or knowledge?**
- **Does this task create new value in the world?**
- **Would this task be difficult to replicate?**

Rule 12- Group Eisenhower Quadrant 1 Tasks based on Similarities.

Rule 13-Eat That Frog Means Tackle The Biggest, Hardest and Most Important Task First. Ask Yourself, what is the Biggest, Hardest and most Important Task For Today?

Rule 14-USE And Apply 80/20 Principle In Every Area By Asking: Is this Task in the top 20% of my activities or in the bottom 80%? Identify Most Important Task, Based ON Weekly Planning.

I. Once Identify Task In the Top 20% input that gives 80% Output. Then, Put 100% effort into 20% inputs, to achieve best results. Remove Trivial Tasks.

Rule 15- Ask Myself If the Tasks, Goals or Workday Activities Needs to be Breakdown into Smaller Manageable Tasks?

I. If The answer is Yes, then I need to Write on Piece of Paper the Task, Goal or Workday Activity. Then, I Need to Write what is the First Small Task of this Big Task.

Rule 16- Write AND Fill The Eisenhower Matrix, what are the Tasks, Goals and Workday Activities I have decided to Do. Put Each Task, Goal and Workday Activity In the Appropriate Eisenhower Matrix Quadrant.

Rule 17- Once The Task, Goals and Workday Activities, Have been written in the Appropriate Eisenhower Matrix, Then You need to Do the Following:

- I. Under Big Task, Goal or Workday Activity in the Eisenhower Matrix, Write Down what are Part 1 and Smaller Manageable Tasks, and activities I Will Do It. Under The Smaller Tasks, and Goals, Then Write Letter (A) or Other Letters and then Smallest Manageable Tasks, Must, Need, Should Do it, To Complete the Big Task. This does not mean I will finish up Big Task Today, but those small manageable tasks can help to complete the task in the next few Months, Weeks, Days.**

II. Example of Writing in Eisenhower Matrix Quadrant:

- (Name of Big Task or Goals) Deadline.**
 - i. Part 1 (Name of Smaller Task or Goals) Submit Assignment.**
 - a. (Smallest Manageable Task) Task.**

Rule 18- Decide The Place and The Amount Of Time I will spend on each activity, be realistic and do not UNDERESTIMATE the time, better overestimate the time.

- I. Deep Work: Where, When, How long and How will you work?**
- II. Decide in advance what is The Most Important Task Out of Deep Work That you'll work on during each deep work session Today. To Work Deeply you need to focus on one task and ignore everything else. When you decide what to concentrate on in advance, you can avoid multitasking.**
- III. Determine, How Much Time Do I need To Finish Up This Deep Work, Shallow Work or Any other Task. Block Off The Time For Tasks, and Block Off Large Chunk of Time Every Day For Deep Work.**
- IV. Give Yourself A time Limit for Each Task and Have Defined Clear Metrics of Success. Next to each item on the list, write about how long it'll take you to accomplish each task. Be realistic about this estimate. Then, try to complete each task within the confines of each time limit. Example you might set a goal to write 500 words every 30 minutes—this way, your task is straightforward and you naturally get two simple progress checks per hour. Time blocking helps you to learn how really long does it take for the things to be done.**

Rule 19-Decide What Type of Note Taking Method Will I Use, When Doing Deep Work:

- I. Analytical Learners: Outline/ List. Good Works well for recording terms, definitions, facts and sequences**
- II. Sentence Method: The goal is to jot down your thoughts as quickly as possible. Works well in meetings or lectures that lack organization. Use when information is being presented very quickly.**
- III. SQ3R (Survey, Question, Read, Recite, Review). Use for dense readings (like business books, text books, whitepapers, etc.). You start the process by skimming the material for bolded text, images, diagrams and summaries in order to produce a list of headlines or main topics.**

- IV. Mapping.** Mapping is a nonlinear system of note-taking that resembles a tree and root structure. Ideas stem from one major concept and are connected by lines (or “branches”). As a note-taking system, mapping works particularly well for visual learners, but it can also be a great tool for analytical-thinkers who have trouble brainstorming because it allows you to make connections you’d otherwise miss with a linear format. Works well for planning essays, recording meetings. Use for big-picture brainstorming sessions.
- V. Smart Wisdom.** It’s a tool optimised for active listening in lecture situations. Instead of taking notes in full sentences, you record only keywords and place them in a chain that maps the thought process.
- VI. Diagram And Processes.** Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.

VII. Cornell Note Taking

- Name.
- Date.
- Class and Period.
- Topic.
- Essential Question at the Top of Page.
- Questions and Main Ideas on the Left Page of the Blank Page.
- Notes On the Right Page of the Blank Page.
- Summary at the bottom of the page.

VIII. Use Smart Notes.

- What is big Idea.
- Question.
- Evidence.
- Conclusion.

IX. Charting. Charting is a great note-taking strategies when you need to compare and contrast ideas. The most widely used charting method is the Pro/Con list.

X. CERC.

- Claim
- Evidence
- Reasoning
- Conclusion

Rule 20 Eat That Frog Means Tackle The Biggest, Hardest and Most Important Task First. Assign This Block of Activities Early in the morning or When I am most effective in the day.

Rule 21 Based on The Decided Tasks, Goals and Workday Activities On the Eisenhower Matrix. Assign Scheduled Activities To Block In The Timeblock, And Draw The Box For That Period in The TimeBlock on Daily Planner. Below is How Will this be Written In the TimeBlock.

I. Example of Writing in the assigned Box.

- **Q-(Write Quadrant from which Task Will be Taken) (Name of Big Task)- Part (Number) and (Smaller Tasks)- A- (Smallest Task. Always be as Letter, In Assigned Box)- Then Check Eisenhower Matrix To See what steps do I need to Take.**
 - i. Example: Q1 Deadline-Part 1-A.
 - ii. Always Check Eisenhower Matrix Quadrant on the Left Page of Daily Planning for That Task and Review What Steps Do I need To Take in Doing This Task.
- **(Write Number in the assigned box), then review on the last Column of the right page of daily planning,] for the list of short Tasks that I need to do. This would be for very short tasks that I need to do it.**
 - i. Example: 1
 - ii. Tasks: (Buy food, pick child, buy coffee, take shower).

Rule 22 Ask Additional Questions when Assigning and Block the periods of time on the Timeblock:

- I. Have I Scheduled time for Distractions, Emails, Internet, Phones. Limit the time you spend on email. If your work requires you to regularly check your email, schedule 1 to 2 hours each day for checking your email; don't look at it during other times.**
- II. Have I set For High Quality Downtime and Recharge?**
 - **Walk.**
 - **Run.**
 - **Read.**
 - **Get New Hobby.**
- III. Set Time for Social Interaction At Work: Do not involve into office politics, but come to do performance. If there is office politics, then you need go and do the job or perform instead involve into office politics.**
- IV. Set Time for Social Interaction With Friends and Other People Outside of Work.**
- V. Set Time For Appointments.**
- VI. Set Time For Meeting. Audit your meetings.**
- VII. Set Time For Boredom and Let Boredom Happen. No Gadgets, Social Media or high Stimulus.**
- VIII. Set Time For Meditation.**
- IX. Set Time For Auditing Time Spent. Audit how you're spending your work time. Before you can trim away shallow work to make room for deeper pursuits, you have to understand the type of work you do on a day-to-day basis. To do this, list out every activity or task you engage in—then quantify the depth of every activity so you know how much time you're spending on deep work vs. shallow work. Reflect on and tweak your schedule: Newport suggests reviewing the accuracy of your time blocks at the end of each day. This will help you set more accurate goals and expectations in the future.**

Rule 23 On the Top Right Page. Write Today's Date.

Rule 24- Analyse Eisenhower Matrix, and Based on That Decide What is the Deep Work and Shallow Work Ratio?

Rule 25 On Right Top Page Of Planner, Based on Eisenhower Matrix and Deep Work and Shallow Work Ratio on the Rule 21, Decide Deep Work Philosophy The Most Appropriate For Today, and Check What is Going to Be Done In Those Blocks On Pages.

I. Shallow Work Philosophy.

II. VAIDAS Daily Routine Philosophy.

III. Benjamin Franklin Daily Routine Philosophy.

IV. Journalistic Philosophy. Journalistic strategy involves do deep work whenever it fits into your schedule. **The Journalistic Philosophy of Deep Work Scheduling is an option for people who are constantly on the move with little to no regularity to their days. This method demands vigilance with your time and the keen ability to notice natural ebbs and flows in your day where you may be able to fit in 30 minutes or an hour or two of deep work. Unfortunately, this method is not for beginners and is likely to fail for people who are not experienced in deep work.**

V. Rhythmic Philosophy. Involves time blocking certain hours, about 1 to 4 hours each day, to complete your deep work tasks. **The Rhythmic Philosophy of Deep Work Scheduling is ideal for individuals with a fairly static schedule. If you can anticipate what most of your days will look like, it's feasible to block off several hours every day for deep work, thereby getting into a daily "rhythm" and leaving the rest of your hours for shallow work.**

VI. Bimodal Philosophy. Involves splitting your schedule based on Deep and Shallow Work. Spend a Day or Week on Deep Work and once is completed, Then Focus on only shallow work. **The Bimodal Philosophy of Deep Work Scheduling allows for a high amount of deep work while enabling you to maintain other activities in your life that you find valuable. Successfully adopting this philosophy requires the flexibility to arrange your year, months, or weeks as you see fit into larger chunks of deep work.**

VII. Monastic Philosophy. Involves cutting out all shallow activities to focus on deep work for weeks or months. Monastic Philosophy **Is the most dedicated form of deep work and involves spending all of your working hours on a singular high-level focus.** While this philosophy has the highest potential for reward and the lowest level of context switching, it's unrealistic for most people who are required to perform various kinds of work in their role. It also blocks the potential for new opportunities, as your default response to commitments that arise is "no."

Rule 26 On Right Page The reason there are three Columns are the following:

- I. If New Obligation comes up, Then on right page, the next Column, reschedule the day.**
- II. To Fix The Time Block, First Cross Out The Time Blocks that Remain In My Current Schedule. Then, In The Next Column To The Right Of Your Current Schedule, Create New Schedule For The Remaining Hours, And Turn Your Attention To Executing New Plan.**
- III. If schedule disrupted, Either create a revised schedule, or Give longer Time than required to handle the tasks.**

Rule 27-On Left Page Organise The Task in the Daily Planning.

- I. When Do I add A task to My List vs Straight Into My Week Plan?**
- II. If the task or obligation pops up, and you writing down and capturing exactly what I need to do. At the End of the day you need to processing the task that needs to be done. There are two places that the task can go:**
 - A. On the Appropriate Task Board List. This is not time specific task list.**
 - B. Or Calendar. It goes on the calendar if this connected to specific day that task needs to be executed. Calendar is for time specific tasks.**
- III. Structure the information that you have captured, whether it is by categories or by role, etc. Your captured information needs an available structure. Availability in this case refers to the possibility to understand what is happening next. Organising your information will allow you to avoid cognitive overloads since you get a "gestalt" of what is going on in your life.**
- IV. Review all Tasks and All information on a regular basis.**

Rule 28-On The Left Page, Write Down Distracting Ideas and General Ideas That Comes During the Day.

- I. One captured the idea on the Daily Planning, then Transfer into the Book of Ideas.**

Rule 29-On The Left Page, What to Write In the Metric Tracker, and What is the Purpose of Metric Tracker.

- I. In This, You Can Track, How Many Hours Do You spend In Deep Work without distraction.**
- II. Any Disciplines I decided To Do On Daily Basis.**
- III. This can be also how many number of sales calls you made today.**
- IV. How Many Steps I made.**
- V. TRACK WHAT you can use the phone for.**
- VI. How Many Minutes I exercised or How many sets of particular exercise I did.**
- VII. Or Some other Metrics That I will follow.**

Rule 30-Ask Yourself, IF I AM Intentional with The Time?

Rule 31 Finish up Job At 17-17:30 and Do not Bring Work To Home.

Rule 32 Did I Ask The Question In The Morning and Evening? This is Based On Values:

- A. What Good Shall I Do This Day?**
- B. What Good Have I Done Today?**

Rule 33 Have Deep Work Timer. If I get up for Bathroom or Coffee, then the Deep Work Timer is stopped, Once Back, Turn On Timer. Deep Work Hours Only counting, when I actually Do Deep Work.

Rule 34 Be There and Do Grinding of Deep Work, even if I Don't feel it.

Rule 35 Use Slow Productivity When Doing Any Task or Deep Work.

- I. Step 1- Slow and Steady and Time Line Expansion. Working Quality of Work again and again in the right setting giving the work the respect and the support it needs to be good. You need to look at this way, did I produced at the end of this year that I am proud of. Best serve is slow, steady and Quality.
- II. Step 2-Do not juggle between task, but do one task at the time at normal and natural pace.
- III. Step 3-Do fewer things daily. You are not a computer processor, you are human.
- IV. Step 4- Work at a natural pace. Seasonality at various level. Instead of worrying about how much you can do in a day, worry how much you can do in months & years? This will shift your perspective.
- V. Step 6- Be obsessed with quality. Do less, do better. Skilled important activities gives you motivation & make you feel more fulfilling.
- VI. Step 7- Be minimalist in your schedule. Say No often on taking more work.

Rule 36-Do At The End of Each Day Review And Reflection of The Progress.

Rule 5- Add, Write and Mark in Calendar, Every Last Friday, Saturday and Sunday of Each Month, That I will Do Review of the Quarterly Value Plan This helps to See If I am on The Track or I need to Do some Changes in My Schedule or Do Something Differently.

Rule 6-Review Every Part of Daily Planning. By using All Parts of *Journaling and Review of A Day* Pages 2088-2091.

Rule 37-Do Shutdown. This is System, that helps to mind shift from work mode to non work mode.

- I. Part 1. Make sure that the personal metrics are recorded.**
- II. Part 2 Go Through task, and Ensure that The Tasks are Fully Captured. Deciding what you want to do with it. You may need to add new task or update calendar.**
- III. Part 3 ideas in the collection column, deciding what you want to do with it. You may need to add new task or update calendar.**
- IV. Part 4 Briefly review any potential sources of unresolved work obligations, by reviewing your calendar and obligation tracking system.**
- V. Part 5 Check weekly plan, and make updating as needed.**
- VI. Part 6 Make The Shutdown Box Completed By Tick the Box On The Top of Left Page of the Daily Planning.**

Shallow Work Philosophy.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Shallow Work, Deadlines, Crises, Emergencies.

12pm-14pm: NOON.

- Shallow Work or Nap.
- Break, Lunch and Intermittent Fasting.
- Financial Security: Read or Look Over Account and Dice.
- Physical

14pm-18pm: Afternoon.

- Shallow Work, Deadlines, Crises, Emergencies.

18pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Family, Or Social or Health or Physical or Mental or Health or Leisure or Communication or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- **Pre-Sleep Ritual and Sleep.**

VAIDAS Daily Routine Philosophy.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

12pm-14pm: NOON.

- Shallow Work or Nap.
- Break, Lunch and Intermittent Fasting.
- Read or Look Over My Financial Security, Account and Dice.
- Physical.

14pm-18pm: Afternoon.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

17:30pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Physical or Mental or Health or Family or Parenting or Reading or Music or Diversion or Conversation or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Benjamin Franklin Daily Routine Philosophy.

5am-8am: Early Morning.

- Rise, Wash.
- Address Powerful Goodness.
- Contrive Day's Business and Take Resolution of the Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study.
- Breakfast.

8am-12pm: Morning.

- Deep Work.

12pm-14pm: NOON.

- Break and Lunch.
- Read or Look Over My Finance, Account and Dice.

14pm-18pm: Afternoon.

- Deep Work.

18pm-22pm: Evening.

- Put Things In Their Place.
- Supper.
- Music or Diversion or Conversation.
- Examination of the Day.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Journalistic Philosophy Daily Routine.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Family and Social
- Shallow Work, Deadlines, Crises, Emergencies.

12pm-14pm: NOON.

- Break and Lunch.
- Read or Look Over My Financial Security, Account and Dice.

14pm-18pm: Afternoon.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

18pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Family, Or Social or Health or Physical or Mental or Health or Leisure or Communication or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Rhythmic Philosophy Daily Routine.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

12pm-14pm: NOON.

- Shallow Work or Nap.
- Break, Lunch and Intermittent Fasting.
- Read or Look Over My Financial Security, Account and Dice.
- Physical

14pm-18pm: Afternoon.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

18pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Family, Or Social or Health or Physical or Mental or Health or Leisure or Communication or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Bimodal Philosophy Daily Routine.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

12pm-14pm: NOON.

- Shallow Work or Nap.
- Break, Lunch and Intermittent Fasting.
- Read or Look Over My Financial Security, Account and Dice.
- Physical

14pm-18pm: Afternoon.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

18pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Family, Or Social or Health or Physical or Mental or Health or Leisure or Communication or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Monastic Philosophy Daily Routine.

5am-8am: Early Morning.

- Rise, Go Outside Get Light, Cold Wash.
- Deep Work: Spiritual or Personal Growth, Learning and What Type of Person I want to Become.
- Journaling And Visualisation.
- Contrive Day's Business and Take Resolution of the Day-Schedule The Day.
 - I. The Question: What Good Shall I do This Day?
- Prosecute the Present Study Or Physical.
- Travel.
- Breakfast.

8am-12pm: Morning.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

12pm-14pm: NOON.

- Shallow Work or Nap.
- Break, Lunch and Intermittent Fasting.
- Read or Look Over My Financial Security, Account and Dice.
- Physical

14pm-18pm: Afternoon.

- Deep Work:
 - A. Career, Business and Educational Aspiration.
 - B. Spiritual.
 - C. Personal Growth, Learning and What Type of Person I want to Become.

18pm-22pm: Evening.

- Travel.
- Shallow Work and Put Things In Place.
- Supper.
- Family, Or Social or Health or Physical or Mental or Health or Leisure or Communication or Environment.
- Examination of the Day, Journaling and Visualisation.
 - I. The Question: What Good Have I done Today?
- Prayer.

22pm-5am-NIGHT.

- Pre-Sleep Ritual and Sleep.

Step 4 Periodic Review.

Rule 1- After establishing your Deep Life Stack, it's important to review and possibly iterate through the layers periodically. Use a specific time, like your birthday, as an anchor for this review. Check if your discipline, values, Professional code of Conduct, Personal Code of Conduct, and plans are still in alignment with your goals and make the necessary adjustments. Do The Deep Life Stack Once A year go through the whole, however on Quarterly, Weekly, Daily Basis review: Values, Calm and Plan.

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 2: What Projects Do I Commit

Rule 1: Use Productivity Funnel To Decide What Project Do I commit.

- I. Step 1-Top- Selection. Potential Activities comes. In selection part you trying to figure it out, the activities coming into funnel, which actually I am going to bring it to my system, and how to execute at some point. Lots of activities going to be blocked at this stage.**
- II. Step 2- Middle-Organisation. The activities that I select, needs to be organised. Where they kept track of, where is information associated with the activities kept track of. This is where you use capture system. Quarterly, weekly, Daily Planning.**
 - Goal 1-There are two goals for this funnel level: to avoid forgetting what you're supposed to do. and to make smart decisions about what to work on next.**
 - Goal 2-Make smart decisions about what to work on next.**
- III. Step 3-Bottom- Execution. Now I know what I am supposed to be doing, now I need to know how will I do it. This is where deep work meets shallow work, Scheduling, quarterly, weekly, daily and execute the activities.**

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 3: How To Fix My Schedule

- I. Do One Project At The Time.**
- II. Do One Task At The Time and At The Natural Pace and Take Time to Complete. Do everything at one's own pace).**
- III. Do fewer things daily. You are not a computer processor, you are human.**
- IV. Work at a natural pace. Seasonality at various level. Instead of worrying about how much you can do in a day, worry how much you can do in months & years? This will shift your perspective.**
- V. Be obsessed with quality. Do less, do better. Skilled important activities gives you motivation & make you feel more fulfilling.**
- VI. Be minimalist in your schedule. Say No often on taking more work.**
- VII. Cutting back on the number of projects you're working on.**
- VIII. Cutting inefficient habits from your daily schedule.**
- IX. Possibly annoying people by sticking to such a fixed work schedule.**
- X. Serialize projects by working on one major project at a time and moving to another when finished to maximise efficiency.**
- XI. Be clear about when to expect results by making an honest evaluation of when you can get something done by.**
- XII. Turn down projects if you're focusing on too many things and can't get a potential project done in a reasonable time.**
- XIII. Drop projects if they end up taking up too much of your time.**
- XIV. Be unavailable at certain times of the day to focus on meaningful work.**
- XV. Turn regularly occurring work into a habit that's done consistently at a fixed date and time.**
- XVI. Start early on important projects (and, Putting End To procrastination.**

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 4: Prepare The Environment, Tools and Eliminate Distractions

Rule 1-Set Up Work and Study Space: Have A dedicated Desk or Study Area Purely for Deep Work, means you always have somewhere to Go.

- I. Step 1-Consider the environment you create. Remove anything that can distract you from your work and isn't relevant to the task.**
- II. Step 2-Clean off your desk to include only the things you need to work on, leaving just a few photos or mementos to help you relax a bit.**
- III. Step 3- Limit your desktop to only the things that are required for what you're immediately working on so that there are no extraneous materials to distract you.**

Rule 2- Prepare The Tool Needed For Deep Work. Prepare Required Documents, Articles, Books or Any Resources For Deep Work and Rules for Deep Work.

- I. Step 1- Download or Print all Reading, References or Listening resources, Kindle and Text To Speech.**
- II. Step 2- Decide in advance what you'll work on during each deep work session. To work deeply you need to focus on one task and ignore everything else.**
- III. Step 3- Determine rules to guide your concentration, like whether you'll use the internet, how many words you'll write every 20 minutes, or where you'll put your phone.**
- IV. Step 4- Have Notebook, Pen, Ruler, Pencils.**
- V. Step 5- Headphone.**
- VI. Step 6- Laptop or Phone. Phone and Laptop Can be Used just for Audiobook.**
- VII. Step 7- Coffee, Tea or Water Bottle.**
- VIII. Step 8- Ask Myself If I am Doing Deep Work Alone or Collaboration. Focusing on "serious work" typically entails working alone for hours.**

Rule 3-Eliminate Distraction:

- I. Step 1- To learn hard things quickly, you must focus intensely without distraction.
- II. Step 2-Identify the biggest Distractions. Eliminate each one of the distraction.
- III. Step 3- Find A Place Alone.
- IV. Step 4- Eliminate Mobile Distraction.
 - A. Uninstalling The Apps that Might Trigger.
 - B. Change Notification Settings for apps and phone.
 - C. Delete Social Media apps.
 - D. Quit Social Media All Together.
 - E. No WI Fi.
 - F. Turn off phone or mute.
 - G. Turn off notification.
- V. Step 5- Schedule Time For Distractions, and Stay only on those schedule time to be Distracted.

Rule 4-After The Deep Work, Deep Studies, Clean up Your Desk, and Put things In their Place, and Do Not Leave Your Desk Dirty or Unclean.

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 5:Hack Meetings, Phones and Emails and Other Technologies.

Rule 1- Hack Meetings:

- I. Step 1- Make it Harder To Call a meeting. Require An Agenda and A Brief Document.**
- II. Step 2-The Meeting Margin Method Assume you have to schedule a meeting that lasts X minutes. Instead of blocking off X minutes on your calendar, block off (1.5)*X minutes.**
- III. Step 3-To process the meeting: clarify any new obligations that were discussed and make sure they're in your system. Perhaps execute some of the smaller tasks right away. The goal here is to close all open loops related to the meeting so that it releases its hold on your mental energy moving forward in the day.**
- IV. Step 4- To catch up on anything missed while in the meeting: check your inboxes to handle anything urgent (if you're in the type of job were such urgent communication is common and cannot be ignored). The goal here is to eliminate the need for you to rudely and uncomfortably split your attention during the meeting itself by constantly checking your inbox. If you know you have time right after to check in, you can confidently concentrate while in the meeting.**
- V. Step 6-To make progress on real work: if the margin is large enough, make progress on things you know need to get done. The goal here is to stave off that feeling that everyone *but you* has control over your time and attention.**
- VI. Step 7- If You Are in the Meeting be Fully Present.**

Rule 2- Hack Phones:

- I. Step 1- Use Phone For Text.**
- II. Step 2- Use Phone For Calls.**
- III. Step 3- Use Phone for Photos.**
- IV. Step 4- Use Phone For Maps.**
- V. Step 5- Use Phone For AudioBooks.**
- VI. Strp 6- Use Phone For Recording Notes, Ideas, Journaling and Review.**
- VII. Step 7- Uninstall Distracting Apps, Like Social media.**
- VIII. Step 8- Set a Schedule For Online Activities at the Computer.**
- IX. Step 9- Use Digital Minimalism for The Phones and any other Technology.**
- X. Step 10- When You are Doing Deep Work or Having Family Time, Leave the Phone In the Other Room and Do Not Touch.**
- XI. Step 11- Schedule Time For Phones, and Stay only on those schedule time to use Phone.**
- XII. Step 12- When you at home do not carry phone in pocket, but put in one of the rooms. If someone call, text go to that room. You will be less distracted.**

Rule 3- Hack Emails:

- I. Step 1- Change the Email Set up.**
- II. Step 2- Never Schedule A Call or meeting Using Email. Use Microsoft Outlook to set up a meeting in the calendar.**
- III. Step 3-Immediately move obligations out of your inbox and into role-specific repositories.**
- IV. Step 4- Make Senders Do More Work When They Email You.**
 - A. Make senders work for your email addresses; don't list it publicly or have it on your website.**
 - B. Ask senders to filter themselves by having different emails or separate contact forms for different queries.**
- V. Step 5-Do More When You Send or Respond to Emails**
 - A. Reduce the back-and-forth of emails with a "process-centric approach to email." By sending more thorough and complete correspondence, you'll close the loop on a conversation more quickly. Reduce the back-and-forth of emails with a "process-centric approach to email." By sending more thorough and complete correspondence, you'll close the loop on a conversation more quickly. For example, a bad reply would be, "Yes, let's meet for lunch. When works for you?" A better reply is, "Here are times over the next week when I'm available. If any of these work for you, let me know, and please send a calendar invite. If none of these work, please send over a few times that do."**
 - B. Example**
 - If the person wants to meet with you. Answer I would love to meet over hangout. Advise what hours and days are you available. "I'm available, Mon, Wed, Fri from 12pm-3 pm. If you are free at any of those times, send a calendar invite my way and we will talk then.**
 - If does not work for you, give me a quick call at and we can work out a time over the phone.**

VI. Step 6-Don't Respond.

- A. Not every email that lands in your inbox requires a response. For some, the default line of thinking is that “it’s the sender’s responsibility to convince the receiver that a reply is worthwhile”. However, this is a controversial belief. Some suggest that [not responding to emails is rude](#), and others recommend [never responding to your emails at all](#).
- B. These three rules may help you find a middle ground that saves your sanity while still remaining open to opportunities that may arise. Newport recommends that you don’t respond to a message with these qualities:
- It’s ambiguous or otherwise makes it hard for you to generate a reasonable response.
 - It’s not a question or proposal that interests you.
 - Nothing really good would happen if you did respond, and nothing really bad would happen if you didn’t.

VII. Step 7-Hold office hours. Setup a recurring Zoom meeting for set times every week where you guarantee to be present. As much as possible, when people send you an ambiguous request or initiate a conversation that will require a lot of back and forth, point them toward your office hours schedule and tell them to stop by next time they can to discuss. It’s a simple idea, but it can reduce the number of attention-snagging back-and-forth electronic messages in your professional life by an order of magnitude.

VIII. Step 8-Do More When You Send or Respond to Emails. Let your team know when you’re available. Share your communication preferences with your team and let them know when you typically answer messages.

IX. Step 9- Schedule Time For Emails, and Stay only on those schedule time to Check The Emails.

Rule 4- Hack Whatapp and Other Technologies

- I. Step 1- Schedule Time For Whatapp and Other Technologies, and Stay only on those schedule time to Check Whatapp and Use Other Technologies.**

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 6: Understand Importance Of Slow Productivity And Apply Slow Productivity In My Life.

Rule 1- Slow Productivity is shift the amount of meaningful things done in the next years. Try to do lot less, but the things I am doing on larger time scale, you get sense overload. Example: you want to produce good book in the next 2 years, this is different type of initiative than trying to do as many writerly promotion things as many as possible.

Rule 2-Slow and Steady and Time Line Expansion. Working Quality of Work again and again in the right setting giving the work the respect and the support it needs to be good. You need to look at this way, did I produced at the end of this year that I am proud of. Best serve is slow, steady and Quality.

Rule 3- Do not juggle between task, but do one task at the time at normal and natural pace.

Rule 4- Do fewer things daily. But You Should Do Most Important Things. You are not a computer processor, you are human.

Rule 5- Work at a natural pace. Seasonality at various level. Instead of worrying about how much you can do in a day, worry how much you can do in months & years? This will shift your perspective.

Rule 6- Be obsessed with quality. Do less, do better. Skilled important activities gives you motivation & make you feel more fulfilling.

Rule 7- Be minimalist in your schedule. Say No often on taking more work.

Rule 8- Work Smart And Hard.

Rule 9-Constrain- We need to be careful to what we saying YES and what we saying No To. Have Rules, how I am going to Decide what I am letting on my plate and what is not.

Rule 10-General Maxim: More Haste, less speed. One should take one's time with everything (do everything at one's own pace). If a decision is to be announces in a letter, better to give preliminary answer (to be polite). Decide and acting are two different things. Slow productivity commitment- do not procrastinate and put things off, but do it slowly consistently and steady.

Rule 11-Mastering one topic at the time and no more than that.

Rule 12- Regardless of What you Get paid per Hour, Give your best. Effort + Attitude Matters. Anywhere you work, you need to work your tail off. No matter how much you paid me, I will work my tail off. This creates the reputation about you that you putting your best no matter how much you getting paid. This shows your great attitude, this will bring more opportunities in your life. Pay Attention to Your effort pay attention to your attitude.

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 7: How To Attack Large Project.

Rule 1: Work On One Project At The Time, And No More Than That. This is the Most Important Rule.

Rule 2: Reduce from a project to a reasonable task.

- I. Step 1 Extract Some Reasonable Task That Will Simply Move You Closer to The Full Project Goal. Reasonable in this instance, means that you have what you need to get started, and the whole task shouldn't take more than 1 to 4 weeks to complete.**

Rule 3: Construct a habit-based plan.

- I. Step 1 Figure out when and where you're going to work on your task and what you are going to accomplish. Try to find a place and time you can hit consistently – something you can transform into a habit before your excitement for the project wanes.**

Rule 4: Complete and repeat.

- I. Step 1 At this point, it's time to repeat. You are now closer to completing your project than before. Survey your options and come up with a new reasonable task that will bring you even closer to your goal. Once your new task has been selected, come up with a new habit-based plan, and get back to work. Your path toward project completion will proceed along these lines. One small task, efficiently executed, at a time, until, eventually, you get within striking distance of your goal, and make that final sprint.**

Rule 5: Consistency

- I. Step 1 The big “doers” in life tend to be those who are consistently working, piece by piece, On one Project At The Time. They get it done. Not in a week of caffeine-fueled frenzy, but in a half-year of small, frequent steps forward.**

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**Stage 8: Understand The Reward Is Waiting For Me For
Doing Deep Work.**

Rule 1: Consider What Reward Can I get for Finish Up Project or Deep Work.

Rule 2: Reward once You have to Finish Up The Work Or Project.

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Stage 9: Preparation Of The Task.

Rule 1-Preparation: Decide in advance what you'll work on during each deep work session. To work deeply you need to focus on one task and ignore everything else. When you decide what to concentrate on in advance, you can avoid multitasking.

- I. Step 1-Think about the tasks that you need to complete and note what time you plan to complete them. Newport recommends breaking down your tasks into half-hour blocks, making sure to schedule buffer blocks to handle emergencies or tasks that run over their allotted time.**

Rule 2-Give Yourself A time Limit for Each Task and Have Defined Clear Metrics of Success. For example, Newport suggests leading metrics like the number of pages you've written or the number of new ideas you've generated. Next to each item on the list, write about how long it'll take you to accomplish each task. Be realistic about this estimate. Then, try to complete each task within the confines of each time limit. Example you might set a goal to write 500 words every 30 minutes—this way, your task is straightforward and you naturally get two simple progress checks per hour.

Rule 3- To learn hard things quickly, you must focus intensely without distraction.”To produce at your peak level you need to work for extended periods with full concentration on a single task free from distraction.”In order to produce the absolute best stuff you're capable of, you need to commit to deep work.

Rule 4- Doing Hard Things:

- I. Step 1-Make better Goals: Goals shouldn't be way too long term. Instead make Goals that you can track, control & those which give you a clear course of action for tomorrow.**
- II. Step 2- Learn how you work: Learn how you get yourself to do that work. Also associate it with Rituals(schedule), environment.**
- III. Step 3- Break it down: Break Big goals into manageable ones by making a rough Roadmap.**

***f*I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.**

Stage 10:Remind and Understand Law Of Productivity For Deep Work.

**Rule 1- Understand Law of Productivity for Deep Work and How Do I have To Approach to Deep Work, Studies, Learning, Thinking and Writing on Daily basis:
High Quality Work Produced = (Time Spent) x (Intensity of Focus).**

- I. Step 1-Do Not Seek Instant Gratification or enjoyment of Deep Work. But Apply Compound Effect, as you taking small steps consistently, which overtime leads to radical difference in your Deep Work and Focus.**
- II. Step 2- Deep Work and Focus Make it Habit. As It takes time Deep Work and Focus to become habit. The Habits become Routine, which is something you do every day without fail.**
- III. Step 3- Concentrate on What Is Important and One Task at the time. Never Multitask. Dedicate your full attention to the task. No Multitasking is allowed.**
- IV. Step 4- Consistency is the most important habit.**
- V. Step 5-DON'T WAIT FOR MOODS- show up, whether you feel inspired or not. Do Deep Work and Be There and Do Grinding of Deep Work, even if I Don't feel it On daily Basis.**
 - A. Remind Yourself that I choose The difficult thing to do for Good reasons. You need to feel like you choose the difficult Thing To Do, as you are autonomous author, as what it is you study, or work. The Work is going to be hard, but you understand that this would lead to greater things and opportunities.**

- VI. Step 6-Remind yourself of what you're working towards. Having a goal in mind will give you motivation to finish your work, and you'll be more successful at staying focused.**
- VII. Step 7- Say NO-We need to learn the slow 'yes' and the quick 'no.' Simply being aware of what is being sold allows us to be more deliberate in deciding whether we want to buy it."**
- VIII. Step 8-Don't fall for Work Smart: Do not fall for the work smart only concept. You need to work very hard.**
- IX. Step 9- Practice: Practice if you are playing in the game, so when the moment comes in the game, its not new to me. That's the reason why you practice, thats the effort, so when you get to that moment, you do not have to think, instinctively things happen.**
- X. Step 10-Preparation: Do Proper Planning A Month, Week, Few days and night before which helps to prevent poor performance. The most prepared wins.**
- XI. Step 11-Do More: Stay back and do more work, and put effort to achieve the results I want. If the person makes 100 calls a day, you need to do 200 calls a day. If the person sells 20 products, you sell 40 products. If somebody practices 3 hours, then you do 5 hours. Do A little bit more.**
- XII. Step 12-Make One Move at A Time:You have to put one foot in front of the other. Focus on the day task. You have to have a plan in place, how you going to improve for each day to get better and stick it to the plan and trust the plan, that this brings to the end result.**
- XIII. Step 13-The market rewards people who outwork and out improve. Outwork Everyone: Try to prove that I was better then anybody else in the craft. Wake Up Early and Go To Bed Early. Get the competitive advantage by Waking up early and do the work.**

XIV.Step 14- Regardless of What you Get paid per Hour, Give your best. Effort + Attitude Matters. Anywhere you work, you need to work your tail off. No matter how much you paid me, I will work my tail off. This creates the reputation about you that you putting your best no matter how much you getting paid. This shows your great attitude, this will bring more opportunities in your life. Pay Attention to Your effort pay attention to your attitude.

XV.Step 15- Rationality. Taking an objective view of problems is valuable when you're [dealing with difficult people](#), or defusing situations where [people are angry](#). Instead of being drawn into a shouting match, a Stoic will seek a rational way to resolve the problem.

XVI.Step 16-Calmness. Staying cool and collected is seen as a characteristic of Stoics. By ignoring things they can't control, Stoics are able to focus on the things they can affect. This helps to relieve the stress that's associated with [working under pressure](#).

XVII.Step 17-Strength. Stoics are often able to demonstrate a strong, [resilient](#) attitude to work. Thinking like a Stoic won't make you immune to the demands of a heavy workload or a hectic working environment, but it will help you to recognize the stressors, and reduce their impact.

XVIII.Step 18-Flexibility. By seeking solutions to problems, and continually reflecting on their experiences, Stoics benefit from being able to [work flexibly](#). In turn, this helps them to respond to change, quickly and positively.

XIX.Step 19-Morality. Modern versions of Stoicism also emphasize the moral elements of the philosophy. Sticking up for what's right, and staying true to your values, are key steps toward achieving [ethical leadership](#).

XX.Step 20-Honesty. The self-scrutiny of Stoic meditation can help you to see what genuinely motivates you – and to communicate that motivation to others. In workplaces with a culture of [intrinsic motivation](#), that can be a particularly valuable skill.

XXI.Step 21-Understanding. Bringing reason to bear on your own behavior and motivations can also make it easier to understand other people's actions and emotions. This can help you to [empathize](#) with them, and to build better relationships as a result.

XXII.Step 22- Be tolerant with others and strict with yourself.” – Marcus Aurelius. It seems like a generic saying you’d see on a cheap mug, but to the Stoics, it’s a way of life: you can only control what you can control, and don’t sweat what you can’t prevent. And while experiencing pleasure and pain is a part of life, Stoics say these moods shouldn’t dominate your existence. While there will be moments of happiness and moments of sadness, those shouldn’t be the moments you’re living for. The only thing you can control, the Stoics say, is yourself, meaning [how you react](#) to the situation around you.

XXIII.Step 23- “Waste no more time arguing what a good man should be. Be one.” – Marcus Aurelius. Another meeting filled with talking about talking, another team huddle where you feel like you’re thinking about thinking – are you really doing your work, or just working around your work? Stoics would hate modern business culture that demands the use of jargon, unnecessarily complicated measures for accomplishing tasks, and dozens of meetings where nothing gets accomplished. And if you’re also tired of this old dynamic, refresh things yourself by streamlining your own processes and focusing on what actually matters in your job. What are your values and goals? What do you hope to tangibly achieve this week, this month, or this year? Set an example for your team and cut the fat to start working smart rather than working hard.

XXIV.Step 24-“Approach each task as if it is your last, giving up every distraction, emotional subversion of reason, and all drama, vanity, and complaint over your fair share.” – Marcus Aurelius. Stoic advice for completing tasks is to focus on one thing at a time until it’s done, which is definitely some advice that many could learn from in the technology era. While multitasking might seem like it makes things go faster, it really doesn’t, and it just crowds your mind with a thousand different thoughts. By “drama,” “vanity,” and “complaint,” Aurelius generally means that you shouldn’t dwell on how hard it is to focus. Just try it, and if you fail, that’s totally fine – the next quote has advice for that too.

XXV.Step 25- Repeat, Repeat, Repeat, Repeat, Repeat. Repeating is the Mother of All things. This helps to remember, once you constantly repeating and do it on daily or Weekly Basis.

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 11: Pre Deep Work Routine

- 1. Rule 1- Set Up Pre Study Routine: Have you ever watched an athlete or sportsperson prepare for an event? They tend to have a set routine. Stretch in a certain way and a certain order, put their socks on at a certain moment, say a small prayer, talk to themselves with their eyes closed.**
- 2. Rule 2-Do The Focus Training on Daily Basis. Train Your Focus Before Doing Deep Work, Do The Training On Daily Basis In The Morning:**
 - I. Step 1-Training for Focus: Put Away Phone for 2-10 minutes. Sit Down and Pick a point on the object or wall, ideally an object should be the same distance placed to which you going to that work and stare at it, you are allowed to blink, and just try and relax, while maintaining visual focus for 2-5 minutes on the Object. As Your mind Starts to Drift, every once in a while, the mind understands that there is something you need to do, and you do not want to do it, or you can't focus, you will find is it's incredibly boring and agitating, like most things you need to focus on, and having hard time focusing on. What you will find is that it carries over to a really terrific ability to Read, Study, Listen and Deep Work. And You start to notice those internal signals. There is something you need to do, and you do not want to do it, or you can't Focus. Chances are You just have not really taught your brain, how to focus. So Start with your visual focus, and then let your mental focus follow that. After doing this Focus Training for 2 to 5 Minutes, then move into the work that you are about to do and really encourage yourself to do that.**
 - II. Step 2-Practice memorising a deck of cards.**
 - III. Step 3-Learn a song or poem by hard.**
 - IV. Step 4-Commit a list of words in a foreign language to memory.**
 - V. Step 5- Memorize the order of a stack of books.**

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Stage 12: Understand About Focus and Hard Focus.

1. Rule 1-Focus — the ability to concentrate all your limited talents on whatever's critical at the moment. Without that you can't accomplish anything of value.
2. Rule 2-Fortunately [sustaining focus for a long period of time] can be acquired and sharpened through training. His suggestion is to “sit down every day at your desk and train yourself to focus on one point.” To Marukami, training to write for four to five hours each morning was no different than training for the marathon that he's run every year for the past two decades. To me, this student is like Murakami's untrained novelist. School work, like any work that requires demanding thinking, is tiring. After a grace period of maybe 20 – 30 minutes, your mind starts to disengage. In [the red book](#), I compare the sensation to a weight descending inside your skull. Your energy fades and you begin to experience a desperate craving for novel stimulation. Nothing in the world seems more tempting than to go seek such stimulation — to check your e-mail, or sift through your Facebook feed like a hyper-extroverted gold prospector.
3. Rule 3-To succeed as a student (or a novelist) you have to fight that feeling and keep working. I call this ability *hard focus*. Fortunately, as Marukami explained, this deficiency can be remedied in the same way that a runner builds his endurance: you have to try to push yourself, each day, a little farther than is comfortable. Over time, your threshold raises. Systematically increased the amount of time I would force myself to work continuously without a break to seek unrelated stimulation. This culminated in my current schedule in which I write for 2 – 3 hours, take a break for lunch, e-mail, and exercise, and then work on my thesis for 2 – 3 hours, before finishing for the day.

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Stage 13: Being Focus and Doing Deep and Hard Work.

1. Rule 0- Use Steps in Choosing Topic and Learning From Rules of Reading

VI. Step 1: Part 2: Steps In Choosing Topic, Skimming The Books, Articles Debate, Discussion For Deep Work Or Deep Study Or Bible Study.

- A. Step 5-How To Become Polymath. Page 25.**
- B. Step 6-Choose The Topic. Pages 26-35.**
- C. Step 7-Three Questions to Ask Yourself Before Saying YES to a New Commitment. Pages 36.**
- D. Step 8-What Tools I Will Use For Learning? Page 37.**
- E. Step 9-Narrow Down Subject or Topic. Pages 38-39.**
- F. Step 10-Information Overload: Why we're facing it and how to handle it. Pages 40-41.**
- G. Step 11-Compile Resources And Create Curriculum. Page 42.**
- H. Step 12-Filter Resources. Pages 43.**
- I. Step 13-Choose A Book, Article, Talk, Discussion, Debate, Speeches, Research, Newspaper, Journal And Give The Reason of The Choice. Pages 44-46.**
- J. Step 14 Skimming: Intelligently Skimming Through The Book or Text. VERY FAST READING AND SKIMMING Pages 47-51.**
- K. Step 15- Find Out What Kind of Resource is this? Pages 52-53.**

VII. Step 2: Part 28: Learning and Create Learning Curriculum.

- A. Step 191-Books For Studies. Pages 2123-2124.**
- B. Step 192-Classical Education Curriculum. Page 2125-2127.**
- C. Step 193- UltraLearning Pages 2128-2247.**
- D. Step 194- How To Be Straight A Student. Pages 2248-2320.**

- 2. Rule 1-Deep Work is ability to focus without distraction on a cognitively demanding task.** You Giving Your full attention. Without Distraction Piece is the most important part, and this means no Context Shifting, No Multitasking. Example When I am reading a book, I am not going to open my Email Box to glance every now and then. This creates new value, improve skills and Hard to Replicate. If there is distraction, this is not deep work, if not hard, then this is not deep work.

- I. No Context Shift At all While Performing Deep Work.**
- II. No Glancing.**
- III. No multitasking.**
- IV. No Distraction.**

3. Rule 2- Deep Work Timer

- I. Step 1-Have Deep Work Timer. If I get up for Bathroom or Coffee, then the Deep Work Timer is stoped, Once Back, Turn On Timer. Deep Work Hours Only counting, when I actually Do Deep Work.**

4. Rule 3- Study Time or Deep Work.

- I. Step 1-Our bodies follow what are known as ultradian rhythms-ninety-minutes periods at the end of which we reach the limits of our capacity to work at highest level.**

- II. Step 2- Study Or Deep Work intervals Maximum 45-90 Minutes.**

- III. Step 3- Take Break 5-10 Minutes To Do:**

- A. Coffee.**
- B. Walk Around.**
- C. No Phones.**
- D. Do the Training for your legs.**
- E. Do the training for Eyes.**

- IV. Step 4-Big Break 1-2h.**

- A. Take 20 Minutes Nap within 4 Hours, after Triggering Learning, they learn much faster, In other words the brain rewires much faster.**

- V. Step 5- Spend in Deep Work Between 1-14h a Day.**

5. Rule 4- Take Notes By Using One Of The Following Methods:

I. Use Cornell Note Taking.

- A. Name.**
- B. Date.**
- C. Class and Period.**
- D. Topic.**
- E. Essential Question at the Top of Page.**
- F. Questions and Main Ideas on the Left Page of the Blank Page.**
- G. Notes On the Right Page of the Blank Page.**
- H. Summary at the bottom of the page.**

II. Analytical Learners: Outline/ List. Good Works well for recording terms, definitions, facts and sequences.

III. Sentence Method: The goal is to jot down your thoughts as quickly as possible. Works well in meetings or lectures that lack organization. Use when information is being presented very quickly.

IV. SQ3R (Survey, Question, Read, Recite, Review). Use for dense readings (like business books, text books, whitepapers, etc.). You start the process by skimming the material for bolded text, images, diagrams and summaries in order to produce a list of headlines or main topics.

V. Mapping. Mapping is a nonlinear system of note-taking that resembles a tree and root structure. Ideas stem from one major concept and are connected by lines (or “branches”). As a note-taking system, mapping works particularly well for visual learners, but it can also be a great tool for analytical-thinkers who have trouble brainstorming because it allows you to make connections you’d otherwise miss with a linear format. Works well for planning essays, recording meetings. Use for big-picture brainstorming sessions.

VI. Smart Wisdom. It’s a tool optimised for active listening in lecture situations. Instead of taking notes in full sentences, you record only keywords and place them in a chain that maps the thought process.

VII. Diagram And Processes. Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.

VIII. Diagram And Processes. Diagrams help visually represent content. However they are not always versatile. A diagram usually serves one purpose best, so selecting the right diagram will make your notes more meaningful.

IX. Charting. Charting is a great note-taking strategies when you need to compare and contrast ideas. The most widely used charting method is the Pro and Con list.

X. CERC.

- A. Claim.
- B. Evidence.
- C. Reasoning.
- D. Conclusion.

XI. Use Smart Notes.

- A. What is big Idea.
- B. Question.
- C. Evidence.
- D. Conclusion.

- 6. Rule 5-To “do less” is to slow down. Focus on one activity at a time. Do less total activities. Be willing to pass through occasional interludes of full non-productivity.**
- 7. Rule 6- Tools Will Be Used For Focus, Pay Attention and Concentration For Any Deep Work, Studies, Learning, Thinking and Writing.**
 - I. Step 1-Use, Listen, Follow and Apply Every Steps of Feynman Technique. Step 161-Feynman Technique. Pages 2021-2033.**
 - II. Step 2- Use Rules of Reading**
 - A. Skimming:**
 - **Step 14-Intelligently Skimming Through The Book. Pages 47-51.**
 - B. Entertainment**
 - **Method 1-Speed Reading. Pages 59-64.**
 - C. Methods for Basic Knowledge For Deep Work or Bible Study.**
 - **Method 1-Survey, Question, Read, Recite, Record, Reflect (SQR4). Pages 66-67.**
 - **Method 2-Use 80/20 Principle For Reading. Pages 68.**
 - **Method 3-Preview, Question, Read, Summary,Test (PQRST). Page 69.**
 - **Method 4-Flip Through Pages and Analyse. Page 70.**
 - **Method 5-Devotional Bible Study by Using Devotional Books. Pages 71-72.**
 - **Method 6-Devotional Bible Read. Pages 73-74.**

D. Deep Work, Deep Study, Bible Study or Any Book- SLOW Reading- Complex Text.

- **Method 1-Chapter Summary Method. Pages 143-147.**
- **Method 2-Character Quality Method. Pages 148-160.**
- **Method 3-Thematic Method. Pages 161-163.**
- **Method 4-Biographical Method. Pages 164-176.**
- **Method 5-Topical Method. Pages 177-180.**
- **Method 6-Word Study Method. Pages 181-189.**
- **Method 7-Book Background Method. Pages 190-194.**
- **Method 8-Book Survey Method. Pages 195-205.**
- **Method 9-Chapter Analysis Method. Pages 206-215.**
- **Method 10-Paragraph Study. Pages 216-229.**
- **Method 11-Verse by Verse Analysis Method. Pages 230-234.**
- **Method 12-Book Synthesis Method. Pages 235-238.**
- **Method 13-Theological Study Method of Bible Study. Pages 239-245.**
- **Method 14-Studying Bible Prophecy. Pages 246-259.**
- **Method 15-Typological Study Method. Pages 260-262.**
- **Method 16- John MacArthur Way Bible Study. Pages 263-268.**
- **Method 17-Inductive Bible Study Method. Pages 269-296.**
- **Method 18-BIBLICAL HERMENEUTICS. Pages 297-302.**
- **Method 19-Theological Group of Principles. Pages 303-306.**
- **Method 20- How To Read A Book Pages 307.**

E. Deep Work, Shallow Work, Bible Study, Analysis of Text, Research, Investigative Journalism, Investigation and Syntopicon, Mixed Method.

- **Method 21- How To Read A Book By Mortimer Adler Various edition Pages 341.**
- **Method 22-How To Read A Book For Various Books. Pages 342-600.**
- **Method 23- Syntopicon Pages 601-642.**
- **Method 24-The Craft of Research. Pages 644-882.**
- **Method 25-Research Books can Be Used. Pages 883-897.**
- **Method 26-Investigative Journalism. Pages 898-923.**
- **Method 27-Mixed Methods of Rules of Reading. Pages 924-942.**

F. Part 6: Analysis Of Book By Using External Sources.

- **Step 40-Aids To Reading, Listening, Conversation, Debate. Pages 944-957.**
- **Step 41-Commentaries On Book and What Are Other's Take on? Pages 958.**
- **Step 42-Review Of The Book. Pages 959-962.**
- **Step 43-Analysing Author and Publisher and Audience. Pages 963-966.**
- **Step 44-How To Spot Bad Science. Pages 967-977.**
- **Step 45-Content Of Critical Review. Pages 978-979.**
- **Step 46-The Funding of Book, Author, Publisher, Speaker, Presenter, School, Government, Politician, Companies, Influencer, Newspaper, Journalist or Other Person. Pages 980-1017.**
- **Step 47-Was There Propaganda and Conspiracy Theories In the Book and Propaganda Analysis. Pages 1018-1025.**
- **Step 48-What did I take From the Book. Pages 1026-1031.**
- **Step 49-Implication of The Book. Pages 1032.**
- **Step 50-My Arguments For Or Against The Author, Writer, Speaker, Debater. Pages 1033-1035.**
- **Step 51-Improve My Arguments and I would Have Another Chance, how would I Approach. Pages 1036-1037.**

- **Step 52-Basic Exploration, Experimentation and Practice. Pages 1038.**
- **Step 54-Simplify The Topic For Myself First. Pages 1055.**
- **Step 55-Reflect, Refine And Simplify. Pages 1056.**
- **Step 56-Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge. Pages 1057-1059.**

G. Part 8: Simplify Explanation and Creating Analogies.

- **Step 70-Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive. Pages 1314.**

H. Part 9:Reflect, Refine and Simplify.

- **Step 71-Reflect, Refine, and Simplify. Page 1316.**

I. Part 10:Organise And Review.

- **Step 72-Organise And Review. Pages 1318.**

J. Part 11:Deep Work and Application.

- **Step 73- The Focus to Say No. Pages 1320.**
- **Step 74-Half Life.The Decay of Knowledge and What to Do About It. Pages 1321-1329.**
- **Step 75-Power of I do not know. Pages 1330.**
- **Step 76-Application. Pages 1331-1339.**
- **Step 77-Letting The World Do The Work For You. Pages 1340-1346.**

III. Step 3- Do And Practice Thinking, Logic and Mental Model For Deep Work, Studying, Learning and Personal Growth.

A. Part 7: Thinking, Logic and Mental Model For Deep Work or Deep Study, Or Bible Study

- **Step 57- Slow Down. Pages 1061-1063.**
- **Step 58- NOT MULTITASK. Pages 1064.**
- **Step 59-You Have Required To Do The Work For Thinking and Applying Mental Tool Models. Pages 1065-1080.**
- **Step 60-Why Critical Thinking, Logic, Thinking and Mental Tools Are Important? Pages 1081-1083.**
- **Step 61-Intradisciplinary Thinking. Pages 1084-1125.**
- **Step 62-Multidisciplinary Thinking. Pages 1126-1168.**
- **Step 63-CrossDisciplinary Thinking. Pages 1169-1211.**
- **Step 64-Interdisciplinary Thinking. Pages 1212-1254.**
- **Step 65-Transdisciplinary Thinking. Pages 1255-1298.**
- **Step 66-Journaling. Pages 1299.**
- **Step 67-Letting The World Do The Work For You. Pages 1300-1305.**
- **Step 68-Journaling. Pages 1306.**
- **Step 69-Letting The World Do The Work For You. Pages 1307-1312.**

IV. Step 4- Do Decision Making For Deep Work, Studying, Learning and Personal Growth.

A. Part 12: Deep Work and Decision Making.

- **Step 78- Slow Down. Pages 1348-1350.**
- **Step 79-NOT MULTITASK. Pages 1351.**
- **Step 80-You Have Required To Do The Work For Decision Making. Pages 1352-1367.**
- **Step 81- Use Rules of Reading for Decision Making 1368-1369.**
- **Step 82-Decision Making Books. Pages 1370.**
- **Step 83-Decision Making. Pages 1371-1408.**
- **Step 84- Thinking, Logic and Mental Model. Pages 1409.**
- **Step 85-Letting The World Do The Work For You. Pages 1410-1415.**
- **Step 86-Journaling. Pages 1416.**
- **Step 87-Letting The World Do The Work For You. Pages 1417-1422.**

V. Step 5- Communication For Deep Work, Studying, Learning and Personal Growth.

A. Part 13:Deep Work and Communication..

- **Step 88- Slow Down. Pages 1424-1426.**
- **Step 89-NOT MULTITASK. Pages 1427.**
- **Step 90-You Have Required To Do The Work For Communication. Pages 1428-1443.**
- **Step 91- Use Rules of Reading For Communication. Pages 1444-1446.**
- **Step 92-Communication Books. Pages 1447-1450.**
- **Step 93- Thinking, Logic and Mental Model. Pages 1451.**
- **Step 94-Letting The World Do The Work For You. Pages 1452-1457.**

VI. Step 6-Strategy and Tactics.

A. Part 16:Deep Work, Shallow Work, Strategy and Tactics.

- **Step 111- Slow Down. Page 1603-1605.**
- **Step 112-NOT MULTITASK. Pages 1606.**
- **Step 113-You Have Required To Do The Work For Strategy and Tactics. Pages 1607-1622.**
- **Step 114- Use Rules of Reading to Analyse The Topic For Strategy and Tactics. Pages 1623-1625.**
- **Step 115-Strategy and Tactic Books. Pages 1626-1627.**
- **Step 116-A Primer on Strategy. Pages 1628-1633.**
- **Step 117-Strategy vs. Tactics: Why the Difference Matters. Pages 1634-1637.**
- **Step 118-Thinking, Logic and Mental Model. Pages 1638.**
- **Step 119- Tiny Gains. Massive Results. Pages 1639-1640.**
- **Step 120-Letting The World Do The Work For You. Pages 1641-1646.**

VII. Step 7 WRITING

A. Part 15:Deep Work and Writing.

- **Step 103- Slow Down. Page 1494-1496.**
- **Step 104-NOT MULTITASK. Pages 1497.**
- **Step 105-You Have Required To Do The Work For Writing. Pages 1498-1513.**
- **Step 106- Use Rules of Reading to Analyse The Topic For Writing. Pages 1514-1516.**
- **Step 107-Writing Books. Pages 1517-1521.**
- **Step 108- How To Become Straight A Student. Pages 1522-1594.**
- **Step 109- Thinking, Logic and Mental Model. Pages 1595.**
- **Step 110-Letting The World Do The Work For You. Pages 1596-1601.**

VIII.Step 8- Performance.

A. Part 20:Deep Work and Performance.

- **Step 148-Performance Books. Pages 1957.**
- **Step 149- Tiny Gains. Massive Results. Pages 1958-1959.**
- **Step 150-The Ultimate Deliberate Practice Guide: How to Be the Best. Pages 1960-1980.**
- **Step 151-Review, Reflection, Review and Accountability. Pages 1981-1982.**
- **Step 152-Improvement. Pages 1983**
- **Step 153- Feedback System In Place. Pages 1983.**
- **Step 154-Repeat. Pages 1984.**
- **Step 155-Letting The World Do The Work For You. Pages 1985-1990.**
- **Step 156- Spend 5k-10k Hours On subject to Become Expert. Pages 1991.**

IX. Step 9- Review, Journaling and Visualisation

A. Part 25: Journaling and Review of 6 Month And Month.

- **Step 171-Materials Needed and Listen And Follow Rules of Reading For Journaling and Review of 6 Month And Month. Pages 2083.**
- **Step 172-Reflect. Pages 2084.**
- **Step 173-Analyse Strength and Weaknesses. Pages 2085.**
- **Step 174- Analyse Threats and Opportunities. Pages 2085.**
- **Step 175- Improvement. Pages 2085.**
- **Step 176- Steps to Take To Do Better and Improve. Pages 2086.**
- **Step 177- Ideas and Gratitude. Pages 2086.**

B. Part 26: Journaling and Review of Week.

- **Step 178-Materials Needed and Listen And Follow Rules of Reading For Journaling and Review of The Week. Pages 2088.**
- **Step 179-Reflect. Pages 2089.**
- **Step 180-Analyse Strength and Weaknesses. Pages 2090.**
- **Step 181- Analyse Threats and Opportunities. Pages 2090.**
- **Step 182- Improvement. Pages 2090.**
- **Step 183- Steps to Take To Do Better and Improve. Pages 2091.**
- **Step 184- Ideas and Gratitude. Pages 2091.**

X. Step 10- Use Flashcard. Flashcards are an amazing way to learn paired associations between questions and answers.

XI. Step 11- Active Recall. After learning something try to write all that you can remember on a piece of paper. Actively recalling the information WITHOUT ANY HELP. If you are capable of reproducing the information verbally, in your own words without looking at the textbook, you got it.

XII.Step 12- The Question Book Method. Take notes by rephrasing rather than writing down the exact wordings.

XIII.Step 13-Self-generated challenges. Create challenges for yourself to solve later.

XIV.Step 14-Closed-book learning. Limit your ability to look for hints.

XV.Step 15-Don't give up on hard problems easily. The more you push through hard problems, the easier your problem-solving skills get.

XVI.Step 16-Prove things to understand them. Your understanding can be an illusion and the only way to know for sure is to prove your knowledge of things.

XVII.Step 17-Always start with a concrete example. Humans learn mostly by doing so it is important to create concrete examples.

XVIII.Step 18-Don't fool yourself. Ask lots of questions to check your understanding.

XIX.Step 19- Train Memory:

- A. Mom (motivation, observation and Method).**
- B. Linking words to Images (Visualisation).**
- C. Linking new information to old information (Association).**
- D. Add emotion.**
- E. Creating a story to link sequence of words.**
- F. Use LOCI story method. The loci story method is basically the story method with one additional feature: Your story involves you going through different parts of a setting (such as a house), and each setting has one object that represents something in the list your trying to memorize. The benefit of this method is that you don't have to come up with a new story every time. You just use the same story, except you change the items in each setting. For example, you can imagine a big mansion with 10 rooms, and during the story you walk through all 10 rooms. In each room you find a different object, which you can change to suit the list you're trying to memorise. Again, you have to make the story vibrant by using visualisation, association, and emotion.**

8. Rule 7- In the Exam

I. Step 1- Use How To Be Straight A Student.

A. Step 194- How To Be Straight A Student. Pages 2248-2320.

II. Step 2 Plan-What you will write before writing anything down. It is extremely important to review the entire exam and skimming through all the questions. This will allow your brain to think about the topics and you'll have a better understanding of the overall difficulty and length of the exam. The next thing that you need to do is to formulate a rough schedule for answering the questions. If you are pressured by time, you should keep a few minutes as a safety buffer and distribute the remaining time as needed among the questions. By doing this, you ensure that you have enough time to go through the entire exam and that you won't get too absorbed by a single difficult question.

III. Step 3- Proceeding- Starting with the questions you can answer easily. The proceeding to answer the more difficult questions.

IV. Step 4- Proofreading- leaving yourself time at the end to go over everything. Check all the answers and fix any typos and double check your grammar. If you have spare time, you can check whether or not you might be able to improve any of your answers.

I Will Read or Listen Like AudioBook On Phone, On Daily Basis And Apply TO The Task, Deep Work, Deep Studies, Learning and Studies.

Stage 14:Post Deep Work.

Stage 5: Rules and Step To Take After Deep Work is Done.

- 1. Rule 1- Clean up Your Desk, and Put everything in their Places.**
- 2. Rule 2- Set Time For Family and Family Stuff.**
- 3. Rule 3- Set Time for Bible Read or Listen and Prayer.**
- 4. Rule 4- Set Time For Meditation.**
- 5. Rule 5- High Quality Leisure During Downtime. The Reason Prioritise Downtime?**

- I. Downtime Improves Our Thinking - Have you ever hit a roadblock in your work and ended the day in frustration, only to come back the next day with a perfectly formed solution? This is the power of the pause. Allowing your mind to rest lets you work through complex challenges with greater clarity than if you powered on empty. As Newport notes, “Providing your conscious brain time to rest enables your unconscious mind to take a shift sorting through your most complex professional challenges.”**
- II. Downtime Replenishes Our Ability to Practice Deep Work - Deep Work makes the case that “you can restore your ability to direct your attention if you give this activity a rest.” After work, don’t direct your attention to high-priority tasks. Instead, give your mind uninterrupted rest through activities like gathering with friends or family, cooking, or walking in nature. Adversely, sneaking in extra emails or group chat conversations does not allow for true rest.**
- III. Our Ability for Deep Work is Finite - Unfortunately, as valuable as deep work is, it can’t be done in unlimited quantity. Newport suggests the upper limit for deep work per day is four hours. Beyond this, our ability to direct focused attention diminishes. Given this, there is plenty of time in the evening to make room for the downtime that will serve your deep work sessions the following day.**

IV. List Of Down Time High Leisure Activities:

- **Walk.**
- **Run.**
- **Cooking.**
- **Spending Time With Family.**
- **Repair things.**
- **Read.**
- **Get New Hobby.**

6. Rule 6-Reviewing, Journaling and Visualisation. Use Rules of Reading to review My Day. If you've had a negative week, make changes to your schedule to cut out factors that led to it.

7. Rule 7- Set Time For Auditing Time Spent. Audit how you're spending your work time. Reflect on and tweak your schedule: Newport suggests reviewing the accuracy of your time blocks at the end of each day. This will help you set more accurate goals and expectations in the future. Ask Questions.

I. Did I reach My Goal For Number of Hours Spent On Deep Work This Week? Yes or No.

II. How Many Items ON My Daily Plan Did I complete?

8. Rule 8- Exercise On Daily Basis.

9. Rule 9-Eat Right: You required energy for you to last long time, stamina, efficiency.

I. Use Keto Diet.

II. Check The Food and The Minerals I need to intake.

III. Do Intermittent Fasting. Between 18/6 to 23/1

10. Rule 10-Sleep Helps To Learn and Focus: Just like downtime helps your brain process the information you've been absorbing, sleep does that multiplied manyfold. Sleep is essential. We simply cannot overstate the importance of good sleep. The Best Thing that Anyone Can Do for Mental Health, Physical Health and Performance in Athletic or Cognitive Endeavours is to make sure that you are getting enough Quality Sleep, enough of the time for you.

- I. Step 1-Avoid viewing bright lights—especially bright overhead lights between 10 pm and 4 am.**
- II. Step 2-If you wake up in the middle of the night (which, by the way, is normal to do once or so each night) but you can't fall back asleep, consider doing an NSDR protocol when you wake up.**
- III. Step 3-Expect to feel really alert ~1 hour before your natural bedtime.**
- IV. Step 4-Keep the room you sleep in cool and dark and layer on blankets that you can remove.**
- V. Step 5-Drinking alcohol messes up your sleep. As do most sleep medications.**
- VI. Step 6-Kids (and indeed all of us) have changing sleep needs over time. Adjust accordingly.**

Two Core Abilities for Thriving in the New Economy

- 1. The ability to quickly master hard things.**
- 2. The ability to produce at an elite level, in terms of both quality and speed.**

This ability to learn hard things quickly, of course, isn't just necessary for working well with intelligent machines; it also plays a key role in the attempt to become a superstar in just about any field—even those that have little to do with technology. To become a world-class yoga instructor, for example, requires that you master an increasingly complex set of physical skills. To excel in a particular area of medicine, to give another example, requires that you be able to quickly master the latest research on relevant procedures. To summarize these observations more succinctly: If you can't learn, you can't thrive. Now consider the second core ability from the list shown earlier: producing at an elite level. If you want to become a superstar, mastering the relevant skills is necessary, but not sufficient. You must then transform that latent potential into tangible results that people value. Many developers, for example, can program computers well, but David Hansson, our example superstar from earlier, leveraged this ability to produce Ruby on Rails, the project that made his reputation. Ruby on Rails required Hansson to push his current skills to their limit and produce unambiguously valuable and concrete results. book: The two core abilities just described depend on your ability to perform deep work. If you haven't mastered this foundational skill, you'll struggle to learn hard things or produce at an elite level